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NONOBSVIOUSNESS AND UNMOTIVATED, YET MINOR, INVENTIONS

Christopher A. Cotropia
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Christopher A. Cotropia*

ABSTRACT—This brief essay on nonobviousness originates from a series of conversations, emails, and preliminary drafts between Dmitry Karshtedt and myself that, sadly, never got a chance to fully evolve. We were exploring what the law says, and perhaps should say, about inventions that are technologically small advances, yet unmotivated by prior art. As Dmitry so aptly framed it, “The question we’re dealing with is, what if everyone thought that something was really hard or unworkable, but turned out to be a straightforward, minor improvement? Obvious or no?” This essay puts to paper our exploration of this question. The law’s emphasis on the cognitive approach to nonobviousness typically grants protection for such inventions, but there are policy reasons to be skeptical of granting patents for minor inventions. In the end, protection may, on net, be warranted for inventions unlikely to be created. Ultimately, the definition of technological progress in the nonobviousness context should include overcoming substantial cognitive barriers, even if the resulting invention is simple.

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I. TECHNOLOGICAL PROGRESS AND THE COGNITIVE APPROACH

Many scholars have explored the nonobviousness requirement—”the ultimate condition for patentability.” Dmitry and myself are no different,
both writing about the contours of the doctrine, albeit with varied perspectives. This commonality, including many others, prompted a discussion about the doctrine that turned into a joint paper project that was never finished. Our project focused on the purpose of nonobviousness, the way courts implemented the doctrine, and whether this implementation could frustrate its goals in certain contexts.

The project started with two observations. First, nonobviousness seeks to limit patent protection to inventions embodying significant technological progress. Rewarding technological leaps, not minor changes, is a fundamental goal of the doctrine. Second, courts often test for nonobviousness by using a cognitive approach. If reasons already exist to create the invention, then the invention is obvious. These two points are expanded upon below.

3 I first met Dmitry at a patent remedies conference when he was still a law student at Stanford. Dmitry was presenting what would become Damages for Indirect Patent Infringement, 91 WASH. U. L. REV. 911 (2014), which won a Samsung-Stanford Patent Prize for scholarship on patent damages. We kept in touch, exchanging articles and discussing legal academia. He went on to clerk at the same court I had clerked on more than a decade earlier—the United States Court of Appeals for the Federal Circuit. He then took a teaching position just ninety miles north of me and was kind enough to invite me to present and attend colloquiums at George Washington University. We often ran into each other at Washington Nationals games, especially during their 2019 World Series championship run. The number of conferences (and Washington Nationals games) we attended together is too many to count. My last in-person memory of Dmitry was at the 10th Annual Mid-Atlantic Patent Works-in-Progress at Georgetown Law Center in 2022 where Dmitry, in true Dmitry form, provided in-depth comments on every draft presented, reciting patent law cases—all of them—with his amazing encyclopedic knowledge of every relevant detail.
4 John F. Duffy, Inventing Invention: A Case Study of Legal Innovation, 86 TEX. L. REV. 1, 6 (2007) (“Current law in almost all major developed countries generally requires that to be patentable, an invention must reflect a certain quantum of technical achievement.”).
5 See, e.g., Robert P. Merges, Commercial Success and Patent Standards: Economic Perspectives on Innovation, 76 CAL. L. REV. 803, 811–12 (1988) (“This requirement asks whether an invention is a big enough technical advance; even if an invention is new and useful, it will still not merit a patent if it represents merely a trivial step forward in the art.”).
The ultimate standard for invention—nonobviousness—requires “some step that is not technically trivial.”\(^8\) Mere novelty is not enough, the invention must be of “a significant enough technical advance to merit the award of a patent.”\(^9\) In turn, patents incentivize leaps in technological progress by limiting protection to these nonobvious advances.\(^10\) I, along with many others, have articulated nonobviousness as the doctrine defining an unpatentable technological gap that exists between the prior art and the nonobviousness state of art.\(^11\) This difference, of what is technologically minor and thus unpatentable, defines the level of technological progress an invention must achieve to qualify for patent protection.\(^12\) Figure 1 below graphically depicts the technological gap enforced by nonobviousness.

