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Disabling Patentability for Skill-Based Inventions: Aligning Patent Law with Competition Policy

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ABSTRACT

This Article proposes that allowing patents on a new trans-industry class of inventions, called skill-based inventions, is harmful to innovation. Skill-based inventions are defined as those inventions that rely upon the skill of the user for their efficacy. The primary argument advanced is that allowing patents on these inventions would significantly interfere with the natural development of innovation through competition on the free market. The federal circuit can surgically bar these inventions from patentability using a re-invigorated version of the § 112 enablement requirement.
INTRODUCTION

Whereas most provisions of the Constitution were implemented only after heated debate, the Patent and Copyright Clause was adopted unanimously.\(^1\) Few could question either its laudable goal of promoting innovation or its tried and true means of achieving that goal by granting patents.\(^2\) Accordingly, it passed into law as one of the least debated and most supported Constitutional provisions.\(^3\)

The main function of the patent laws is to keep the free market innovation machine running smoothly. The free market is an arena in which only those businesses that can provide the best services and innovative products at the lowest costs will be able to survive. Patents serve two important functions: first, they ensure that businesses play fair in this competitive arena by inventing new technologies rather than stealing them from their competitors; and second, they force businesses to disclose new innovations in order to obtain a temporary patent monopoly. However, as the patent laws have evolved over time the explosion of new patenting activity and the rigidity of the new patent laws have revealed that the patent laws can serve as not only a lubricating oil in the great engine of competition, but as a clotting sludge as well.

The original Patent Office was run by three cabinet officials who also served as patent examiners.\(^4\) In the first three years of its existence only 55 patents were issued.\(^5\) Since then, over six million patents have been issued, and the number increases daily. Intellectual property has become increasingly important in the new economy. As with any valuable commodity, as its value has increased, so has the amount of litigation surrounding its ownership. This litigation, as well as the offensive and defensive patenting activity that it entails, has been grinding the gears of the free market innovation machine.

The increase in litigation has also led to the need for a more formalistic and bright line patent law doctrine. In response, Congress created the Federal Circuit Court of Appeals to handle all cases arising under the patent laws. The federal circuit has added a reliability and predictability to patent law that did not exist before,

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2. Id.
3. Id.
4. Id. at 19.
5. See CHISUM ET AL., supra note 1, at 19 n.75.
mainly by enforcing a regime of formalistic rules. At the same time, patent rights have grown notably stronger since the inception of the federal circuit, because these formalistic rules necessarily come at the expense of the flexibility that is necessary to reject technically sound but conceptually deficient patents. These strengthened patent rights can deter innovation-producing competition.

As the number and strength of patents has increased so too has their capacity to interfere with the engine of competition that they were initially created to augment. To study this issue Congress commissioned the Federal Trade Commission (FTC) to determine whether patent law was working properly with competition to spur innovation. In 2003, the FTC released its results, noting that while patent law as a whole seemed advantageous for innovation, many commentators expressed concern that there were certain "legal standards and procedures that . . . may have anticompetitive effects [and] cause unwarranted market power [that could] unjustifiably increase costs." To address this issue, one of the main recommendations of the report was for the courts to "consider possible harm to competition—along with other possible benefits and costs—before extending the scope of patentable subject matter."

This Article considers these issues for an emerging trans-industry class of inventions that are making their way into the patent system. These inventions, which this Article refers to as skill-based inventions, are those inventions whose efficacy is largely determined by the skill of the user. They can include, but are not limited to: business plans, financial tactics, medical procedures and sports moves. Before these inventions become entrenched in the patent system, it should first be considered whether patents are required to spur innovation in this area. If such patents are necessary, then their costs and benefits should be evaluated.

9. FTC Report, supra note 8, at 14 (capitalizations removed).
10. This definition is elaborated upon and discussed in detail infra at pp. 32-47. While skill-based patents can be truly trans-industry, I address them mainly in the context of the four aforementioned classes. Furthermore, not all inventions that fall into this category are necessarily skill-based.
Skill-based inventions represent an area of invention that has flourished in the absence of patents. Competition in the free market has been effective in the absence of patents because skill-based inventions are by their very nature difficult to misappropriate or conceal from the public. Furthermore, the benefit of patents in this area is dubious since patent disclosures cannot communicate the skill necessary to properly utilize the invention. The arguments that this Article develops ultimately hold that the scope of patentable subject matter should not be extended to skill-based inventions.

However, even after these policy issues are successfully argued, patents in this area cannot be denied by the federal circuit unless a sound legal basis exists. Fortunately, the patent laws already have a requirement that supports the exclusion of these inventions from the patent system. The § 112 enablement requirement holds that a patent's written disclosure must enable a person having ordinary skill in the art (PHOSITA) to use the invention. The written disclosure of a skill-based invention can never meet this requirement because the requisite skills needed for a skill-based invention cannot be conveyed through mere disclosure. As such, the enablement requirement will never be met and the grant of a patent can always be denied. The validity of skill-based patents as skill-based patents has not yet been litigated and therefore the issue is ripe for federal circuit determination.

This Article develops an argument against the granting of skill-based patents in three parts. Part One explores the roots of innovation and notes that it is primarily driven by competition. This Part concludes with a review of the results of several empirical studies which reveal that patents are only beneficial for innovation some of the time. Part Two defines the area of skill-based inventions, explores how competition acting alone can spur innovation and demonstrates that patents can interfere. Finally, Part Three examines the legal rules in this area and concludes that the contours of the enablement requirement support the removal of skill-based inventions from the realm of patentability.

I. ROOTS OF INNOVATION

The value of innovation in modern society can hardly be questioned. Scholars have speculated that innovation has lead to at

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11. See infra Part III.B for the development of this argument.
least a twenty-fold increase in real wages in the past century.\textsuperscript{12} Despite its proven value, the causes of innovation still remain somewhat of a mystery; one that this Article does not purport to solve.\textsuperscript{13} Instead, this Part is only intended to develop a general framework that explores how competition in the free market is the core generator of innovation upon which the patent laws are intended to function.

\textbf{A. First Principles of Patent Law}

Congress shall have [the] Power to . . . promote the Progress of Science and useful Arts, by securing for limited Times to Authors and Inventors the exclusive Right to their respective Writings and Discoveries.\textsuperscript{14}

Clearly, the mandate of the Patent Clause commands that patent law and policy should be framed in such a manner as to maximize the progress of science and the useful arts. Boiled down to its essence, a principled approach to the patent laws asks the most basic of questions with regards to the issuance of a patent: would the technological development of society occur in roughly the same time frame but for the grant of this patent?\textsuperscript{15} When properly applied, this simple test perfectly operationalizes the constitutional mandate of the patent laws.\textsuperscript{16} Unfortunately, this test can only serve as a meta-tool

\begin{quotation}

13. See, e.g., Mark A. Lemley, \textit{Reconceiving Patents in the Age of Venture Capital}, 4 J. SMALL & EMERGING BUS. L. 137, 139 (2000) [hereinafter Reconceiving Patents] ("The problem is, quite frankly, that we don't have a clue how innovation works."). While Professor Lemley's remarks are an exaggeration, they serve to highlight the conflicting views on the generation of innovation.


15. See Glynn S. Lunney, Jr., \textit{E-Commerce and Equivalence: Defining the Proper Scope of Internet Patents Symposium: E-Obviousness}, 7 MICH. TELECOMM. TECH. L. REV. 363, 412 (2005) (stating an efficiency test substantially identical to the "but for" test without being called such).

16. This form of the "but for" test is different from the one discussed in the FTC report. \textit{See FTC Report, supra} note 8, ch. 1, at 10 ("[O]ne could ask whether the claimed invention would have emerged in roughly the same time frame "but for" the prospect of a patent"). This Article has tweaked the definition so that patents that conform to the test are always in the best interest of society. The test as formulated in the FTC report had one flaw, which the report noted. \textit{See id.} ch. 4, at 7, n.37 ("[a]n invention worth developing solely because of competitive advantages conferred by its patent rights could raise exclusionary concerns, yet would pass through a 'but for' screen"). By reformulating the test it can be made to consider the overall benefits and harms of a patent relative to the world sans that patent. This consideration necessarily includes the costs associated with exclusionary tactics, along with any and all other costs and benefits of the patent. Therefore, this reformulated "but for" test \textit{by definition} can
\end{quotation}
for analyzing patent law because the conceptual nature of the test makes it impossible to apply on a case-by-case basis.\(^{17}\)

Although impossible to apply in every case, this test must serve as the guiding principle for the formulation of patent laws. The test requires that patents be issued only where they will improve the technological development of society. Inherent in this standard is the idea that patents must be evaluated not only for the benefits that they bring but also for the costs that they impose on the natural competitive process.

The main benefit of the patent laws is to deal with the non-exhaustible and non-excludable nature of information. As a non-exhaustible good, the use of information by more than one person has no cost. This is precisely why the spillover benefits from information are so high and can lead to explosive economic growth.

As a non-excludable good, information cannot be fenced off in the way of land or other tangible goods. This creates an appropriability problem in which it becomes difficult for innovators to recover the costs of invention. Patent laws mitigate this problem by allowing innovators to legally exclude others from using their invention for a limited amount of time so that they may recoup their costs and even extract a profit.

In solving the appropriability problem, the patent laws are used to create four main incentives.\(^{18}\) First, they create the incentive to invent by allowing inventors to reap the possibly substantial returns from their invention for a limited period of time. Second, they create the incentive to disclose innovation to society, by requiring disclosure of an invention as part of the patenting process. Third, they create an incentive to commercialize an invention. The patent laws allow the initial inventor to commercialize their invention without fear of misappropriation, and they allow the inventor to easily transfer their invention and allow someone else to bring it to market. Finally, the

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\(^{17}\) Id. ch. 1, at 11. This is especially true of the reformulated “but for” test I have proposed here since this test performs all of the work of an ideal patent law. Professor Lunney also attempted to transform the obviousness requirement into a modified version of this test. While his idea certainly shed light on the way we would like our obviousness requirement to function, the obviousness test is not capable of shouldering this hefty burden alone and his test could not be adapted because it was nearly impossible to apply. See Lunney, supra note 15, at 413 (Professor Lunney used the creative investment fraction as a proxy for the “but for” test).

\(^{18}\) See CHISUM, ET AL., supra note 1, at 66-71 for a general discussion.
patent laws create an incentive to innovate by forcing new inventors to design around pre-existing patents.\textsuperscript{19}

By giving inventors the right to exclude, the patent laws also reduce transaction costs by solving Arrow's paradox. The paradox can be seen from both the perspective of a buyer and seller of an invention. A buyer of an invention does not know the value of the invention until they have had a chance to evaluate it, but they cannot evaluate the invention without first acquiring it. A seller cannot trust a buyer to evaluate their invention for fear that the buyer may misappropriate it. Patent rights solve this paradox by giving an inventor the right to exclude the buyer. Should the buyer refuse to live up to their end of the bargain, the seller can enforce their patent in court and recover steep damages.

The patent laws are not without their costs. The most obvious harm they cause is preventing the widespread use of information. By their very nature, non-exhaustible goods are most efficient in the short-term when they are utilized by all, because the costs of reproduction are trivial. By giving the right to exclude, patents necessarily prevent inventions from being put to their value maximizing usages.

This is not the only way that patents can impose costs on society. Patents also impose secondary costs that vary through different industries and categories of invention.\textsuperscript{20} Some categories, such as business methods, may be prone to bad patents because of the inexperience of the PTO in those areas.\textsuperscript{21} Patents that are used for purely strategic defensive or offensive purposes may damage some industries, such as the computer hardware and software industries.\textsuperscript{22} As will be discussed infra, strategic patents can drive up transaction costs and thereby deter innovation. In order for the patent laws to

\textsuperscript{19} As the expense and occurrence of patent litigation has increased, this feature of competition can also stifle creative activity. Inventors may be deterred from designing around inventions by the threat of litigation. Even if the lawsuit has no chance of success, the expense of defending against the lawsuit can be enough to deter innovation.


\textsuperscript{21} See FTC Report, supra note 8, ch. 4, at 39-40.

\textsuperscript{22} See id. ch. 3, at 30-56.
achieve their constitutional mandate, patent policy must carefully weigh both the primary and secondary costs of patents against their benefits. Only then will patents be able to properly augment the main driving force of innovation: competition on the free market.

