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and the Teaching-Suggestion-Motivation Test**

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By Randall J. Hirsch, M.D.*

I. INTRODUCTION

¶1 The Supreme Court of the United States recently decided the case of *KSR International Company (KSR) v. Teleflex, Incorporated* (Teleflex).¹ Originally, Teleflex sued KSR for infringement of its patent related to an electronic throttle control device that was mounted to a support bracket of an assembly for an adjustable automobile pedal.² The invention's design allowed the pedal to be adjusted without moving the electronic sensor, which created a less bulky, expensive, and complex device to manufacture.³ KSR moved for summary judgment on the grounds that the patent was invalid for obviousness under 35 U.S.C. § 103.⁴ In its decision regarding summary judgment, the district court analyzed several patents in the prior art.⁵ The district court held that the prior art references expressly taught the design of Teleflex's patent and therefore it was obvious and invalid.⁶

¶2 On appeal, the Federal Circuit stated that the district court did not use the appropriate test in arriving at its decision.⁷ The Federal Circuit criticized the district court for not applying an appropriate teaching-suggestion-motivation (TSM) test.⁸ Since issues of material fact remained, the district court erred as a matter of law, and the Federal Circuit vacated and remanded the district court's ruling for further evidentiary proceedings.⁹ KSR appealed the decision of the Federal Circuit to the United States Supreme Court, and the Court granted certiorari.¹⁰ While the Federal Circuit's determination of the district court's improper issuance of summary judgment was technically the issue on appeal, the case had much larger implications. The parties in the dispute and almost 40 amicus curiae used the case as a vehicle to uphold or challenge the Federal Circuit's use of its method of determining the obviousness of patents, the TSM test.

¶3 The TSM test is a test that the Federal Circuit had utilized to determine the obviousness of a patent. However, the test was a court-made construct and not a

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¹ *KSR Int'l Co. v. Teleflex, Inc.*, 127 S. Ct. 1727 (2007).

² *Teleflex, Inc. v. KSR Int'l Co.*, 119 F. App'x 282, 283-84 (Fed. Cir. 2005).

³ *Id.* at 284.

⁴ *Id.*

⁵ *Id.* at 286.

⁶ *Id.*

⁷ *Id.*

⁸ *Teleflex, Inc. v. KSR Int'l Co.*, 119 F. App'x 282, 288 (Fed. Cir. 2005).

⁹ *Id.* at 290.

¹⁰ *KSR Int'l Co. v. Teleflex, Inc.*, 126 S. Ct. 2965 (2006) (mem.).

statutorily defined guideline. Many argued therefore, that the TSM test went beyond the mandates of the Constitution, Congress, and the Supreme Court, and imposed too high a threshold to prove nonobviousness.¹¹ The Supreme Court agreed and stated that the TSM test applied by the Federal Circuit was too stringent.¹²

¶4 This note, however, will counter the arguments against the TSM test by demonstrating that the TSM test not only is in line with constitutional, congressional, and Supreme Court doctrine, but also, that it is the only way to determine obviousness of a patent in an objective manner. First, the policy underlying issuance of patents will be described and its relation to the need for nonobvious patenting of inventions. Second, the complex interplay between subjectiveness, invention, and the need for an objective standard for patentability will demonstrate why the TSM test is needed. Finally, some of the criticisms of the TSM test, as elucidated in *KSR v. Teleflex*, will be addressed.

II. PATENTS AND OBVIOUSNESS

A. *The Policy Reasons Underlying Patents*

¶5 Advancements in knowledge and technology benefit society overall. Consequently, innovation and experimentation have long been encouraged. This recognition was present at the founding of this country, where it was made a fundamental part of the government's duties at its inception. The United States Constitution directly authorizes Congress to "promote the progress of science and useful arts" by granting exclusive rights to inventors for their discoveries.¹³ These exclusive rights, patents, give an inventor a monopoly over the sale and use of his work for a specified period of time. By granting this monopoly, an inventor has the potential to reap tremendous monetary rewards from his invention. The more useful and novel the invention is, the more there is a potential for profit. As his investment in research and development is protected, an inventor is theoretically induced to create increasingly innovative and useful products because the potential rewards are greater. Most importantly, however, this encouragement eventually gives society the benefits of the innovation after the expiration of the patent. As long as the innovation is significantly valuable enough to outweigh the temporary cost of granting a monopoly, patents overall are beneficial for society.