![Figure 1 – Technological Progress Gap Defined by Nonobviousness](image)

While requiring a particular level of technological advancement may be the fundamental standard of nonobviousness, courts often adopt a specific test to determine whether this standard is met in a given case. The cognitive approach to determining nonobviousness is such a test and discussed in Dmitry’s 2020 article, *Nonobviousness: Before and After*.\(^13\) As Dmitry explained, the cognitive “approach asks tribunals to decide if a [person having ordinary skill in the art] would have had a reason to modify or combine prior art references to achieve the claimed invention and to

\(^8\) Duffy, *supra* note 4, at 6.
\(^12\) See *id*.
\(^13\) See Karshtedt, *supra* note 2. This terminology was also used in Abramowicz & Duffy, *supra* note 6, at 1603, and likely came up often in discussions Dmitry had with his colleague at GW, Michael Abramowicz, regarding nonobviousness.
reasonably expect success in getting to this goal at the time of filing.”

Courts identify lack of motivation or reasons to combine or modify the prior art as evidence of nonobviousness. This method of determining nonobviousness is driven, at least in part, by the comparative ease of implementation—a cognitive barrier is easier to identify than some amorphous standard of technological contribution such as “flash of genius,” for example. Focusing on the presence or absence of cognitive barriers also combats hindsight bias—a major concern of the courts, particularly the Federal Circuit. Investigating cognitive bias forces the fact finder to focus on the time before the invention’s creation and evaluate whether skilled artisans were likely to create the invention, and thus alleviate the need for the inventor’s activities and insights.

II. DickeY-John AND TRIVIAL, BUT AGAINST THE GRain, INVENTIONS

Often the goal of nonobviousness (i.e., protection for substantive technological progress) and the test for nonobviousness (i.e., the cognitive approach) align. However, the existence of cognitive barriers often blocks major technological advances worthy of patent protection. What happens when these concepts are not aligned, particularly when the cognitive

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14 Karshiedt, supra note 2, at 1633–34 (discussing post-KSR v. Teleflex cases).
15 Id.
17 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.”), abrogated on other grounds by In re Gartside, 203 F.3d 1305 (Fed. Cir. 2000). See also Justin Lee, Note, How KSR Broadens (Without Lowering) the Evidentiary Standard of Nonobviousness, 23 BERKELEY TECH. L.J. 15, 15 (2008) (“The general thrust of the [KSR] opinion can, and should, be interpreted to broaden the type of evidence that can be used to support a finding of obviousness, without discarding the decades of Federal Circuit precedent requiring rigorous evidence guarding against hindsight bias.”); Gregory N. Mandel, Patently Non-Obvious: Empirical Demonstration that the Hindsight Bias Renders Patent Decisions Irrational, 67 OHIO ST. L.J. 1391, 1400–03 (2006) (providing empirical evidence of hindsight bias in the adjudication of patent cases).
18 See KSR Int’l Co. v. Teleflex Inc., 550 U.S. 398, 421 (2007) (“When there is a design need or market pressure to solve a problem and there are a finite number of identified, predictable solutions, a person of ordinary skill in the art has good reason to pursue the known options within his or her technical grasp. If this leads to the anticipated success, it is likely the product not of innovation but of ordinary skill and common sense.”).
Nonobviousness and Unmotivated

approach does not fit with the nonobviousness requirement’s purpose of denying patent protection to the trivial? As Dmitry framed it, “The question we’re dealing with is, what if everyone thought that something was really hard or unworkable, but turned out to be a straightforward, minor improvement? Obvious or no?”

Dmitry, as he would often do,21 had the perfect case to bring a theoretical question to life. Here, the case illustrating the disconnect between test and theory is Dickey-john Corp. v. International Taptronics Corp, a Seventh Circuit decision around the time of the Federal Circuit’s creation.22 The invention at issue in Dickey-john monitored the dispensing of seeds by planters to alert farmers of malfunctions.23 The prior art used mechanical seed dispensing monitors, which were judged “worthless” because they could not hold up to the hostile environmental conditions, such as herbicides, insecticides, and graphite mixed with the seeds.24 The invention instead employed a photoelectric cell for detection to great success.25

The alleged infringer asserted this invention was obvious because the use of photocells to count small objects was well known in the prior art.26 And the Seventh Circuit agreed that the “prior art no doubt taught the use of a capacitor to counteract the problem of the photocell responding to gradual rather than sudden changes in light, the kind of gradual change which would occur from dust accumulating on the lenses of the photocell.”27 Prior to the invention, technology had progressed to use photocells in dirty environments to tally small items.28 The claimed invention, as the court put it, was “admittedly . . . a difference in degree.”29 Others had already used photocells to count “admission tickets,” “pitched baseball[s],” “fish,” “bolts and screws,” or a “dark spot on . . . paper” and the invention was just counting another object—seeds.30