B. Innovation through Competition

While patent policy plays an important role in creating incentives for innovation, it is not the primary source of innovation. Competition plays the dominant role in encouraging innovative activity. Patents serve as an overlay on the baseline of free competition, not vice versa. Competition has been credited with being the root cause of the explosion of economic growth to which we are all beneficiaries. In contrast, the existence of benefits from patents is not so certain. A study commissioned by the U.S. Congress in 1958 concluded, in the words of one prominent scholar, “if we didn’t have a patent system, it would be irresponsible to create one, but since we have one, it would be irresponsible to eliminate it.” This is not to say that patents are useless, for they can limit free riding on others’ innovations in a way that other protective regimes cannot; it is only to point out that the importance of competition to our economy requires that we fashion our patent policy with the utmost care. This Section explores the various ways that competition can spur innovation in different market structures and by different functional classes. The first Subsection explores competition

24. See, e.g., Cohen et al., supra note 20 (noting that patents were only helpful for discrete inventions); Levin et al., supra note 20 (noting that patents were not necessary in most industries); Edwin Mansfield, Patents and Innovation: An Empirical Study, 32 MGMT. SCIENCE 173 (1986) (this survey of twelve industries and 100 firms found that patents were essential only in the biotechnology and pharmaceutical industries).
25. Bonito Boats v. Thunder Craft Boats, 489 U.S. 141, 156 (1989) (noting that free exchange of obvious and non-novel ideas is the baseline upon which the patent law depends).
26. See, e.g. FMIM, supra note 12, at 1 (“The capitalist economy can usefully be viewed as a machine whose primary product is economic growth. Indeed, its effectiveness in this role is unparalleled.”).
27. Reconceiving Patents, supra note 13, at 139 (citing STAFF OF SENATE SUBCOMM. ON PATENTS, TRADEMARKS & COPYRIGHTS, 85TH CONG., AN ECON. REVIEW OF THE PATENT SYSTEM: STUDY NO. 15, at 80 (Comm. Print 1958) (prepared by Fritz Machlup)).
29. See, e.g., id. at 8 (“This economy is founded on the privilege to compete. That is the fundamental, bedrock principle of our capitalist economy .... We simply must be very concerned when we manipulate out markets to restrain competition.”) (internal quotations omitted) (citation omitted).
in the context of various market structures. The next Subsection addresses some positive and negative features of competition in its role as a generator of innovation.

Before beginning this discussion, it is useful from the outset to distinguish the two main functions of competition: setting prices and spurring innovation. Both of these aspects of competition can suffer harm as a result of patent policy. An overbroad patent policy can not only reduce the efficacy of competition in spurring innovation, as will be described infra, but can damage the ability of competition to find the socially optimal price for goods. In order for competition to function properly as a price setter, patent policy should provide exactly enough incentive for inventors to create socially beneficial inventions; nothing more and nothing less. In the ideal balance of patent incentives and this type of competition, a reduction of incentives would cause the inventor to quit inventing and put his talents to other uses, and any more incentives would allow the inventor to extract additional monopoly rents that are a loss to society.30

This Section focuses on the ability of competition to spur innovation.31 Joseph A. Schumpeter has remarked:

[I]n a capitalist reality as distinguished from its textbook picture, it is not [price] competition which counts but the competition from the new commodity, the new technology... competition which commands a decisive cost or quality advantage and which strikes not at the margins of the profits and the outputs of the existing firms but at their foundations and their very lives.32

So long as consumers are attracted to innovative products, firms must compete with each other to innovate. Innovative firms can appropriate the gains from their innovations using a variety of tactics, one of which is patents. The others include first-mover advantages, learning curve advantages, complementary sales and service efforts, and secrecy.33 Firms that are capable of effective innovation are able

30. See CHISUM ET AL., supra note 1, at 60-61 (noting that overbroad patents which reduce available substitutes allow for the extraction of monopoly rents).

31. For a discussion of the competition which drives innovation, as distinguished from competition which sets prices, see generally 4 PROFESSOR DR. F. DE VRIES LECTURES IN ECONOMICS: THEORY, INSTITUTIONS, POLICY (1982).

32. JOSEPH A. SCHUMPETER, CAPITALISM, SOCIALISM, AND DEMOCRACY 84 (3d. ed. 1962). This paper does not evaluate Schumpeter's ultimate conclusion that oligopolistic competition is required to generate innovation. Only his description of competition as a dynamic force is adopted.

33. See FTC Report, supra note 8, at 11.
to both transform and take over markets. Those firms that are not able to keep up with the innovation of their competitors will face extinction.\textsuperscript{34}

1. Competition in Varied Market Contexts

In a market structure where there are many firms, these firms must compete with each other not simply in terms of price, but in terms of innovation. Firms that cannot innovate and offer improved products will not survive in this environment. As firms begin to compete with each other through innovation simply to survive, they are forced to incorporate innovation into their routine production processes.\textsuperscript{35}

[Firms] simply cannot risk reliance on the fortuitous appearance of new ideas, often contributed unpredictably by outside sources, and as likely to be offered to other enterprises as to themselves. These firms feel forced to incorporate the generation of new techniques and new or improved products as a critical part of their day-to-day, routine operations. It is built into the company’s organization and budgeted like any other activity.\textsuperscript{36}

This sort of routine innovation comprises the bulk of innovation spending in the United States.\textsuperscript{37}

As firms begin to conventionalize innovation, the race for R&D can become an escalating arms war that drives firms to invest more and more money into R&D.\textsuperscript{38} This process has been detailed in

\textsuperscript{34} See Gerhard Rosegger, The Economics of Production & Innovation: An Industrial Perspective 3 (2d ed. 1996).

\textsuperscript{35} See FMIM, supra note 12, at 30 (“[F]irms have increasingly taken over the process of technical change, transforming it from a fitful and uncertain discovery process into something closer to a routine internal matter.”).

\textsuperscript{36} See id. at 32; see also Eliezer Geisler, Creating Value with Science and Technology 4 (2001):

Once the link between the R&D function of the firm and its commercial side was firmly established, innovation became a recognized force in corporate success and in its market competitiveness. Moreover, this recognition was not limited only to major corporations, but filtered down to smaller companies, who then adopted this same attitude toward research, science and technology.


\textsuperscript{38} See generally FMIM, supra note 12, at 45-51.
microeconomic terms by Professor Baumol. He notes that this
process causes firms to increase their R&D spending, and a ratchet
mechanism prevents firms from decreasing their spending.\textsuperscript{39} The
process works as follows: Firms will spend as much on R&D as their
competitors.\textsuperscript{40} However, once a firm achieves a particularly
promising line of research it will increase spending on R&D.\textsuperscript{41} Other
firms will follow suit, but no firm can retreat for fear of being pushed
out of the market.\textsuperscript{42} Innovation spending can only rise, since firms
increase spending in competition with each other, and the ratchet
mechanism prevents the level of spending from decreasing.\textsuperscript{43}

Even in a monopoly situation, competition can be useful in
spurring innovation. The high rates of return enjoyed by the
monopolist can induce competitors to pay high entry costs in order to
steal the market from the monopolist.\textsuperscript{44} The monopolist, in turn, will
devote money to R&D to innovate its products and protect its market
position, even if this results in its new products cannibalizing sales
away from its old products.\textsuperscript{45} In fact, a monopolist may have greater
incentive to invest in R&D because they stand to lose much more than
a prospective entrant.\textsuperscript{46} As Schumpeter put it, "[c]ompetition of the
kind we now have in mind acts not only when in being but also when
it is merely an ever-present threat. It disciplines before it attacks."\textsuperscript{47}
The mere threat of competition can force a monopolist to spend
money to erect barriers to entry. Monopolists will advance
innovation of their products so that they can continue to obtain
monopoly rents.\textsuperscript{48}

\textsuperscript{39} Id. at 50.
\textsuperscript{40} Id. at 47; see also GEISLER, supra note 36, at 6 ("Following the examples of corporate
giants... other manufacturers formed and institutionalized their R&D activity as an on-going
function of these companies.").
\textsuperscript{41} FMIM, supra note 12, at 48-49.
\textsuperscript{42} Id. at 50.
\textsuperscript{43} Id. at n.8. (Professor Baumol does acknowledge that the ratchet is not perfect and
innovation spending can in some circumstances decrease. However, he claims the ratchet will
provide powerful resistance against the decrease of innovation spending).
\textsuperscript{44} See FTC Report, supra note 8, ch. 2, at 9.
\textsuperscript{45} Id. A notable example of this phenomenon is Microsoft. Oftentimes, Microsoft
products are not replaced by the products of another company, but by newer generations of
Microsoft products.
\textsuperscript{46} Id. at 9-10 ("[T]he monopolist that does face a threat of entry may have more
incentive to invest in R&D than a prospective entrant would have, because the monopolist may
have more to lose from entry than a potential entrant has to gain.").
\textsuperscript{47} SCHUMPETER, supra note 32, at 85.
\textsuperscript{48} See CRISTIANO ANTONELLI, THE ECONOMICS OF INNOVATION, NEW TECHNOLOGIES
AND STRUCTURAL CHANGE, 116 ("The introduction of product innovation able to target well-
Competition also disciplines monopolies by forcing reinvestment of their monopoly rents into their products.\textsuperscript{49} Firms will spend profits on innovation until they arrive at the equilibrium price where marginal profit equals marginal return. Firms that do not do so may fall behind in the innovation race. Competition can thereby force money back into R&D rather than allowing companies to extract monopoly rents. Empirical data supports the idea of this ratchet mechanism and the feedback of money into R&D. "Industry funding of R&D in the United States (in constant 1992 dollars) nearly quadrupled between 1970 and 1998 (increasing from about $34 billion to nearly $133 billion in constant 1992 dollars)."\textsuperscript{50}

Competition may be stopped from driving down monopoly rents where barriers to entry protect a firm.\textsuperscript{51} Barriers can exist in the form of high sunk costs, which prevent competitors from moving into the industry.\textsuperscript{52} However, barriers to entry can also exist in the form of overbroad patent rights.\textsuperscript{53} Furthermore, the patent holder can use their patent rights to threaten expensive litigation, which may deter venture capital financing and allow the patent holder to maintain their societally inefficient position.\textsuperscript{54}

2. Features of Competition

Competition provides the proper incentives for both follow-on and initial innovations.\textsuperscript{55} In addition to large firms and monopolies, the proper competitive incentives can also mobilize small inventors and entrepreneurs into the competitive fray.\textsuperscript{56} Sometimes these types

\begin{itemize}
  \item defined product-niches and to match the specific requirements of the groups of consumers can secure a fraction of the general demand curve for well-identified products and generate relevant mark-ups.
  \item \textsuperscript{49} FMIM, supra note 12, at 32.
  \item \textsuperscript{50} Id. at 34.
  \item \textsuperscript{51} Id. at 40.
  \item \textsuperscript{52} Id.
  \item \textsuperscript{53} See FTC Report, supra note 8, ch. 2, at 7 ("The creation of a patent monopoly can 'lead[] to restriction of production, a supracompetitive price, and what economists call an efficiency or deadweight loss.'") (citing Dam, supra note 20, at 248).
  \item \textsuperscript{54} See FTC Report, supra note 8, ch. 2, at 8. See also, e.g., Josh Lerner, Patenting in the Shadow of Competitors, 38 J. LAW & ECON. 463, 465, 489-90 (1995) (finding that high litigation costs deter biotechnology firms from seeking patents when rivals already hold patents).
  \item \textsuperscript{55} See FTC Report, supra note 8, at 8 ("Like patent policy, competition plays an important role in spurring the development of technologies and sequences of related, follow-on technologies.").
  \item \textsuperscript{56} See FMIM, supra note 12, at 61 ("How entrepreneurs act at a given time and place depends heavily on the prevailing . . . reward structure in the economy.").
\end{itemize}
of inventors may be responsible for more than their share of initial, groundbreaking inventions. The free market in conjunction with patents provides the possibility of vast returns on new technology and thereby can properly incentivize these individual and small innovators. Even large companies can be lured into making new groundbreaking initial innovations by the possibility of huge returns.

In fact, the nature of a competitive market is such that it can enlist innovation from a number of sources. Unlike a centrally directed economy, a free market can generate innovation from sources that are not traditionally thought of as innovative. Not only manufacturers, but users, distributors, suppliers, repairers and "[a]ny functional class" can be a "potential source of innovation." So long as these sources can appropriate enough gains from their innovation to offset their costs, they will innovate. Some of these sources may have lower innovation costs than others because they may be in a better position to generate innovation than others. The net result is that competition causes increased innovation at efficient prices.