¶6 In contrast, a nonpatent system does not offer an inventor protection for his ideas. Any new innovation would be able to be quickly copied by competitors after release. The resources an inventor would spend in innovation would be wasted as others would be able to free-ride on his investment. An innovator would therefore be disadvantaged compared to competitors. Consequently, there would be no inducement for someone to make significant advancements. This situation would be counter to society's best interest to spur innovation. The need to overcome the free-rider problem to encourage innovation has long been recognized, and in this country, the First Congress enacted the first Patent

¹¹ See, e.g., Brief of Intellectual Prop. Law Professors as Amici Curiae in Support of Petitioner, *KSR Int'l Co. v. Teleflex, Inc.*, 127 S. Ct. 1727 (2007) (No. 04-1350) [hereinafter *Brief of IP Law Professors for KSR*].

¹² *KSR Int'l Co. v. Teleflex, Inc.*, 127 S. Ct. 1727, 1746 (2007).

¹³ U.S. CONST. art. I, § 8, cl. 8.

Act in 1790.¹⁴ This recognition, the need to encourage innovation and avoid free-ridership, despite almost 50 revisions of the Patent Act, still remains.¹⁵

B. What Factors Go into Issuing a Patent?

¶7 The patent system was created to benefit society, not individual inventors.¹⁶ Society incurs a cost by issuing a monopoly — it is a restriction of information, causes increased prices, etc. To limit the harm, patents are only issued for a limited time. On the other hand, society does benefit from advancement in knowledge and introduction of new technologies into the market. However, not all innovations will be sufficiently inventive or advanced enough to “outweigh” the harm caused to society by the issuance of a patent. Determining the line that differentiates those innovations that provide a benefit to society and overcome the cost — and are worthy of a patent — constitutes much of the legal system’s involvement in the patent process.

C. How to Determine the Benefit to Society

¶8 As the cost to society, the monopoly, is a set cost, the assessment of the balance needs to center on how to define a sufficient benefit to be worthy of a patent. Unfortunately, legislative instruction is not clear. The grant of promoting the “progress of science and the useful arts” does not clarify what the exact definition or threshold of progress or “inventiveness” is or should be in order to be granted a patent, and no definition has ever been more specifically defined.¹⁷ The threshold line that needs to be drawn divides those ideas which are worthy of a temporary monopoly because their benefit to the public outweighs the harm and those that are not.¹⁸ But how does one set a standard for those inventions that benefit society by being sufficient progress? Objectively, it would not make sense to issue a patent for those claims that removed knowledge that already existed in the public domain, those inventions that would have arisen even without the inducement of a patent, or those that were not sufficiently inventive.¹⁹ Granting a patent in these cases would represent a net cost to society because the harm of a monopoly is not outweighed by any significant benefit.

¶9 Issuing patents for knowledge that is already in the public domain grants a monopoly to things that are not, by definition, innovative and has the effect of removing knowledge from society. In theory, it would be relatively easy to test for these claims by determining what the state of public knowledge was that existed at the time of invention. All written records, communications, opinions, etc. comprise a set group of knowledge at the exact moment of invention, whenever that may be. Preventing the issuance of patents for “inventions” that claim what is already known would just be a matter of finding the entire set of information that existed at that time.²⁰ This understanding, to deny patents to

¹⁴ *Bonito Boats, Inc. v. Thunder Craft Boats, Inc.*, 489 U.S. 141, 146 (1989).

¹⁵ *Graham v. John Deere Co.*, 383 U.S. 1, 10 (1966).

¹⁶ *Id.* at 9.

¹⁷ *Id.* at 11.

¹⁸ *Bonito Boats*, 489 U.S. at 148.

¹⁹ *Graham*, 383 U.S. at 6, 9, 11.

²⁰ While this is by no means a realistically easy task, in theory, what was known up to the moment of invention is set — it does not change with time — and therefore, all one has to do is “look it up.”

non-inventions, is explicitly codified in the Patent Act as the novelty requirement.²¹ However, granting a patent for, and therefore inducing, inventions that are only slightly more advanced than what is already known does not sufficiently benefit society to overcome the cost of a monopoly. Therefore, something more than absolute novelty is required.