The minor nature of the invention was irrelevant in light of the strong cognitive barriers against using photocells in seed chutes. The Seventh

20 Email from Dmitry Karshtedt to author (Sept. 20, 2019; 5:03 P.M.) (on file with author).
22 Dickey-john Corp. v. Int’l Taptronics Corp., 710 F.2d 329 (7th Cir. 1983).
23 Id. at 332–33.
24 Id.
25 Id. at 340–41.
26 Id.
27 Id. at 345.
28 Id.
29 Id.
30 Id. at 340–41.
Circuit concluded, “In a very real sense, it was not, however, merely prior art which taught away from using the photocell in a planter monitor, but rather, common sense. . . . the dirt problem was simply considered ‘too severe’ to make that avenue of experimentation,” using a photocell, “worthwhile.”31 The invention was nonobvious because farmers would have never considered using photocells in the seed counting environment.32 The court found, “[t]he problem was not too severe. We think that one with ordinary skill in the art would have regarded it as too severe, and hence would have continued, as did plaintiff’s expert, to tinker with the mechanical monitor in order to solve the problem.”33 The defendant’s expert contrary conclusions were “a textbook example of hindsight . . . he was in no position to say that it would have been tried at all by one with ordinary skill in the art.”34

The facts in Dickey-john provide a prototypical example of an unmotivated, yet technologically minor invention. This invention, truly “against the grain” meets the cognitive approach.35 But, the invention does not fit well under basic nonobviousness theory. While the court essentially admitted the invention as being technologically advanced, the invention was trivial in reality.36

Our question, and the factual scenario in Dickey-john, present a situation where the cognitive approach fails as a proxy for a significant technological contribution. The two concepts do not coincide. There can be, as in Dickey-john, simple inventions for which no reason to make them existed, or, in some cases, were explicitly discouraged. Figure 2 below depicts this intersection between these two concepts, the cognitive framework and level of technological progress. The white area on the left graphically depicts the situation being discussed, and present in Dickey-john, where the presence of a cognitive barrier does not overlap with significant technological progress.37

31 Id. at 345–46.
32 Id.
33 Id. at 346.
34 Id. at 344–45.
35 I can’t take credit for this; it was Dmitry’s pun when discussing Dickey-john. Dry humor was a specialty of his.
36 Id. at 344–46.
37 The gray area to the right presents another dimension that Dmitry and I discussed briefly, but never explored. This would be an invention that represents a major technological advance that is already suggested in the prior art. These inventions shouldn’t need the incentive of patent protection for their creation given that motivation already exists. See, e.g., Abramowicz & Duffy, supra note 6, at 1613–14 (discussing obviousness and ease of discovery); Glynn S. Lunney Jr., Patent Law, the Federal Circuit, and the Supreme Court: A Quiet Revolution, 11 SUP. CT. ECON. REV. 1, 3–4 (2003). Patent protection, perhaps, may be necessary to further speed up the invention’s creation. Or, under the
This framing prompts a couple of questions. First, who cares? Patenting minor inventions may be unproblematic or perhaps the cognitive approach directly captures an aspect of technological progress. In that case, the distinction between the two concepts does not truly exist. Second, if we do care, what should the courts or Congress do? Dmitry and I exchanged thoughts on these questions, but alas, time never allowed us to converge on definitive answers. Given the circumstances, I will provide some brief thoughts on both.

Regarding the first question, this situation of granting patent protection for unmotivated yet minor inventions can run counter to patent policy. Patents on trivial technologies create a thicket of exclusivities that is difficult to avoid, either by designing around or clearing a path via Prospect Theory, exclusivity is needed to ensure full exploitation and investment in the invention. See Edmund W. Kitch, The Nature and Function of the Patent System, 20 J.L. & ECON. 265, 280–84 (1977); see also Robert P. Merges, Uncertainty and the Standard of Patentability, 7 HIGH TECH. L.J. 1, 2–4 (1992) (explaining that nonobviousness should “reward[] one who successfully invents when the uncertainty facing her prior to the invention makes it more likely than not that the invention won’t succeed”).

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Figure 2 – Relationship Between Nonobviousness Findings

III. RETHINKING THE COGNITIVE APPROACH’S PLACE IN NONOBVIOUSNESS DOCTRINE

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licensing. This cordonning off of minor advances can discourage larger ones, with would-be inventors knowing they may be blocked by these trivial patents. Patents on these minimal improvements also force prior inventors who hold patents on significant developments to share their rents with these smaller improvement patentees. This blocking patent situation may further discourage fundamental inventions. A cluttered invention environment with patents on small steps in a technology’s development is the very situation nonobviousness tries avoiding by incentivizing major inventions, not minor ones.