Another beneficial feature of competition is that it can result in a diversity of innovation. The diversity of innovation can prove very beneficial as competitors may explore areas that would be neglected in a centrally directed research effort. This feature is more important where research paths are highly unpredictable.

57. See id. at 56 ("One can even offer the plausible conjecture that most of the really revolutionary new ideas have been, and are likely to continue to be, provided preponderantly by independent innovators.").

58. See id. at 63 ("[N]ever before has productive activity been so effective and prestigious as a method for the attainment of wealth, power, and prestige."); accord Jay Dratler, Jr., Does Lord Darcy Yet Live? The Case Against Software and Business-METHOD Patents, 43 SANTA CLARA L. REV 823, 848 (2003) ("Only the hope of... a major pioneering invention[,] and... earning potentially unlimited returns[,] can provide strong enough motivation for accepting real risks of total loss.").

59. See FTC Report, supra note 8, ch. 2, at 9 (noting that large firms will even cannibalize their own products in hopes of achieving market power).


61. Id. at 70.

62. See, e.g., id. at 11-27 (in certain industries, such as scientific instruments, users are better situated to innovate the products because they are constantly using them and can tailor them to their needs).

63. See FTC Report, supra note 8, ch. 2, at 15 ("When many firms devote R&D efforts to tackling the same problem, the public benefits."); see also Daniel Rubinfeld & John Hoven, Innovation and Antitrust Enforcement, in DYNAMIC COMPETITION AND PUBLIC POLICY 65, 87-88 (Jerry Ellig ed., 2001) (diversity of innovation is beneficial).

64. See FTC Report, supra note 8, ch. 2, at 15-16; see also Rebecca S. Eisenberg, Patents and the Progress of Science: Exclusive Rights and Experimental Use, 56 U. CHI. L. REV. 1017,
Like patent law, competition also has certain features that can be detrimental to innovation. However, unlike patent law, these features are limited in number and effect and easily offset by the benefits of competition. For example, as various competitors vie to get ahead of each other, most notably in the context of patent races, they can spur each other to work too hard and too fast.\(^{65}\) Some commentators have looked upon this diversity of research as a wasteful duplication of effort.\(^{66}\) Others have speculated that it can be inefficient because it leads to investments in innovation before these newer innovations are properly utilized.\(^{67}\) The damage of these races may be especially exacerbated in the patent context, where firms race to invent the same thing.\(^{68}\) However, other scholars have looked on this competition in a positive light.\(^{69}\) They note that this same sort of duplicative activity occurs regularly in a competitive market when businesses compete.\(^{70}\)

Another possible weakness of competition is that it may cause too much innovation too quickly. New competitors may introduce products in the market that render older products from other competitors obsolete before those products have been able to recoup their development costs and before the potential gains from those products has been fully realized.\(^{71}\) Generations of new products can render old product lines obsolete in a process that Schumpeter has referred to as "creative destruction."\(^{72}\) Firms are happy to wreak this evolutionary chaos on markets in order to realize the supernormal profits that early innovators can obtain in a competitive market. Of course the same competitive market will reduce these profits once new innovators move into the market, and firms will have to continually innovate to stay ahead of the pack, resulting in even more creative destruction.\(^{73}\) The accelerated process of creative destruction

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1066-69 (1989) (when research may follow unexpected paths a diversity of research may be especially beneficial).

65. See FTC Report, supra note 8, ch. 2, at 10.


68. See id.


70. See Merges & Nelson, supra note 69; Dam, supra note 20, at 263.

71. See FMIM, supra note 12, at 137.

72. See ROSEgger, supra note 34.

73. id.
contains a negative externality that may be harmful to overall innovation "[b]ecause the creators of innovation and those who suffer the resulting (creative) destruction are different individuals or groups." 74 The owners of the old products take massive losses as a result, resulting in a net loss to society.75 However, it is unclear whether this actually leads to overinvestment in innovation. Given the massive societal spillovers from innovation, it is hard to imagine that there is such a thing as too much innovation.76

While it is obvious that competition has a net positive effect on innovation, it is unclear how much it is impeded or assisted by the patent laws. The benefits and harms of competition appear to vary throughout different industries.77 The next section reviews empirical studies of the efficacy of competition and patent policy in various industries.

C. Empirical Studies

Empirical studies across the board show that the meld of competition and patent law required to create the optimum level of innovation varies through different industries. Competition was always required to achieve a high level of innovation in all industries. In two industries, biotechnology and pharmaceuticals, patents were needed.78 Despite the fact that many industries did not require patent rights to spur innovation, when patent rights were available companies generally would secure them.79

The reason patent protection is required in those two industries is to appropriate gains from innovation. In different industries, there were other, more efficient means of appropriating gains. For example, patent protection was not as effective as secrecy, lead-time, learning curve advantages, and sales and service efforts.80

In the biotechnology and pharmaceutical industries, patents are necessary to prevent free riding on innovative breakthroughs.81

74. See FMIM, supra note 12, at 137.
75. Id.
76. See FMIM, supra note 12, at 137-38.
77. See FTC Report, supra note 8, ch. 2, at 8-9 ("[E]conomic theory and empirical evidence suggest that the effect of an increase in competition on innovation will vary from on context to another.").
78. See, e.g., Mansfield, supra note 24, at 180 (this survey of twelve industries and 100 firms found that patents were essential only in the biotechnology and pharmaceutical industries).
79. See id.
80. See Levin et al., supra note 20, at 816.
81. See FTC Report, supra note 8, at ch. 3, 1-2.
Unlike other industries, products in biotechnology and pharmaceutical companies take a long time to develop and require a massive amount of resources, both to develop and ready for commercialization. Therefore, the consequences of misappropriation are heightened for these industries. In addition, in the biotechnology industry patent disclosures can also serve as a useful source of research for the inspiration of design around innovation.

The computer software and hardware industries do not share those attributes that make patent protection valuable. Low upfront costs, the predictability of product development, quick pace of technological change, and alternate regimes of intellectual property protection make patent protection unnecessary. In the computer hardware industry, trade secret was found to be a far superior mechanism than patenting. Since companies would have a hard time determining if a competitor was copying their technology, they found that they were much better off by simply keeping their technology a secret. While competitors could reverse engineer their products, the fast pace of the industry assured the original developers that they would appropriate the majority of the gains from their innovations. In the software industry, copyright offers an alternate regime for software protection. The longer duration of protection, cheaper costs, and predictability make it an attractive regime in that industry. Furthermore, patent disclosures are not useful to software developers because the disclosure of source code is not required.

In fact, in the computer software and hardware industries the ease with which patents can be obtained can actually be harmful. Innovators complain that their development efforts are stifled because of the amount of time they have to spend examining prior patented art and navigating around said prior art. This is especially so because a majority of the innovation that occurs is follow-on innovation. The threat of litigation generated by the plethora of patents can also deter would-be innovators.

The effect of patents also varies within industries. For example, in the computer hardware manufacturing industry, specialized design
firms noted that patent protection is helpful to spurring innovation.89 A specialized design firm could be one that designs computer semiconductors but contracts with semiconductor foundries to have their products manufactured.90 In this sub-industry patents are used to protect critical business assets and are enforced against infringers. This example illustrates that it is possible for innovation in an industry as a whole to be impeded by patents, even though patents may still help innovation in a small subset of that industry.

This brief discussion of empirical studies of patents reveals that while competition is always necessary to spur innovation, the effects of patents vary across industries, and even within industries. Therefore, restricting patentability by industry may not be effective. Instead, patents should be barred for a category of patents in which all patents are harmful to innovation.

II. SKILL-BASED INVENTIONS

The preceding section illustrated that there are many situations in which the patent laws conflict with the workings of competition to cause a loss of efficiency for society. These problems exist because there is a tension between the constitutional mandate of the patent system and the statutory and common law scheme that has been put in place to operationalize it. To some degree this conflict is inevitable. As was stated supra, the “but for” test that could perfectly carry out the mandate of the patent system is impossible to apply on a practical level and can only serve as a theoretical guidepost. The statutory scheme enacted to carry out the mandate of the patent system must necessarily sacrifice some conceptual purity so that it may be applied on a practical level.

However, it can be argued that the statutory scheme may be sacrificing too much in order to achieve its formalistic ends. Some have complained that it has turned into little better than a registration system for patents.91 The difficulty lies in finding a way to properly

89. See FTC Report, supra note 8, at 34.
90. See id. at 32-33.
91. Some have even speculated that a registration system may be more effective. See generally F. Scott Kieff, The Case for Registering Patents and the Law and Economics of Present Patent-Obtaining Rules, 45 B.C. L. REV. 55 (2003). Also, some have argued that it is not worth the cost of reforming. Mark Lemley has argued that the United States Patent and Trademark Office’s issuance of patents that do not adequately meet patentability standards does not cause enough economic harm to warrant the expenditure of additional resources for the purpose of increasing patent quality, because only a very small portion are ever licensed or
reform the system. Removing patent protection from entire industries does not seem to be an effective solution since, as mentioned above, sometimes a sub-industry of a particular industry may rely heavily on patent protection to spur innovation even though the industry as a whole does not. While there are certain industries that seem to suffer as a whole from patent protection, there are still inventions within those industries that undoubtedly promote the aims of the patent system, even if patents in the industry as a whole fail.

The key to reforming the system therefore lies in finding a trans-industry category of inventions that includes only those patents that fail the "but-for" test and which can be excluded from the system in a manner that comports with the formalistic requirements of the federal circuit. This can be done by finding a category of invention that by its very nature is heavily dependent upon competition for development and does not easily lend itself to patent protection. Skill-based inventions comprise one such category, because skill-based inventions are heavily dependent upon competition between skilled competitors for development, and skills do not easily lend themselves to patenting. The next Section lays out the boundaries of this category.

A. Defining Skill Based Inventions

Skill based inventions are, as their name implies, inventions based upon the skill of their users, such as a method of shooting a basketball. They normally involve a method for doing something where the method requires a considerable amount of skill, and where the results from usage will directly vary based upon that skill. It is this last distinction that truly sets them apart from other inventions.

Most inventions require a baseline level of skill to be used and will yield the same results so long as this baseline level of skill is used. Unlike normal inventions, the results from the usage of skill-based inventions vary directly with the skill of the user. This

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92. As mentioned above, in the computer hardware industry, in which many firms complain that patent protection is damaging as a whole, semiconductor design firms depend upon patent protection for their existence. See FTC Report, supra note 8, ch. 3, at 34. See also John R. Allison & Emerson H. Tiller, The Business Method Patent Myth, 18 BERKELEY TECH. L.J. 987, 1004 n.48 (2003) ("If there are serious problems with the quality of U.S. patents, they appear to be systemic rather than specific to a certain technology."); accord Dan L. Burk & Mark A. Lemley, Policy Levers in Patent Law, 89 VA. L. REV. 1575, 1634 (2003) ("Even if industry-specific patent legislation is legal, however, we are not persuaded that it is a good idea.").
distinction has been captured in the more formal definition: Skill-based inventions are those inventions whose efficacy is substantially determined by the skill of the user, and not inherent in the invention itself; or those inventions which act primarily as gatekeepers to the aforementioned types of inventions. The second prong of the definition, the gatekeeper prong, covers those inventions that are not themselves skill-based inventions, but act primarily to cover the use of a skill-based invention. This second prong is fleshed out in more detail once the first prong is explained.

Patents on typical inventions assume that the user has a baseline level of skill. This concept has manifested itself in the form of a Person Having Ordinary Skill In The Art, or a PHOSITA. A PHOSITA is assumed to be acquainted with all of the prior art.93 The concept of a PHOSITA is entirely distinct from the concept of a skill-based user. A PHOSITA typifies the baseline level of skill needed to obtain a predictable result from any patented invention. A skill-based user, on the other hand, typifies a person who uses a skill-based invention and obtains different results based upon their skill level.

An example will help to illustrate this definition more precisely. Imagine that we have an invention on a method of putting a golf ball.94 Imagine that we also have a patent on an improvement on a golf club. The first would be a skill-based patent because the efficacy of a golf putt using the patented technique would depend substantially upon the skill of the user. The second invention, an improvement on a golf club, would not be a skill-based invention. The efficacy of the golf club is not determined by the skill of the user. The typical response to this is that the golf club would be more effective in the hands of a better user. However, this conflates usage of the golf club with the golf club itself. No matter who the user of the club is, the improvement on the club (the invention at issue) is always the same. This differs from the golf swing, where the same invention is actually different when employed by different users.