¶10 Issuing patents for those inventions that would not have been made without the inducement of a patent is much more difficult. Aside from directly asking an inventor the reasons for his invention — which would invariably be because of a patent, if that was the requirement — there are no reasonable methods for determining which inventions would not have been created “but for” the patent system.²² Furthermore, the “but for” test would still not act as an appropriate measure for determining those inventions that sufficiently benefited society to outweigh the cost of a monopoly. For example, many of the greatest scientific breakthroughs in history came about despite the fact that they were not patentable (e.g., the theories of evolution, relativity, calculus, etc.). Alternatively, the rewards from a potential monopoly may induce the creation of “inventions” that are arguably not significantly beneficial, and therefore, not worth the cost to society (i.e., multiple pharmaceuticals for the same disorder that have relatively the same efficacy and side effects). In order to be worth the cost to society in issuing a patent, an invention needs to demonstrate something more.

D. Why “Inventiveness” is Not the Patentability Standard

¶11 The above standards for patentability, while not offering a proxy for a sufficient benefit, do utilize objective evidence that could facilitate an objective determination of sufficient patentability. However, the objective criteria discussed above — what existed in the public knowledge, for example — are inadequate when a more sufficient amount of inventiveness is needed to make a patent worthwhile. No objective measure of sufficient innovation necessary to meet patent requirements has ever been defined. What has been left, therefore, is a subjective determination of an invention’s “inventiveness.” However, depending on who is making the judgment, the decision is based on policy decisions, individual tastes, individual experience, and the like. Because of this subjectivity, it would be technically impossible to describe in words the definition of a value for inventiveness such that everyone could make the same determinations for the same objects.

E. The Need for an Objective Standard

¶12 A subjective determination of inventiveness — and therefore patentability — could be established to potentially address the above shortcomings. Patents *could* be issued for those inventions that an evaluator deems are sufficiently innovative, without ever firmly establishing a general standard. Granting of a patent would become a sort of policy decision where each submitted claim would be weighed based on its inventiveness and benefit to society as determined by the evaluator. The determination of a patent would

²¹ 35 U.S.C. §§ 101-102 (2000); *Bonito Boats*, 489 U.S. at 148.

²² *Graham*, 383 U.S. at 10-11 (how to actually “weed[] out those inventions which would not be disclosed or devised but for the inducement of a patent” is difficult to define).

therefore be subjected to the individual biases of the examiner. This determination of patentability without objective standards (a determination based on values not concrete facts) would create a system that has high transaction costs. As it would be difficult to anticipate approval for one's invention *ex ante* due to the subjectivity, there would be a decreased incentive to make large investments in an invention for fear that it would be lost if a patent is not issued. It would also create imbalance if individual examiners have differing opinions of inventiveness and consequently approve inventions of differing quality, possibly conflicting with each other.

¶13 It may be possible to create a board consisting of a relatively few number of individuals who would evaluate all patent applications and determine patentability based on agreed upon standards reflecting governmental policy. This system is in fact what originally was created in the United States with the Commissioners for the Promotion of Useful Arts.²³ As long as there are few patent applications and the technology breadth is small, this group may be able to issue relatively standardized decisions that adequately reflect governmental policy. However, as the number and complexity of patent requests increases, the ability of the system to keep up becomes overwhelmed. Increasing the number of examiners only would serve to increase the disparity in standards. This is what happened to the original Commission²⁴ and later, the United States Patent and Trademark Office (USPTO).²⁵ Since the Commission's individualized subjective determination of patentability was unworkable, the role was turned over to the judiciary.²⁶

¶14 The U.S. judiciary operates under principles of consistent standards, precedent, and equitability. The facts of a case are determined as objectively as possible. Law is applied consistently. Those that act in a similar way are treated similarly. This equitability allows for the future planning of actions and theoretically lowers transaction costs by creating a standard by which "everyone might know when his actions were safe and lawful."²⁷ As for determining sufficient inventiveness for a patent, a subjective determination based on policy and individual tastes, employing a value based system within the judiciary would not only suffer from the same difficulties as the Commission, but it would also undermine the principles of the judicial system. A standard for patentability that exists under the auspices of the court system, therefore, needs to be more objective.

F. How to Create an Objective Standard of Inventiveness

¶15 In order to create an objective set of criteria for patentability, inventiveness itself needs to be defined more objectively. "Most if not all inventions arise from a combination of old elements."²⁸ New "ideas" are really just an evolution or adaptation of what came before, not a "flash of inspiration" that is independent of everything.