This essay’s focus, however, is on minor improvements that are unlikely to be created due to the cognitive barriers in the prior art. In Dickey-john, without the inventor’s photocell use in the seed chute, it was unlikely such a technology, albeit a simple one, would ever have seen the light of day, or at least its creation would have been substantially delayed. Patenting in this situation may induce minor inventions, and thus play a productive role in technological progress. Moreover, the greatest harm to granting exclusivity for a minor invention lies in its economic insignificance, and there are other mechanisms that can discourage such “economically and technically trivial patents.” The presence of cognitive barriers naturally limits the number of these simple inventions even further. These factors thin the thicket created, minimizing the harm patent protection introduces in these circumstances.

This line of reasoning suggests the definition of technological progress in the context of the nonobviousness doctrine should be expanded. That is, technological progress is not limited to advances in the technological result; it also includes advances in the technological processes, and the opening of development pathways. The technical advance in Dickey-john was not using a photocell in a difficult environment, which had been known and done before. Rather, it was bringing the photocell to the seed chute environment—a process that had to

38 See Atlantic Works v. Brady, 107 U.S. 192, 200 (1882) (“It was never the object of those [patent] laws to grant a monopoly for every trifling device, every shadow of a shade of an idea, which would naturally and spontaneously occur to any skilled mechanic or operator in the ordinary progress of manufactures. Such an indiscriminate creation of exclusive privileges tends rather to obstruct than to stimulate invention.”); Jeanne C. Fromer, The Layers of Obviousness in Patent Law, 22 HARV. J. L. & TECH. 75, 80–81 (2008).


41 See Duffy, supra note 4, at 11–12.
overcome significant discouragement. Perhaps the technological progress nonobviousness seeks to further is not only the destination of the ultimate invention being a significant technological advance but also the journey to invention, which is significant in its own right. Putting this broader definition in terms of Figure 2, both circles are inquiring into the underlying purpose for the nonobviousness requirement.

If the definition of technological progress is expanded to include cognitive barriers, then courts need not change their nonobviousness approach. This does mean, however, courts cannot engage in a nonobviousness analysis that completely ignores the cognitive approach. Decisions such as *Anderson’s Black-Rock Inc. v. Pavement Salvage Co.* and *Sakraida v. Ag. Pro, Inc.* that care exclusively about the resulting technological advance are examples. The patentability of inventions such as those in *Dickey-john* would likely be found obvious under this approach because the photocell used in a seed chute “did not produce a ‘new or different function’” and “only unites old elements with no change in their respective functions.” “Synergism,” the technological result-oriented doctrine in these cases, “does not focus on the path taken from the prior art to the invention and whether this path is unlikely to be traveled by the skilled artisan. Instead, synergism involves a comparison of operation—operation of the prior art by itself compared to the prior art when combined.” Result-focused nonobviousness inquiries, such as synergism, should be avoided because they ignore the technological progress of overcoming cognitive barriers.

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Filtering these unmotivated, yet minor inventions out of the patent system is unlikely and ultimately unworkable. As we tried to work through

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42 *Dickey-john Corp. v. Int’l Tapetronics Corp.*, 710 F.2d 329, 344–46 (7th Cir. 1983).
46 *Anderson’s-Black Rock*, 396 U.S. at 60.
49 See, e.g., *Stratoflex, Inc. v. Aeroquip Corp.*, 713 F.2d 1530, 1540 (Fed. Cir. 1983) ("A requirement for ‘synergism’ or a ‘synergistic effect’ is nowhere found in the statute . . . The reference to a ‘combination patent’ is equally without support in the statute . . .").
the implications section of this project, Dmitry noted, “[m]y intuition is that the Federal Circuit as an institution thinks that the technical leap is simply not measurable independently (e.g., without looking at motivation) - at least not without hindsight distortions that are so serious as to make that project impossible.” I agree—doctrines like synergism that strived to live outside of the cognitive framework are no longer used, and the Supreme Court’s decision in *KSR* refocused the inquiry on cognitive barriers such as lack of reason to combine and absence of “common sense” or “design need or market pressure to solve a problem.” The best way to rectify this is to bring the cognitive approach into the nonobviousness and technological progress discussion. Overcoming cognitive barriers is a form of technological progress and aligns with decisions like *Dickey-john*. In the end, this is probably the right result patent policy-wise.

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