The main problem with the first prong of this definition is that a clever patent drafter can get around it by obtaining a patent on the apparatus used to perform the skill-based invention. The second prong of the definition addresses this problem. It captures those inventions which act primarily as gatekeepers for skill-based

94. This is not actually so far from reality, as this patent actually exists. See U.S. Patent No. 5,616,089 (filed Mar. 29, 1996) (issued Apr. 1, 1997) ("Method of putting").
inventions. The word "primarily" is used here for two reasons. First, as mentioned above, it captures those inventions that are only attempts to get around the first prong. Second, it does not capture those inventions that contribute a large measure of value to the skill-based endeavor.

This part of the definition requires the most subjective evaluation. The main difficulty revolves around determining whether something "primarily" acts as a gatekeeper. This apparent ambiguity can be partially resolved by considering three additional factors. First, was there a significant amount of research and development that went into the invention? The greater the costs of development, the more likely that the invention does not act primarily as a gatekeeper. Second, does the particular form of the apparatus require the use of the skill-based invention? If an exact form is necessary, this means the invention probably had independent value and is not primarily a gatekeeper. Finally, how much does the invention independently contribute to the efficacy of the skill-based invention? The more it contributes, the more likely the invention is not primarily acting as a gatekeeper. To evaluate this last prong, one may consider the amount of skill required for proper use of the invention. The greater the level of skill required, the more likely that this is a gatekeeper. However, it should be kept in mind that these factors cannot stand-alone and require some level of balancing.

A brief example can show the difference in context, and also point out the gray area. An invention that has no other purpose but to act as a gatekeeper might be a regular stick that is to be used for some skill-based purpose. Imagine there is a patent on a method of using the stick to hit a ball, and the efficacy of the hit is largely determined by the skill of the user. Imagine that the stick has been patented in conjunction with the method of hitting, and that nearly any stick will accomplish this purpose. Here, the patent on the stick is clearly an attempt to patent the skill-based invention and will be barred by the gatekeeper prong. This conclusion is bolstered by the fact that the stick will also fail the three evaluative factors: (i) it required little R&D, (ii) the exact form of the stick is not important, and (iii) it contributes little independent value to the invention.

On the other hand, an invention can act as a gatekeeper and have independent value, and therefore be patentable. For instance, there is

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95. For example, consider an improved tennis racquet. Only the most skilled may be able to fully utilize the invention, but the invention is clearly not skill based because the improvement on the tennis racquet is always the same, no matter who is using the invention.
a medical procedure patent on surrogate embryo transfer. This process was extremely expensive to develop and it was ultimately developed by Fertility and Genetics Research, Inc. (FGR). To perform the procedure FGR developed a catheter-like instrument to facilitate the process and attempted to patent the device. Assuming that this process is in fact a skill-based invention, the catheter-like instrument is still not a gateway to a skill-based invention. The three factors mentioned above gravitate towards a finding that the invention is not primarily a gatekeeper. The invention required extensive R&D, the particular form the invention is vital, and the apparatus at issue contributes value to the skill-based endeavor.

It is the gatekeeper prong that will require the greatest amount of discretion and development by the courts. Of course, it would be preferable to have a bright line test that could be mechanically applied. However, a rigid test will never be sufficient because patent law deals with the flexible and ever-changing world of inventions and ideas. Instead, the quest should be to find the test that introduces the least amount of discretion for the most amount of innovative gain.

B. Patents on Skill-Based Inventions and Competition

Before the scope of patentable subject matter is expanded to a new category of inventions, the benefits and harms to competition should be carefully examined. This Section examines how competition operates to create innovation in this area without the aid of patents. It then explores how patents might interfere with this innovation generation.

1. Innovation by Competition

Competition already provides incentives for skill-based inventions without patent protection because the rewards for innovation can generally be appropriated without the use of intellectual property. Skill-based inventions are also generally difficult to copy effectively, since by their very nature, they require a certain degree of skill. This difficulty of imitation can serve to help


97. Id.

98. This inquiry comports with the recommendation of the FTC's report. See FTC Report, supra note 8, at 15 ("For future issues, it will be highly desirable to consider possible harms to competition that spurs innovation—as well as other possible benefits and costs—before extending the scope of the patentable subject matter.").
the initial inventor appropriate gains from their technology. One study found that for most industries "lead time, learning curve advantages, complementary sales or service efforts, and secrecy were all more effective means of protecting the competitive advantages of new processes than patents were." This idea is analogous to the common reality of sports, where the first athlete to introduce a sports move will have a learning curve advantage over their competitors. Similarly, the first industry to implement a successful business plan will be rewarded with the income from a successful business. In the medical and scientific communities there has been ample work done within an incentive structure, which oftentimes is based on peer esteem.

Furthermore, allowing patents on skill-based inventions would do little to spur innovation. The empirical studies detailed supra demonstrated that for most industries patent protection was not required to spur innovation. The two exceptions were biotechnology and pharmaceuticals. These industries were dependent upon patent protection because of the steep upfront costs and the ease with which technology could be misappropriated. Skill-based inventions have exactly the opposite qualities. They have low upfront costs and are difficult to misappropriate because they require the development of a skill to be utilized properly. Accordingly, it seems unlikely that they will benefit from protection.

2. Costs to Competitive Development

As a preliminary issue, it should be noted that patents in this area do not confer a great deal of benefit to society. The disclosures from patents on skill-based inventions have a very limited utility since the skill that is necessary to properly utilize the invention cannot be conveyed to a new user through disclosures. Accordingly, these patents would give the inventor a monopoly without giving society a

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99. See FTC Report, supra note 8, ch. 2, at 10, n.74.
100. See id. at 11 (citing Levin et al., supra note 20).
101. See id. ch. 4, at 43 ("[C]ritics argued that business method patents do not foster incentives to innovate, because business methods traditionally evolve in response to competition and internal business needs, without regard to legal rights to exclusivity.").
103. See Levin et al., supra note 20 (noting that patents were not necessary in most industries).
104. See Levin et al., supra note 20.
commensurate benefit in return, all the while harming competition in the manners discussed next.

Patents on skill-based inventions can be particularly harmful to innovation because innovation in this class is so dependent upon competition. Competition is so vital because it drives players to improve their skills and to improve their techniques. Those who cannot successfully keep up with the pace of competition must either drop their prices considerably or be forced out of the market altogether.

Patents in this area would be devastating to this sort of competition. A skill-based invention by definition is one whose efficacy is largely determined by the skill of the user. Patents would be harmful here because the overall efficacy of the endeavor is substantially determined by skill, but patents would divert rents from the skilled to those who simply thought of the invention. It is much easier to conceptualize a new sports move than to execute it to perfection. The same theory applies to business plans; great ideas for new products are a dime a dozen, but it is the execution of these ideas that separates the truly great entrepreneurs. Thomas Edison famously noted that genius is 1% inspiration and 99% perspiration.

This damage is compounded because patents would make it more difficult for users to obtain new technology. In a free market, "any functional class" can generate innovation. The functional class that is most likely to generate innovation is the class that has the most incentive to do so. In the case of skill-based inventions, the users of the invention will be the class with the most incentive to innovate. Users of the inventions will naturally spend considerable time practicing and therefore gaining significant expertise in the invention. If they find a way to improve the invention, they stand to make considerable gains via competitive advantage. Patents on inventions will restrict the flow of skill-based inventions to users who could provide further innovation. The natural development of skills and innovative techniques that flows from the constant competition between champion and challenger would be stifled.

Many of the areas that would be covered by patents on skill-based inventions have not traditionally received patent protection.

105. See discussion in Part A, supra.
107. See supra notes 60-61 and accompanying text.
108. See supra notes 60-61 and accompanying text.
The sudden introduction of patents could introduce new costs as the norms of the affected industries adjust. Traditional methods for the quick dissemination of skill-based inventions may be destroyed due to the patent system. For example, publishing articles not only provides prestige to researchers, but also quickly disseminates new information to the community. In sports and finance, the incentive to compete forces athletes and financiers to use and thereby divulge their latest techniques.109 Entrepreneurs are also driven by the same incentives, and they have the additional incentive to disclose in order to obtain venture funding.110 In situations where information is not normally divulged, traditional rules surrounding trade secret can protect the rights of inventors.111

The introduction of patents may also result in other problems, such as the use of patents for strategic purposes. This problem is amplified with skill-based inventions because they contain broad claims.112 One notorious example of this in the medical community occurred with Josiah Bacon, who came to own a patent on the technique of inserting vulcanite rubber dentures in the mid-nineteenth century, although the technique was already widely practiced.113 For years, he exploited this patent to the tune of nearly $700,000 annually, a hefty sum at the time. He continued this practice until he eventually met his early demise at the hands of an outraged dentist.114

109. Douglas L. Price, Assessing the Patentability of Financial Services and Products, 3 J. HIGH TECH. L. 141, 153 (2004) ("Historically in the financial industry when someone invented a new financial product or method it was openly copied, used, and improved by others in the industry.").

110. Rochelle Cooper Dreyfuss, Are Business Method Patents Bad For Business?, 16 SANTA CLARA COMPUTER & HIGH TECH L.J. 263, 275 (2000): But neither the free-rider nor the disclosure rationale justifies business method patents. Businesses are largely practiced in public. Accordingly, there is little need to especially encourage disclosure . . . . In sum, while business innovations are certainly desirable, it is not clear that business method patents are needed to spur people to create them.


112. See, e.g., FTC Report, supra note 8, ch. 4, at 41 ("[P]anelists expressed concern that business method patents will contain claims that encompass every manner of implementing a particular business model."); Keith E. Maskus & Eina Vivian Wong, Searching For Economic Balance in Business Method Patents, 8 WASH. U. J.L. & POL'Y 289, 292 (2002) ("[M]any patents cover remarkably broad claims that could permit patentees to exclude competition in a wide swath of Internet applications . . . .").

113. See Rueda, supra note 96, at 109-10.

114. See id. at 109-12.
The nature of the technology at issue also introduces special licensing problems. When the licensing of patents occurs with low transaction costs, inventions can be sold to the most efficient users. Unfortunately, the transaction costs for skill-based inventions are very high because skill-based inventions are by their very nature difficult to value. A buyer or a seller does not know how valuable a skill-based invention is because they cannot know how effectively it will be used. Further, a bargaining breakdown can occur because skilled users may be unwilling to pay for patent rights for something that they rightly see as substantially based upon their own skills. This can prevent intellectual property from reaching its most efficient usage.

Another problem is the difficulty and high cost associated with monitoring skill-based inventions. Intellectual property lawyers would be forced to monitor everything from business models and transactions to sporting events and medical procedures. Allocating these costs could pose another roadblock to licensing and hamper the flow of goods to their most valued usage.

The transaction costs would be amplified by the difficulty in defining the patented invention. Potential infringers would never be sure if their skill-based activities were indeed infringing a patent. Publicly subsidized courts and privately supported arbitrators would likewise encounter difficulty in adjudicating potential disputes. These problems could be compounded by groups who purposefully use ambiguous language in hopes of capturing broader inventions. Ultimately, these sorts of costs would have to be borne by society at large and would hinder innovative activity.

III. PATENT LAW DOCTRINE

Even if it was proven beyond the shadow of a doubt that skill-based inventions are both harmful to innovation and a perfectly delineated category of invention, the federal circuit could not deny them patent protection unless it had some doctrinal ground upon which to stand. This Part addresses the legal issues surrounding skill-based inventions. The first Section of this Part explores the current stance of the federal circuit towards skill-based inventions. The next Section then provides a doctrinal basis to accomplish their exclusion.