²³ *Graham v. John Deere Co.*, 383 U.S. 1, 7 (1966).

²⁴ *Id.* at 10.

²⁵ *Id.* at 12. This was mostly due to an individual USPTO examiner's own subjective interpretation of what is an "invention."

²⁶ *Id.* at 10.

²⁷ *Id.* at 10 (Letter from Thomas Jefferson to Isaac McPherson (Aug. 18, 1813), in 6 THE WRITINGS OF THOMAS JEFFERSON 175 at 182 (H.A. Washington ed., 1854)).

²⁸ *In re Kotzab*, 217 F.3d 1365, 1369 (Fed. Cir. 2000).

Symbolically, this dynamic can be quantified, whereby ideas in the common knowledge A and B are combined in some way to produce new idea C ($A + B = C$). This first iteration of an innovative process would create an invention C that is not sufficient for patenting. As above, this combination would not create something that was sufficiently innovative to outweigh the cost to society of a monopoly. It is non-novel because the new “invention” includes all of the elements of old ideas. It also signifies something that anyone familiar with A and B would “know” how to do. It is just the next step in the evolutionary process of an innovation. However, as the iterations continue, for example $C + D = E$,²⁹ the combinations become more thoroughly advanced from the original combination of known elements that what we think of as “inventiveness” becomes more likely. These further iterations are still combinations of known elements, but their combination creates new innovations that are several steps beyond what is generally known (A , B , and D). Each new iteration of combination produces a “distance” between what is generally known and the innovation itself. This distance can be described qualitatively as the difference between the understanding of someone on the “cutting edge” and those of general skill in a particular art.³⁰ In order to establish an objective definition sufficient for patentability, a specified difference, or number of iterations, could be set.

¶16 However, this does not put an end to the subjectiveness problem. While specifying the number of iterations required for sufficient inventiveness may be abstractly defined, a standard that is actually practiced cannot be defined by these equations. After more than one iteration the set point for sufficient inventiveness would describe a future state of a combination of old elements before anyone knows what it is going to be. If that future state was known, by definition it would not be inventive. Working backwards — by evaluating the claimed invention and trying to determine the number of iterations it required to get there — would not be practical and subject to an individual examiner’s own biases, again introducing unwanted subjectivity.³¹ Therefore, something other than a quantification of a defined number of iterations for inventiveness would need to be set as the threshold for adequate inventiveness.

¶17 An alternative approach that would decrease the subjectivity inherent in evaluating a set number of iterations considers the ends of the novelty spectrum. At the far end of the spectrum, the number of iterations approaches infinity whereby the invention becomes something where no previous art can be recognized, that is, something completely novel. Evaluations of patentability based on this standard would be relatively straightforward. A claimed invention could be assessed against the state of current knowledge. It would be in essence a negative test, whereby proving any element of current knowledge would defeat patentability.³² However, this would create a very high

²⁹ Where D can represent another known element or a new combination of known elements.

³⁰ By definition, if every idea is a combination of old ideas, then those innovations that are truly astonishing are just a combination of old elements as well. The difference is that the invention has gone through multiple iterations of combinations of (what to the inventor would be) prior elements faster than that in the general public so that the result appears advanced (or even a flash of creative genius).

³¹ It would be impractical to recreate an individual inventor’s thought process to determine how he came up with the idea, and any independent evaluation would be subjected to hindsight bias (*see* III c. *infra*).

³² It would not be possible to have a positive test; that is, having someone prove affirmatively that his claimed invention includes no other previous work, as all previous work would have to be shown not to be related to the claimed invention.

threshold for patentability. If all inventions are just combinations of previous ideas, then no invention would pass the test. If it were possible to create an invention that was so far advanced in number of iterations that no prior art was recognizable, the amount of time, effort, and investment would arguably be so high so as to be prohibitive. Setting the patentability threshold this high would not spur sufficient advancement in knowledge benefiting the public as called for by the constitutional mandate.