115. See FMIM, supra note 12.
A. The Bounds of Patentability

Skill-based patents are currently patentable under the statutory scheme as it has been construed by the federal circuit and interpreted by the PTO. The PTO’s interpretation of the federal circuit’s construal has stretched the bounds of patentability to the limits of humankind’s endeavors. One scholar has sarcastically questioned if there are even any bounds remaining by pointing out that we have allowed patents on language, the fine arts, and theology.117

The current patent statute requires that in order to be patentable, an invention must be patentable subject matter, useful, novel, nonobvious, and disclosed in its best mode in a fashion that allows for it be enabled by a PHOSITA.118

The utility and novelty requirements do not serve as powerful, flexible bars to patentability for skill-based inventions. In order to satisfy the utility requirement, a patent applicant need merely show that the invention has a “useful” application.119 This requirement is usually not much of a hurdle except in the case of chemical or pharmaceutical inventions for which no use has yet been found.120 The novelty requirement likewise does not pose a bar to patents on skill-based inventions because it can only bar pre-existing inventions.121

The statutory subject matter requirement, though at one time a significant bar to skill-based inventions, functions now to bar only the most abstract of inventions. Patentable subject matter includes any “process, machine, manufacture, or composition of matter”122 and the Court has interpreted this broadly to include “anything under the sun that is made by man.”123 Following the lead of the Supreme Court, the federal circuit has further emaciated this section by declaring that

120. See CHISUM ET AL., supra note 1, at 735.
121. In order for an invention to be barred on novelty grounds, every claim of the new invention must exist in a single prior art reference.
any process is patentable so long as it is applied in a "useful way".\textsuperscript{124} Given this narrow reading, the subject matter requirement now serves to bar only natural phenomena, mental processes or abstract concepts that have not been applied to produce a useful result.\textsuperscript{125}

I will argue \textit{infra} that the enablement requirement can be used to effectively bar skill-based inventions from patentability. However, since the federal circuit has not yet ruled on this issue the PTO has not used the written description or the enablement requirement for this purpose.

The requirement that carries the largest burden of operationalizing the mandate of the Patent Clause is the nonobviousness requirement. However, it is ill suited to serve as a bar to skill-based inventions because it was meant to exclude patents that did not represent a sufficiently significant technological leap forward, not to exclude patents based upon the skill of the user involved.\textsuperscript{126}

In relevant part, the nonobviousness section states:

A patent may not be obtained . . . if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains.\textsuperscript{127}

"Nonobviousness asks whether a development is a significant enough technical advance to merit the award of a patent."\textsuperscript{128}

The nonobviousness requirement has not been able to bar skill-based inventions because it was not tailored for that purpose and is difficult to apply. The judicial test for its interpretation is convoluted at best, consisting of a three-pronged test with attendant secondary considerations.\textsuperscript{129} Applying the test requires determining the scope and content of the prior art, ascertaining the differences between the

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\textsuperscript{125} Diamond v. Diehr, 450 U.S. 175, 185-86 (1981). An abstract concept can be patented as part of an invention which produces a useful result. \textit{See}, \textit{e.g.}, \textit{id}. at 187 ("It is now commonplace that an application of a law of nature or mathematical formula to a known structure or process may well be deserving of patent protection.").

\textsuperscript{126} \textit{See} P.J. Federico, \textit{Commentary on the New Patent Act}, 75 J. Pat. Trad. Off. Soc'y 160, 179-80 (1993) ("An invention which has been made, and which is new in the sense that the same thing has not been made before, may still not be patentable if the difference between the thing, and what was known before is not considered sufficiently great to warrant a patent.").


\textsuperscript{128} \textit{See FTC Report}, \textit{supra} note 8, at 10.

prior art and the claims at issue, and then evaluating whether one with ordinary skill in the pertinent art would have automatically bridged that gap. Secondary considerations include "commercial success, long felt but unsolved needs [and] failure of others."  

Particularly problematic is the standard for determining whether a PHOSITA would combine prior art references to create the invention at issue. This is resolved using the "suggestion test." In a move towards formalism, the federal circuit has required that in order for an invention to be deemed obvious, there must be an explicit or strongly implied notion in the prior art calling for the combination of the elements of the invention. The federal circuit has required this test because allowing judges to speculate on whether a PHOSITA would combine existing elements to create the invention without an explicit prior art reference raises the possibility of a highly subjective and unpredictable hindsight bias.  

By choosing the more formalistic test the federal circuit has chosen predictability over conceptual flexibility, which can have the effect of letting in many marginal patents. However, had the federal circuit chosen otherwise, it would have sacrificed some of the predictability that it was mandated to bring at its inception. Tweaking the nonobviousness requirement by modifying the suggestion test has almost become a zero-sum game; what is gained in requiring a larger innovative advance is lost in predictability, and vice versa. Barring skill-based inventions using the nonobviousness requirement is like attempting to use a star-shaped cookie cutter to

130. See id. at 17.
131. Id. at 18. Others cases have also included the licensing activity on a patent as a secondary consideration. See Minnesota Mining & Mfg. Co. v. Johnson & Johnson Orthopaedics, Inc., 976 F.2d 1559, 1575 (Fed. Cir. 1992).
132. See In re Dembiczak, 175 F.3d 994, 999 (Fed. Cir. 1999) (holding that there must be some "suggestion" in order to combine prior art references and find an invention obvious) (questioned on other grounds).
133. See In re Dembiczak, 175 F.3d at 999.
134. Studies have confirmed the existence of a hindsight bias in the legal context. See Chris Guthrie et al., Inside the Judicial Mind, 86 CORNELL L. REV. 777, 799-805 (2001); BEHAVIORAL LAW AND ECONOMICS 99 (Cass Sunstein ed. 2000); Russell Korobkin & Thomas S. Ulen, Law and Behavioral Science: Removing the Rationality Assumption from Law and Economics, 88 CAL. L. REV. 1051, 1095 (2000). This problem has not gone unnoticed by the federal circuit in the obviousness context. See, e.g., In re Dembiczak, 175 F.3d 994, 999 (Fed. Cir. 1999) ("Our case law makes clear that the best defense against the subtle but powerful attraction of a hindsight-based obviousness analysis is rigorous application of the requirement for a showing of the teaching or motivation to combine prior art references."); Al-Site Corp. v. VSI Int'l, Inc., 174 F.3d 1308, 1324 (Fed. Cir. 1999).
135. Wagner & Petherbridge, supra note 7, at 1116-17.
make a circular cookie – the contours of the requirement do not fit properly, and forcing the issue will necessarily be messy and imprecise.

The next four Subsections review how these requirements have applied to skill-based inventions across various industries.

1. Business Methods

The field of business method patents has grown so large that it encompasses novel business plans. The pendulum of patentability has swung strongly in this domain since the early twentieth century when the second circuit in Hotel Security v. Lorraine Co. disallowed a patent on a method of doing business. In that case, the second circuit held that a method for account balancing designed to prevent fraud by workers in hotels and restaurants lacked novelty and therefore could not be patented. Although decided on novelty grounds, that case was widely read as barring patentability for business methods patents because the court in dictum stated "[a] system of transacting business disconnected from the means for carrying out the system is not, within the most liberal interpretation of the term, an art."

The flimsy foundation of the exception ultimately came back to haunt it and led to its demise. In the dissenting opinion to In re Schrader, Judge Newman blasted the exception, stating:

I discern no purpose in perpetuating a poorly defined, redundant, and unnecessary ‘business methods’ exception, indeed enlarging (and enhancing the fuzziness of) that exception by applying it in this case. All of the ‘doing business’ cases could have been decided using the clearer concepts of Title 35. Patentability does not turn on whether the claimed method does ‘business’ instead of something else, but on whether the method, viewed as a whole, meets the requirements of patentability as set forth in Sections 102, 103, and 112 of the Patent Act.

137. Id. at 469. Subsequent cases upheld the idea of a business method exception. See, e.g., Loew's Drive-In Theatres, Inc. v. Park-In Theatres, Inc., 174 F.2d 547, 552 (1st Cir. 1949) (holding that system of parking cars in an open lot to maximize viewing of a movie screen was not patentable subject matter); Commentators on the patent law also perceived the existence of a business method exception. One commentator stated that there is a “long-standing rule that abstractions, mental theories or business methods are not patentable subject matter.” Editorial Notes, The Patentability of Printed Matter: Critique and Proposal, 18 GEO. WASH. L. REV. 475, 476 (1950).
138. In re Schrader, 22 F.3d 290, 298 (Fed. Cir. 1994).
The strength of her argument loosened the lid on the exception to such a degree that Judge Rich was able to blow it off with minimal effort in *State St. Bank & Trust Co. v. Signature Fin. Group*, when he unambiguously “[laid] this ill-conceived exception to rest.”

Since that decision, the PTO has been flooded with business method patents. Some business method patents, like US Patent No. 6,101,483, “Personal shopping system and portable terminal,” seem uncontroversial. Others, however, strain the limits of credulity, as they seem little more than business plans. For instance, Priceline.com has a patent on a “[m]ethod and apparatus for a cryptographically assisted commercial network system designed to facilitate buyer-driven conditional purchase offers.” This patent basically preempts a business plan of an Internet website which facilitates reverse auctions for goods. In October of 1999, Priceline.com filed suit to enforce its patent against Expedia.com. Walker Digital proudly proclaims “we . . . take our core ideas, protect them with patents and establish licensing partnerships with major industry players . . . .” At one point, this would have sounded the death knell for patentability, but instead Walker Digital’s business model has become, rather ironically, the idea for other companies. Some


140. The number of Class 705 patents filed and issued has increased substantially since 1998, the year that *State Street* was decided. See Class 705 Application Filing and Patents Issued Data at http://www.uspto.gov/web/menu/pbmethod/applicationfiling.htm (last visited Apr. 10, 2005).

141. U.S. Patent No. 5,794,207 (filed Sept. 4, 1996) (issued Aug. 11, 1998); two commentators have pointed to the Priceline.com patent as having had a positive affect on the industry because it “lured hundreds of millions of investment dollars to finance its attempt to practice its business methods.” Jeffrey R. Kuester & Lawrence E. Thompson, *Risks Associated with Restricting Business Method and E-Commerce Patents*, 17 GA. ST. U. L. REV. 657, 682 (2001). Ironically, Priceline.com was subsequently the subject of a securities fraud action brought by its shareholders. See *In re Priceline.com Inc.*, 342 F. Supp. 2d 33 (D. Conn 2004). The venture capital raising feature of business method patents that has been lauded by numerous commentators (see, e.g., *Reconceiving Patents*, supra note 13, at 144-45) is a double-edged sword: whatever economic gain that patents bring by allowing for ease of venture backing must be balanced against the harm of facilitating overly aggressive financing.

142. See *Expedia Seeks To Dismiss Suit*, N.Y. TIMES, Dec. 21, 1999 at C22.


144. For example, one commentator speculates that Howard Lutnick, a holder of many financial patents, and “his fellow early adopters may be following in the footsteps of Priceline.com’s founder Jay Walker [and] Mr. Walker’s intellectual property incubator, Walker Digital.” See Paul E. Schaafsma, *A Gathering Storm in the Financial Industry*, 9 STAN. J.L. BUS. & FIN. 176, 188 (2004).
patentees no longer even pretend that they are not patenting a business plan disguised as a business method. For instance, one particularly bold patent proclaims this in its title, "System, method, and business model for speech-interactive information system having business self-promotion, audio coupon and rating features." In response to the deleterious effect this patenting could have on pre-existing businesses, Congress passed the First Inventor's Defense Act in 1999. This law includes a prior user exception for business inventors who have been using an invention for over a year before a patent is filed.

This does not mean that all business method patents are skill-based inventions. In fact, the definition used here only captures two types of business method patents: business plans and business methods—patents that primarily act as gatekeepers to business plans. Business methods fall into the skill-based category because the success of a business largely depends upon the expertise of the executor of the business plan. A great business plan executed poorly is a recipe for disaster.

Patents that are obvious business plans would include the patent discussed above, a "[s]ystem, method, and business model for speech-interactive information system having business self-promotion, audio coupon and rating features." Also included in this group would be legal plans, such as tax shelters or poison pills. The efficacy of these plans is so highly dependent upon the lawyers that implement the details that these must fall into the category of skill-based inventions. An example of a patent that acts as a gatekeeper would be the apparatus claims of the Priceline.com patent on an Internet reverse auctioning site. While an apparatus cannot actually be a business plan, in this case it is clear that the apparatus is claimed primarily to exclude others from the business plan at issue. A business method patent that would not be included in this class would be “[s]ystem and

147. In this regard, the exclusion of skill-based patents will accomplish a significantly different end than that proposed by the Business Method Improvement Act of 2001, H.R. 1332, 107th Cong. (2001), which would have overruled State Street in some measure and created a presumption of invalidity for all business method patents. That bill was ultimately defeated and faced strong opposition from parties who claimed that business method inventions should not be treated differently from any other class of inventions. See Russell A. Korn, Comment: Is Legislation the Answer? An Analysis of the Proposed Legislation for Business Method Patents, 29 FLA. ST. U. L. REV. 1367, 1376-86 (2002).
method of displaying information by an electronic price label'"150 because this invention solves a narrowly focused problem irrespective of the skill of the user.

In a thorough study of business method patents, Professors Allison and Tiller separated Internet patents into three distinct categories.151 One category is Internet business models and, as its name implies, is comprised largely of methods of doing business on the Internet.152 Inclusion in the category of skill-based patents is due to their reliance upon the skill of the business owner. Another category they created is a class of patents that were "narrower in scope" and only intended to "solv[e] a specific business problem."153 These are not skill-based patents since their efficacy is in no way based on the skill of the user and they do not act primarily as gatekeepers for an invention that does. Their third category of Internet related patents is comprised of patents that could be described as Internet software technique patents.154 Because these patents are more focused on solving a software problem than acting as a business plan or gateway to a business plan, they are not included in the category of skill-based patents.

151. See Allison & Tiller, supra note 92, at 1034-36.
152. Id. at 1035. The following patents were included in this class: the Priceline.com patent just mentioned, U.S. Patent No. 6,006,265 (filed Apr. 2, 1998) (issued Dec. 21, 1999) ("Hyperlinks resolution at and by a special network server in order to enable diverse sophisticated hyperlinking upon a digital network") (essentially digital video with hyperlinks); U.S. Patent No. 6,009,412 (filed June 25, 1998) (issued Dec. 28, 1999) ("Fully integrated online interactive frequency and award redemption program") (essentially internet shopping with a rewards program); U.S. Patent No. 5,978,780 (filed Nov. 21, 1997) (issued Nov. 2, 1999) ("Integrated bill consolidation, payment aggregation, and settlement system") (essentially, an online bill payment system).
154. Allison & Tiller, supra note 92, at 1035-36. Internet software technique patents include U.S. Patent No. 6,003,077 (filed Sept. 15, 1997) (issued Dec. 14, 1999) ("Computer network system and method using domain name system to locate MIB module specification and web browser for managing SNMP agents"); U.S. Patent No. 6,005,939 (filed Dec. 6, 1996) (issued Dec. 21, 1999) ("Method and apparatus for storing an Internet user's identity and access rights to world wide web resources"); Professors Allison and Tiller admit that distinguishing this last category from Internet business techniques can be difficult. Since both Internet business techniques and Internet software techniques are not included in the category of skill-based patents in my analysis, this difficulty in distinguishing them does not pose a problem.
State Street was decided during the height of the "dotcom" frenzy, and, as such, was perceived as a decision that opened the door for many Internet patents. However, State Street actually dealt with a financial product and it had the effect of opening the door for financial patents, although the financial community remained largely unaware of this fact. However, as more and more financial products become patented, lawyers are now advising their clients to both examine their systems for infringement as well as defensively patent their own systems.

Walker Digital has also jumped into the fray, once again patenting ideas in the hopes of licensing them to (perhaps involuntary) partners. Others, such as Howard Lutnick, head of Cantor Fitzgerald, have followed suit. In a race-to-the-bottom response, major companies such as Merrill Lynch, Chase Manhattan, Citicorp Life Insurance and General Electric have waded into the patent frenzy. Their collective portfolios include:

- Method and Apparatus for Processing Checks to Reserve Funds
- Stock Option Control and Exercise System
- System for Managing Real Estate SWAP Accounts
- Supply Chain Financing System and Method
- Method and Formulating an Investment Strategy for Real Estate Investment

Universities have also followed suit with patents such as "Method and System for Securities Pool Allocation."

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155. See Schaafsma, supra note 144, at 183-84.
156. State Street Bank & Trust Co., 149 F.3d 1368, involved U.S. Patent No. 5,193,056 (filed Mar. 11, 1991) (issued Mar. 9, 1993) ("Data processing system for hub and spoke financial services configuration"); See also Schaafsma, supra note 144, at 184 ("Since the publicity surrounding [State Street] focused on e-business applications . . . the financial community remained generally unaware of the expanding applicability of patents.").
158. See Schaafsma, supra note 144, at 188-89.
159. Id. at 187.
160. Id. at 188-92.
Although *State Street* may have opened the floodgates for patentability of financial products, litigation had already begun on a smaller scale much earlier. In 1983 a federal district court ruled that a patent on a Cash Management Account ("CMA"),167 was valid because it "[taught] a method of operation on a computer to effectuate a business activity."168 The court did limit the case, however, by noting that the same invention would not have been patentable if it was implemented by hand.169 Thus limited, the lower court decision did not generate near the amount of press and patenting activity as the broad *State Street* decision. After *State Street*, the press took notice, and this has opened the door to many more business patents.

This aggressive patenting has led to expensive licensing activity through the threat of litigation. Mopex, Inc. obtained patents for an "open end mutual fund securitization process"170 and used them to demand a license fee of approximately $20 million per year from the American Stock Exchange.171 Electronic Trading Systems Corp. employed a similar strategy with a patent for an "Automated Futures Trading System,"172 which netted them over $10 million dollars from each the Chicago Board of Trade and the Chicago Mercantile Exchange.173 The combination of the lucrative financial industry, the quick feeding frenzy on patents, and the high stakes litigation may contribute to a hugely inefficient "storm" of patent activity in the financial industry.174

Like business method patents, not all financial patents are skill-based inventions. Essentially, financial inventions that would yield consistent results with different users are not skill-based.

166. U.S. Patent No. 5,563,783 (filed Apr. 4, 1995) (issued Oct. 8, 1996); for a more complete list of companies and patents that have issued, and also that have been filed, see Schaafsma, *supra* note 144, at 187-91.


169. *Id.*


171. See *Price*, *supra* note 109, at 154-55.


173. See Schaafsma, *supra* note 144, at 184-85 (in addition to the large settlements there were less expensive licenses granted to also smaller, but still significant licenses issued).

174. See generally *id.*
Accordingly, the following patents would not fall in the skill-based invention category: "Method and Apparatus for Processing Checks to Reserve Funds"\textsuperscript{175} and "Method and system for automated document generation."\textsuperscript{176} Patents that are used to predict the values of stocks are generally not dependent upon the skill of the user because they yield the same valuation no matter who uses the program. However, the following patents are dependent upon the skill of the user and so would fall into the skill based category: "Investment company that issues a class of conventional shares and a class of exchange-traded shares in the same fund";\textsuperscript{177} "Method and system for creating a portfolio of stock equities";\textsuperscript{178} "Method and apparatus for tax-efficient investment using both long and short positions";\textsuperscript{179} and "Method for investing working capital."\textsuperscript{180}

Hard cases involve patents like the one at issue in \textit{State Street}: "data processing system for hub and spoke financial services configuration." The data processing system was used to allow mutual funds to pool their assets in an investment portfolio organized as a partnership. This invention is difficult to categorize because it acts as a gatekeeper to a skill-based invention; namely, a variety of mutual funds organized as a partnership. The partnership arrangement is skill-based because the efficacy of the partnership depends largely upon the skill of the organizers. However, the claimed invention is not the partnership arrangement itself, but rather an apparatus to implement the invention. The hard case arises when the question is whether the primary function of the system at issue is to act as a gatekeeper, or whether the invention has independent value. In making this determination the three factors mentioned above (costs of development, importance of the form of the invention, and the independent value contribution of the invention) should be considered. The court will have to pay close attention to the individual facts of each case to draw this line properly.

3. Medical Procedures

Medical procedures were not originally patentable in the United States. In 1862, the validity of a patent for the administration of

\textsuperscript{177} U.S. Patent No. 6,879,964 (filed Mar. 7, 2001) (issued Apr. 12, 2005).
ether, one of the earliest anesthetics, was litigated.\textsuperscript{181} Despite the fact that the court noted that the use of ether was one of the "great discoveries of modern times,"\textsuperscript{182} it nonetheless held that the patent was invalid. The court ruled that in order to be patentable, the principle idea behind an invention must "be embodied and set to work" and that "[n]either the natural functions of an animal upon which or through which it may be designed to operate, nor any of the useful purposes to which it may be applied can form any essential parts of the combination, however they may illustrate and establish its usefulness."\textsuperscript{183} This logic was later used by the PTO in \textit{Ex Parte Brinkerhoff} to hold that a method for the treatment of hemorrhoids was not patentable.\textsuperscript{184}

The situation changed in 1954 when the PTO reversed itself by holding that medical treatment methods are indeed patentable.\textsuperscript{185} Since then, the PTO "has routinely issued patents for medical procedures."\textsuperscript{186} Cedars-Sinai Hospital holds patents on procedures that are as varied as cardiac surgery and hepatitis viral inactivation in blood products.\textsuperscript{187} By 1996, the PTO was issuing nearly 100 medical procedure patents per month.\textsuperscript{188} One particularly egregious patent consisted of a method of examining an ultrasound for fetal external genitalia to determine its gender.\textsuperscript{189} Dr. John D. Stevens, the inventor, admitted that the invention depended upon someone having enough skill to distinguish between male and female genitalia early in a pregnancy.\textsuperscript{190} Although many doctors had misgivings about patents on potentially life-saving medical procedure inventions, they were not galvanized into action until one doctor actually sued another in court for infringing upon a patent.\textsuperscript{191}

\begin{thebibliography}{99}
\bibitem{181} Morton v. New York Eye Infirmary, 17 F. Cas. 879 (C.C.S.D.N.Y. 1862).
\bibitem{182} \textit{Morton}, 17 F. Cas. at 883.
\bibitem{183} \textit{Id.} at 884.
\bibitem{184} 24 Off. Gaz. Pat. Office 349 (1883); \textit{see also} DONALD CHISUM, CHISUM ON PATENTS § 1.03(3) (2005)
\bibitem{186} Rueda, \textit{supra} note 96, at 125.
\bibitem{187} \textit{Id.} at 126.
\bibitem{188} \textit{Id.}
\bibitem{190} Rueda, \textit{supra} note 96, at 128-29.
\end{thebibliography}
Largely as a reaction to this litigation, the American Medical Association (AMA) put pressure on Congress to make it so that medical procedures could not be patented. In a compromise intended to placate outraged doctors and worried medical patent holders alike, Congress amended the patent laws to essentially exempt medical practitioners and related health care entities from liability for infringement of a medical procedure patent by a medical practitioner.192 This compromise allows doctors to avoid liability while still allowing the holders of medical procedure patents to go after deep-pocketed contributory infringers, such as medical device manufacturers and pharmaceutical companies.193

Although medical practitioners may be largely immune from liability for their use of skill-based inventions, the class still extends into this area. Examples of skill-based medical inventions include: “Method of treating the skin of a subject”;194 “Method of tissue lesion removal”;195 and “Method of surgically treating scoliosis.”196 A full determination of whether these inventions are skill-based would consider whether the aforementioned procedures would produce different results based upon the skills of the operating physician. As discussed supra, the hard cases arise when a possibly independently useful device is tied to a skill-based procedure.

4. Sports Moves and Related Patents

The validity of a sports move patent has never been litigated and has consequently received scant attention in the literature. While the Patent Office Board of Appeals did, in 1942, briefly mention that a sports move would not be patentable,197 the patentability requirement has so narrowed since then that some practitioners consider them a

193. See Todd Martin, Patentability of Methods of Medical Treatment: A Comparative Study, 82 J. PAT. & TRADEMARK OFF. SOC’Y 381, 404-05 (2000) (stating that in any case medical procedure lawsuits against doctors were rare and claims were usually pursued against deeper-pocketed defendants).
197. See Ex parte Mayne, 59 U.S.P.Q. (BNA) 342, 344 (Pat. Off. Bd. App. 1942): [A] discovery of a new method for solving certain mathematical problems which are much simpler and shorter than any known method, would not be a proper subject matter for a patent and this might be said also of the discovery of a new stroke in swimming or a new maneuver of troops in battle (emphasis added).
real possibility. In reality, there is more than a mere possibility for such patents, as evidenced by the PTO's issuance of patents on sports moves. There are numerous patents on techniques for putting a golf ball, and even one on an exercise method. There is even a patent on a method of swallowing a pill, which although not a sport, is a physical act. The Arena Football League has obtained another type of sports patent. Not only have they obtained patents on their game, but also on their playing field. This sort of patent protection could be used in conjunction with copyright to give owners extra protection.