¶18 At the other extreme of the novelty spectrum is non-novelty. An objective threshold could be established whereby a patent could be granted to any invention that is a combination of known elements ($A+B=C$). This too is relatively an objective determination as the prior art is known and the claimed invention can be analyzed to see if it is just a combination of those elements. Very little subjective interpretation or value judgment on behalf of the examiner is required. Obviously, under this test, every invention would be able to be patented, again subverting the purposes of the Patent Act. It is therefore between these two extremes that a threshold for patentability must lay.

¶19 However, as above, setting a standard somewhere in between — that is, stating what iteration of combinations would be sufficiently inventive — would require subjective value judgments and be extremely difficult, if not impossible, to define. A standard established somewhere within this middle zone would require a high subjective content that would be antithetical to the judicial system. The system needs a threshold set as close to the objective ends of the spectrum while retaining a sufficient amount of innovation to uphold the purposes of scientific progress. But the question remains, how to determine this leap?

III. THE TSM TEST AND OBVIOUSNESS

A. *Quantifying the “Leap” of Innovation*

¶20 What is needed to establish an objective standard for patentability is a defined sufficient “leap” beyond what is already known that can be demonstrated as objectively as possible. It has been long recognized that in order to earn a patent, the leap that had to be made was one that evidenced “more ingenuity and skill... than were possessed by an ordinary mechanic acquainted with the business.”³³ An “ordinary mechanic” just combines or substitutes old elements. It can also represent someone just producing the next step in the evolution of an innovation, which anyone knowledgeable would “know” how to do. This is equivalent to the low objective, non-novelty, standard ($A+B=C$). What the courts, and society, have consistently stated is that something exhibiting more innovation is required to be worthy of a patent. As noted above, the required amount of innovation necessary for patenting has never been qualified by the courts or Congress. Courts have defined what is not patentable: those inventions that do not make a sufficient leap (iterations beyond the first order), or more specifically, those inventions that are obvious.³⁴

¶21 The evaluation of what is not patentable, rather than attempt to prove what is patentable, known as the non-obviousness requirement, provides the third statutory

³³ Hotchkiss v. Greenwood, 52 U.S. 248, 267 (1850).

³⁴ This is also a negative test, like attempting to prove total novelty, above. Innovation is not proved, but rather, attempts are made to demonstrate that the claim is not sufficiently innovative.

requirement of patentability, along with utility and novelty.³⁵ As obviousness, or what leap is not sufficiently more than the skill of an ordinary mechanic, is itself a subjective determination, the non-obviousness requirement remained uncoded for most of the Patent Act's history and was left to the courts to develop.³⁶ For more than 100 years, the courts denied patents to claims where a person skilled in the art would find the difference between the claim and the prior art obvious.³⁷ In 1952, Congress revised the Patent Act and finally codifying this standard and creating the statutory requirement that a claim for a patent be non-obvious.³⁸ The non-obviousness requirement is well-suited to the legal system for reasons stated below.³⁹

B. Evaluating a Sufficient Leap

¶22 Assessing a sufficient leap to overcome obviousness is a subjective aspect of the patentability determination. In an otherwise objective analysis, differences in the determination of this leap would create a large variability in outcomes and undermine any standardization of the test overall. To cut down on the variability of this determination, obviousness is evaluated from the perspective of a person of ordinary skill in the art (POSITA).⁴⁰ An invention is obvious, and therefore unpatentable, if a POSITA would find that the leap was insufficient to make the invention nonobvious. Congress codified this test in the nonobviousness requirement for patentability by stating that 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.”⁴¹ Congress finally codified the language that was often used by the courts in order to establish uniformity and definiteness in decisions and have a stabilizing effect.⁴²

C. Why the POSITA's Opinion Needs to be Balanced with Other Factors

¶23 Unfortunately, leaving the evaluation of obviousness solely up to a POSITA not only does not further standardize what a sufficient innovation is, but is also fraught with the same subjectivity a standard needs to avoid. Aside from the fact that every POSITA may have a different opinion of what is obvious,⁴³ a more significant problem is that the evaluation occurs *ex post*, that is, it occurs after — sometimes years after — the circumstances at the time the inventor actually had his “flash of insight.” This *ex post* evaluation injects subjectivity into the obviousness determination because the examiner's

³⁵ 35 U.S.C. § 103 (2004).

³⁶ *Graham*, 383 U.S. at 10-12.

³⁷ *Id.* at 15, 16 (citing H.R. REP. NO. 82-1923 (1952) and S. REP. NO. 82-1979 (1952)).