Given the expense of litigation, the likelihood that these patents will ever be litigated is slim to none. However, should a sports move be patented that has the revolutionary effect on a sport similar to that the Fosbury Flop, the chances of litigation would certainly increase.

Most sports moves are themselves skill-based inventions. For instance, "Method of putting" and "Method of practicing golf shots" are both skill-based inventions. The hard cases in sports moves come when the skill-based invention is tied to a new or innovative device.


204. The Fosbury Flop is now the standard technique used in high-jumping events. Dick Fosbury's method was to jump over the bar feet first, whereas prior jumpers had faced forward. See Jeffrey A. Smith, Comment, It's Your Move—No It's Not! The Application of Patent Law to Sports Moves, 70 U. COLO. L. REV. 1051, 1071-72 (1999).


B. Barring Patents on Skill-based Inventions

This section explores how legal doctrine supports the exclusion of skill-based inventions from patentability. Specifically, skill-based inventions cannot meet the requirements of a broadly construed enablement requirement. The first Section explores the contours of the doctrine surrounding the enablement requirement. The second Section shows how skill-based inventions cannot satisfy a broad construal of this requirement.

1. Enablement Doctrine

The Patent Clause states that "[t]o promote the Progress of Science and useful Arts" the government is empowered to give patents to inventors. Thus, the government is empowered to enter into a quid pro quo relationship wherein society and inventors exchange inventions for exclusive rights. At the core of this relationship is the enablement requirement of § 112. In relevant part, that section states:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art ... to make and use the same.

Early in its history, the Supreme Court noted the importance of this requirement: "This [enablement requirement] is necessary in order to give the public, after the privilege shall expire, the advantage

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207. This approach could be criticized on the grounds that it calls for a high amount of judicial activism because it is asking the court to rule on a doctrinal issue in a manner that comports with the policy objectives of the patent system. Two responses apply to this critique. The first is that the federal circuit has both the expertise and the obligation to consider policy, so long as that policy will not take the court outside of the discretion which it is given by the general language of the patent statutes and the voids that have been left by patent doctrine. This approach is thoroughly expounded in Burk & Lemley, supra note 92, at 1668-70. The second and more powerful response (which only applies in a subset of the cases in which the first response applies) is that it is not activist to construe doctrine in a manner that comports with policy objectives when the doctrine itself lends itself to such a construal. This is true even if the construal of the doctrine will have a dramatic effect on the law. Even a ruling that has a dramatic effect can still be considered a model of judicial restraint so long as it is based on solid legal grounds. It is possible that the reason that the construal will have such a dramatic effect is because the patent system has fallen out of step with the correct construal of patent law. After all, the patent system is influenced not only by the courts but also by the PTO and the patent lawyers who practice before it. Therefore, it is not true that a court is activist when the court's doctrinal approach reaches the same result as a policy approach. Instead, it indicates that Congress has created a well-crafted statute in which legality comports with good policy.


for which the privilege is allowed, and is the foundation of the power to issue the patent."\(^{210}\) In order for parity to exist between the exclusive rights granted to the patentee and the knowledge society has received, the enablement clause requires "that the public knowledge is enriched by the patent specification to a degree at least commensurate with the scope of the claims."\(^{211}\)

The formative case dealing with the enablement requirement is the Supreme Court case of *O’Reilly v. Morse*.\(^{212}\) Professor Morse invented the American Electro-Magnetic Telegraph, an invention that revolutionized communication in the early history of the United States. Though Morse’s seminal invention was already by its nature broad, his claims were broader still. The eighth claim of his patent claimed any use of electro-magnetism to communicate over long distances.\(^{213}\) O’Reilly had also invented a similar telegraph and Morse filed a patent infringement lawsuit. O’Reilly’s defense was that Morse could not possibly have enabled his superbroad invention. In agreeing with O’Reilly, the Court noted that "Professor Morse has not discovered, that the electric or galvanic current will always print at a distance, no matter what may be the form of the machinery or mechanical contrivances through which it passes."\(^{214}\)

This line of reasoning was upheld in *In re Fisher*.\(^{215}\) In that case, the patentee attempted to claim a hormone preparation having at least twenty-four amino acids when the only hormone disclosed had thirty-nine amino acids.\(^{216}\) The patentee also attempted to claim all potency ratings above a certain threshold for a composition, even though it had only disclosed compositions with potencies slightly above that threshold.\(^{217}\) The court rejected the claims, holding that they were overly broad because they were not matched by the scope of their enablement.\(^{218}\)

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211. National Recovery Technologies, Inc. v. Magnetic Separation Systems, Inc., 166 F.3d 1190, 1195-96 (Fed. Cir. 1999) ("The scope of the claims must be less than or equal to the scope of the enablement."); see also *In re Fisher*, 427 F.2d 833, 839 (C.C.P.A. 1970) ("The scope of the claims must bear a reasonable correlation to the scope of enablement provided by the specification to persons of ordinary skill in the art.").
213. See id. at 66.
214. Id. at 117.
216. Id. at 839.
217. Id.
218. Id. at 839-40.
In *Amgen, Inc. v. Chugai Pharmaceutical Co., Ltd.* the court again found this ground to be dispositive.\(^{219}\) Amgen had claimed a patent on any DNA sequence encoding erythropoietin (EPO) through recombinant DNA technology.\(^{220}\) Amgen had disclosed a few analogs that could make EPO through recombinant DNA technology.\(^{221}\) The court noted that “[t]he essential question here is whether the scope of enablement . . . is as broad as the scope of the claim.”\(^{222}\) Relying on *Fisher*, the court ruled that Amgen had not enabled its claim because it had claimed only a few analogs when countless analogs existed and therefore “Amgen has not enabled preparation of DNA sequences sufficient to support its all-encompassing claims.”\(^{223}\)

Interestingly enough, the court in *Amgen* linked the standard of conceptualization of an invention to its enablement. The court noted that:

> [i]t is not sufficient to define [the invention] solely by its principal biological property, e.g., encoding human erythropoietin, because an alleged conception having no more specificity than that is simply a wish to know the identity of any material with that biological property.\(^{224}\)

The court completed this link in *Fiers v. Revel*.\(^ {225}\) That case was an appeal from a three-way priority dispute between Fiers, Revel and Sugano in which Sugano was awarded priority of an invention for DNA that encoded for human fibroblast beta-interferon (B-IF).\(^ {226}\) Revel had an Israeli application that had the earliest filing date of the three. In order to rely on its date he needed to demonstrate enablement as of that date.\(^ {227}\) The Board ruled that he could not prove enablement to the date, however, because his application did not disclose the nucleotide sequence for the DNA.\(^ {228}\) The court upheld the ruling of the Board, which noted that without full


\(^{220}\) *Id.* at 1203.

\(^{221}\) *Id.* at 1214.

\(^{222}\) *Id.* at 1212.

\(^{223}\) *Id.* at 1213.

\(^{224}\) *Amgen*, 927 F.2d at 1206.

\(^{225}\) *Fiers v. Revel*, 984 F.2d 1164 (Fed. Cir. 1993).

\(^{226}\) *Id.* at 1166.

\(^{227}\) *Id.* at 1169.

\(^{228}\) *Id.* at 1170.
disclosure there could not have been conception, and "[l]ogically, one cannot . . . enable an invention that has not been conceived."229

Another feature of the enablement doctrine is that it varies depending upon the predictability of the invented subject matter. In Fisher, the court also noted that "[i]n cases involving unpredictable factors, such as most chemical reactions and physiological activity, the scope of enablement obviously varies inversely with the degree of unpredictability of the factors involved."230

This line of reasoning was most notably applied in In re Wands.231 That case involved an invention that provided immunoassay methods for the detection of hepatitis B using high-affinity monoclonal antibodies.232 The dispositive question was whether Wands had enabled the invention by enabling the relevant antibodies.233 In order to be enabling, Wand’s patent application must have disclosed a method whereby these antibodies could be obtained without “undue experimentation.”234

This line of reasoning is not limited to biotechnology cases. Even in an industry with a reputedly low enablement bar, the federal circuit has upheld this line of reasoning. In the computer software case, White Consolidated Industries, Inc. v. Vega Servo-Control, Inc., White claimed a patent on a numerical control system for machine tools that could be used on any number of machine tools so long as the user had the proper translator.235 White had not provided the translator in the patent.236 In holding that the patent was not properly enabled, the court noted that implementing the invention should not require unreasonable effort or undue experimentation.237

2. Enablement Requirement Supports Barring Skill-based Inventions

The enablement doctrine supports barring patents on skill-based inventions because they cannot properly enable a PHOSITA to use

229. Id. ("[W]hile the court ultimately upheld the ruling of the board, it did so on written description grounds.") (quoting slip op. at 13).
231. In re Wands, 858 F.2d 731 (Fed. Cir. 1988).
232. Id. at 733.
233. Id. at 736.
234. Id.
236. Id.
237. Id. at 791.
the invention. This failure manifests itself in four ways: first, the scope of their claims cannot be commensurate with the scope of the invention because the user's skills are improperly included within the claim scope; second, whatever description is ultimately given yields unpredictable results and requires undue experimentation because the results vary with the skill of the user; third, the patent does not provide the requisite quid pro quo to society because it fails to provide those skilled in the art with a specific and useful teaching and the claim scope is overly broad; fourth, skill-based patents cannot be properly conceptualized and described by the inventor because the inventor cannot conceptualize and describe all of the skills necessary for the invention.

The seminal case of O'Reilly v. Morse explains claim scope in the context of the enablement requirement. In that case, the Court held that Morse's eighth claim was so broad as to be impossible to enable. His broad claim attempted to cover every single device using electromagnetism to communicate over distances. In denying his claim, the Court noted that his device was only one of many, where each device was a "complicated and delicate machine[...], prepared by the highest mechanical skill." For this reason, Morse's claim was too broad to be enabled. Skill-based inventions all suffer from this flaw. Each use of a skill-based invention is itself an endeavor that requires the highest skill level of the user. Furthermore, a patent disclosure on a skill-based invention can only allow the user to begin practice on the invention. In contrast, the breadth of the claims encompasses any use the practitioner might make of the invention, no matter how skilled.

The Patent Office Board of Appeals addressed the question of claim scope in Ex parte Mayne. That case involved a method for combating seasickness by focusing on an object. The Board noted that the "these claims cover manifestations of inertia effects through the sense of feeling, but we are unable to see wherein the sense of feeling could be employed in any one of the various forms illustrated, and, therefore, the claims are not supported by the disclosure."
The Board went on in that case to state that the invention at issue was not patentable because it posed the same patentability problems as a method for solving certain mathematical problems, or the "discovery of a new stroke in swimming or a new maneuver of troops in battle." In essence, the Board ruled that skill-based inventions could not be patented for lack of enablement.

Skill-based inventions are also not patentable because they yield unpredictable results. The *Wands* test provides the backdrop against which inventions can be evaluated for predictability. This test requires that the invention be useful without requiring undue experimentation. In *Wands* the federal circuit propounded eight factors to make this determination: "(1) the quantity of experimentation necessary, (2) the amount of direction or guidance presented, (3) the presence or absence of working examples, (4) the nature of the invention, (5) the state of the prior art, (6) the relative skill of those in the art, (7) the predictability or unpredictability of the art, and (8) the breadth of the claims." Skill-based patents fail nearly every factor of this test. They fail the first factor since they require much experimentation and practice because they rely upon the skill of the user for their efficacy. They fail the second factor since they can only provide minimal guidance or direction because a written disclosure is insufficient to convey the skill necessary to use the invention. They fail the third factor since working examples are limited because those examples themselves will vary depending upon the skill of the examples' creators. They fail the fourth factor because the nature of skill-based inventions is such that by definition they will require much experimentation in the form of practice to develop the skill. They may fail the fifth factor since the prior art for skill-based inventions may be comprised of other skill-based inventions, which

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*Davies v. United States*, 31 Fed. Ct. Cl. 769, 778-79 (1994) (citing *Brown v. Davis*, 116 U.S. 237, 249 ... (1886)). In *Davies*, the user of the accused device could manually perform the function which the patent claimed as an automatic function. Granting summary judgment to the defendant in literal infringement, the court held that where "a human being substitutes for a part of the claimed structure," the infringement standard under 35 U.S.C. § 112, ¶ 6, that the structure be same as or equivalent to that disclosed in the specification ... is not met. *Davies*, 31 Fed. Ct. at 778-79; see also *Valley Recreation Prods., Inc. v. Arachnid, Inc.*, ... 36 F.3d 1117 ... (Fed. Cir. Sept. 30, 1994) (affirming grant of summary judgment to defendant on literal infringement, where patent claimed scoring means requiring human intervention, whereas accused device performed identical function automatically.)


244. *In re Wands*, 858 F.2d 731, 737 (Fed. Cir. 1988).
will themselves require extra experimentation. The seventh and eight factors provide the strongest arguments. The art is inherently unpredictable because the nature of skill-based inventions is such that the results vary directly with the skill of the user. The breadth of their claims is, by contrast, extremely broad. This combination should be fatal because in Fisher the court held that when considering these two factors together "the scope of enablement obviously varies inversely with the degree of unpredictability of the factors involved."\textsuperscript{245}

This construal of the enablement requirement is supported by congressional intent. In 1930 Congress passed the Plant Patent Act.\textsuperscript{246} Congress knew that plant patents would run afoul of the enablement requirement because a written description could not adequately enable one with skill in the art to predictably recreate the exact varieties of the plants invented.\textsuperscript{247} Therefore, Congress specifically built in an exception to the enablement requirement for plant patents that exempts them from the stringent demands of the enablement requirement.\textsuperscript{248} Clearly, Congress understood that the enablement requirement bars patents that cannot yield predictable results. Skill-based inventions yield unpredictable results, but unlike plant patents, they have no statutory exception to forgive their enablement shortcomings. The Plant Patent Act demonstrates that Congress did not intend for the enablement requirement to serve only as a demand for a certain level of disclosure; Congress also intended it to serve as a freestanding limitation on patentable subject matter that excludes those inventions for which an enabling disclosure is impossible.

The reason that the enablement requirement requires that the claim scope must be commensurate with the enabled invention and that the invention must yield predictable results is because the enablement requirement is responsible for ensuring that society is receiving a benefit from the patent disclosure that is commensurate with the patent monopoly given to the patentee. Skill-based inventions cannot meet this requirement. As mentioned above, their claim scope is vastly out of proportion with what they enable. This problem is compounded by the fact that they yield unpredictable

\textsuperscript{245} In re Fisher, 427 F.2d 833, 839 (C.C.P.A. 1970).

\textsuperscript{246} Act of May 23, 1930, ch. 312, 46 Stat. 376.

\textsuperscript{247} See CHISUM ON PATENTS, supra note 184, § 1.05[1][c] ("This statute recognizes that in the case of new plant varieties a written description normally cannot serve to enable one with skill in the art to reproduce exactly the variety.").

\textsuperscript{248} 35 U.S.C. § 162 (2001) ("No plant patent shall be declared invalid for noncompliance with section 112 of this title if the description is as complete as is reasonably possible.").
results. They claim an entire area of skill-based endeavor but cannot properly enable it to give predictable results. Therefore, they cannot satisfy the *quid pro quo* that "is the foundation of the power to issue the patent."\(^{249}\)

The federal circuit addressed this relationship in the case of *Genentech Inc. v. Novo Nordisk*.\(^{250}\) In that case, Genentech attempted to claim the use of cleavable fusion expression to attain amino acids of human growth hormone by merely disclosing that the cleavage process should be used for that purpose.\(^{251}\) In rejecting the claim as not being enabled, the court stated "[w]here ... the claimed invention is the application of an unpredictable technology in the early stages of development, an enabling description in the specification must provide those skilled in the art with a specific and useful teaching."\(^{252}\)

Skill-based inventions are akin to an unpredictable technology in the early stages of development. Like the claim in *Genentech*, the claims of skill-based inventions only disclose what particular process should be used, but cannot actually disclose *how* that process should be used. Since they cannot disclose a specific and useful teaching, they cannot be properly enabled.

*Genentech* also reveals another argument against the enablement of skill-based inventions. In *Fiers v. Revel* the court noted that that which cannot be conceived cannot be enabled.\(^{253}\) Genentech attempted to claim a patent on a cleavage process that it knew would only theoretically work. However, the actual usage of the invention would require a tremendous amount of refinement. The court denied Genentech’s patent on the grounds that the patentee cannot "bootstrap a vague statement of a problem into an enabling disclosure sufficient to dominate someone else’s solution of the problem."\(^{254}\) Skill-based inventions should be barred for the same reason: they cannot actually conceive of the skill necessary to use the invention so they bootstrap an overview of the skill in an attempt to dominate someone else’s skill-based solution to a problem.

Before concluding this Section, it is also important to note that the enablement requirement is not the only requirement that could theoretically be used to bar skill-based inventions from patentability.

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\(^{249}\) Grant v. Raymond, 31 U.S. 218 (1832).


\(^{251}\) *Id.* at 1363.

\(^{252}\) *Id.* at 1367.

\(^{253}\) See Fiers v. Revel, 984 F.2d 1164, 1170 (Fed. Cir. 1993).

\(^{254}\) *Genentech*, 108 F.3d at 1366.
The federal circuit has recently empowered the written description requirement of § 112, especially in the area of biotechnology. In fact, in *Fiers* the federal circuit supported the idea that in the field of biotechnology the written description requirement must contain a full and complete description of the DNA itself.\(^{255}\) Another possibility is the best mode requirement of § 112, which requires the inventor to disclose the best-known method of using an invention. It is possible to argue that an inventor can never disclose their best-known method of using a skill-based invention because skills cannot be disclosed.\(^{256}\) The federal circuit has been very flexible in its approach to § 112 so it is not inconceivable that these requirements could be stretched for this purpose. Numerous scholars have commented on the flexibility of this requirement in the industries of biotechnology and computer software.\(^{257}\) For biotechnology inventions, § 112 applies a very demanding bar, requiring an extremely high level of disclosure.\(^{258}\) In the computer hardware industry the requirement is reversed. The source code of patented programs need not even be disclosed.\(^{259}\)

Although both of these alternative approaches could theoretically work, they would require the federal circuit to take a large step in evolving the doctrine for that purpose. In contrast, the enablement requirement as it exists now already supports the exclusion of skill-based inventions. As Judge Rader noted in his dissent in *Enzo Biochem, Inc. v. Gen-Probe Inc.*, the enablement requirement is "the most important patent doctrine after obviousness."\(^{260}\) He went on to note that the enablement requirement "has many important

\(^{255}\) See *Fiers*, 984 F.2d at 1170.


\(^{258}\) See, e.g., *Fiers*, 984 F.2d at 1170-71 (adequate written description of DNA requires literal disclosure of DNA's makeup); Regents of the University of California v. Eli Lilly, 119 F.3d 1559, 1567 (Fed. Cir. 1997) (functional description of genetic material is not adequate disclosure).


applications. Beyond mere adequacy of disclosure, it serves as the line of demarcation between the visionary theorist[s] ([who] add nothing to the useful arts) and the visionary pioneer[s] ([who] contribute to the useful arts)."\textsuperscript{261} While there are many alternative grounds upon which skill-based inventions could be barred, none seems as well suited for the task as the enablement requirement.

3. Barring Gatekeeper Inventions

The enablement requirement also supports the exclusion of those patents that act only as gatekeepers to skill-based inventions because they have no independent utility. As part of the \textit{quid pro quo} that is at the heart of the patent bargain, an invention cannot be enabled if does not have utility.\textsuperscript{262} The federal circuit has elaborated on this relationship in the case of \textit{In re Cortright}. That case involved an invention that supposedly cured baldness.\textsuperscript{263} The court noted the relationship of the enablement and utility requirements:

If the written description fails to illuminate a credible utility, the PTO will make both a section 112, 1 rejection for failure to teach how to use the invention and a section 101 rejection for lack of utility \ldots This dual rejection occurs because '[t]he how to use prong of section 112 incorporates as a matter of law the requirement of 35 U.S.C. § 101 that the specification disclose as a matter of fact a practical utility \ldots'.\textsuperscript{264}

The utility requirement holds that "[w]hoever invents \ldots any new and useful \ldots composition of matter \ldots may obtain a patent

\begin{itemize}
\item \textsuperscript{261} Id.
\item \textsuperscript{262} \textit{See, e.g., In re Brana}, 51 F.3d 1560, 1564 (Fed. Cir. 1995) ("Obviously, if a claimed invention does not have utility, the specification cannot enable one to use it.").
\item \textsuperscript{263} \textit{In re Cortright}, 165 F.3d 1353 (Fed. Cir. 1999).
\item \textsuperscript{264} Id. at 1356. \textit{See also In re Swartz}, 232 F.3d 862, 863 (Fed. Cir. 2000):
\end{itemize}

To satisfy the enablement requirement of § 112, p. 1, a patent application must adequately disclose the claimed invention so as to enable a person skilled in the art to practice the invention at the time the application was filed without undue experimentation. The utility requirement of § 101 mandates that the invention be operable to achieve useful results. Thus, if the claims in an application fail to meet the utility requirement because the invention is inoperative, they also fail to meet the enablement requirement because a person skilled in the art cannot practice the invention.

\textit{See also Process Control Corp. v. HydReclaim Corp.}, 190 F.3d 1350, 1358 (Fed. Cir. 1999);
\textit{accord Amgen, Inc. v. Chugai Pharmaceutical Co.}, 927 F.2d 1200, 1214 (Fed. Cir. 1991) ("Considering the structural complexity of the EPO gene, the manifold possibilities for change in its structure, with attendant uncertainty as to what utility will be possessed by these analogs, we consider that more is needed [for enablement].").
The seminal case on the utility requirement is *Brenner v. Manson*.

In that case, the Supreme Court ruled that an inventor could not patent a new steroid compound without disclosing a use for that compound. In arriving at this decision, the court began from the proposition that the utility requirement, not unlike the enablement requirement, is based upon the "basic *quid pro quo* contemplated by the Constitution." The Court then noted that this *quid pro quo* is "derived by the public from an invention with substantial utility." The Court defined substantial utility as existing "where specific benefit exists in currently available form."

Patents on inventions that act primarily as gatekeepers to skill-based inventions should be barred on dual enablement/utility grounds because they cannot confer any specific benefit. Since the only purpose of these inventions is to create a monopoly on skill-based inventions that are inherently unpredictable, then gatekeeper inventions cannot confer any specific benefit. The Court has noted: "a patent is not a hunting license. It is not a reward for the search, but compensation for its successful conclusion. '[A] patent system must be related to the world of commerce rather than to the realm of philosophy.'" The Court wisely cautioned that patents on such inventions "may confer power to block off whole areas of scientific development, without compensating benefit to the public." Therefore, the Court recommended that "[u]nless and until a process is refined and developed to this point—where specific benefit exists in currently available form—there is insufficient justification for permitting an applicant to engross what may prove to be a broad field."

**CONCLUSION**

It should always be kept in mind that the main driving force behind innovation is the competitive free market. Patents act a double-edged sword in this market: they can help spur innovation by allowing inventors to appropriate gains from inventions in return for

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266. *Id.* at 535.
267. *Id.* at 536.
268. *Id.* at 534.
269. *Id.*
270. *Id.*
271. *Id.* at 534 (citations omitted).
272. *Id.* at 534.
273. *Id.* at 534-35.
disclosing inventions, but they can also create harmful monopolies that stifle competition. Accordingly, changes in the patent laws should only be made after a careful consideration of their effects on competition. Following this mandate, this Article argues that allowing patents on skill-based inventions will have harmful effects on competition.

Denying patents on these inventions is no easy task. Clever applicants can twist patent applications until they conform to the patent laws. However, using the tests delineated herein skill-based inventions should be readily separable from their non-skill based counterparts. Still there will be gray areas where the federal circuit will have to use their expertise to set the correct boundaries. An amount of discretion will have to exist but this is inevitable since perfectly rigid patent laws will never be able to bar cleverly morphing patent applications. The benefit derived from excluding skill-based inventions will strongly outweigh the harm caused by the uncertainty that will result from the gray areas surrounding this category.

As more and more skill-based inventions make their way into the patent system the issue of their validity is likely to come before the federal circuit. The natural contours of the enablement requirement support the exclusion of skill-based inventions from the realm of patentability. This exclusion will help align patent law with competition policy.

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274. See John R. Thomas, Formalism at the Federal Circuit, 52 AM. U. L. REV. 771, 774 (2003) ("Bright-line rules may prevent the fine-tuning needed to reach individualized judgments and instead encourage behavior to the boundaries of prohibited conduct.").