³⁸ *Id.* at 12.

³⁹ Other standards within the legal system operate as a threshold to determine what things are not. For example, in the criminal system the standard is innocence unless there is evidence supporting guilt beyond a reasonable doubt. It is a yes/no test, not a determination of the quality of guilt.

⁴⁰ *Id.* at 15 and n. 41 (citing H.R. REP. NO. 82-1923 and S. REP. NO. 82-1979). The issue of who qualifies as a POSITA is a subject of other articles.

⁴¹ 35 U.S.C. § 103(a).

⁴² *Graham*, 383 U.S. at 15 (citing H.R. REP. NO. 82-1923 and S. REP. NO. 82-1979).

⁴³ This problem exists in all fields of the law and leads to the problems with a battle of the experts.

own knowledge and experience up until the point the claim is analyzed colors any determination of obviousness. While the threshold question is what would have been obvious to a POSITA *at the time* of invention, what is used in the evaluation is information that is created *after* the time of invention. Not only does the passage of time affect the evaluation of any ex post evaluation of an examiner, but also the fact that the invention was created at all, especially the closer it is to the first iteration of a combination of old elements, biases the examiner into a belief that the invention would have been obvious.⁴⁴ “Armed with the knowledge of the patented invention, the selection and combination or changing of what has previously been done to make the claimed invention becomes much easier to comprehend.”⁴⁵ This “hindsight bias” injects a problematic variability, and more significantly, an inaccuracy into the obviousness determination and undermines the purpose of the Patent Act itself, which provides patents for those inventions beyond the scope of public knowledge *at the time they were created*.

D. The Teaching-Suggestion-Motivation Test as an Answer

¶24 Thus, the POSITA’s opinion of a sufficient leap or obviousness cannot be the sole determination of patentability.⁴⁶ In order to create an objective legal standard for obviousness, and therefore, patentability, a standard has to be created that modulates the inherent subjectivity of the POSITA. To accomplish this, the POSITA’s opinion needs to be considered within a more objective framework determining the amount of innovation.

¶25 What remains in the establishment of a standard is the yet unresolved problem of determining if there is a sufficient leap of innovation. As discussed above, sufficient inventiveness needs to be more than just a first-iteration invention and the only practical objective test would be a standard at the non-novelty level (which is also at the first iteration level). If subjectivity precludes determining a sufficient innovation level beyond the first iteration level positively, then an objective standard can be established that evaluates innovation through a negative test: *any invention that can be proven to be a first-iteration combination cannot be sufficiently innovative to be nonobvious*. This is the only way to evaluate the inherently subjective determination of innovation in an objective, court-based way. Any invention that can not be proved to be a first-order iteration for a POSITA would therefore be nonobvious.

¶26 The state of knowledge at the time of invention is objective, that is, all patents, journals, memos, and other documented materials that were produced up until the time of invention are set and cannot be changed after invention. The purpose of the claimed invention, the problem to be solved, is also relatively objective, in that the function and reason for the invention do not change. The differences between the claimed invention

⁴⁴ *In re Kotzab*, 217 F.3d 1365, 1369 (2000) (“[T]he very ease with which the invention can be understood may prompt one ‘to fall victim to the insidious effect of a hindsight syndrome wherein that which only the invention taught is used against its teacher.’”); *In re Shaffer*, 229 F.2d 476, 480 (C.C.P.A. 1956) (“[A] person having the references before him who was not cognizant of appellant’s disclosure would not be informed that the problem solved by appellant ever existed.”).

⁴⁵ Christopher Cotropia, *Patent Law Viewed Through an Evidentiary Lens: The “Suggestion Test” as a Rule of Evidence*, Tulane Public Law Research Paper No. 06-03, draft, March 2006, [hereinafter Cotropia, Evidence], <http://ssrn.com/abstract=893965> (last visited October 26, 2007).

⁴⁶ If this were so, it would be tantamount to the old Commissioners as discussed above.

and the prior art is unchanging and objective. These elements provide the backbone of the objective test.

¶27 To apply the nonobviousness test, it needs to be determined if the claimed invention is just a combination of old elements (a first-order iteration). If the prior art and contemporaneous knowledge just “add up” to the new claim, the innovation is obvious. This first-order iteration cannot, by definition, include any “inventiveness.” When assessing whether a claimed invention is solely a first-order iteration, it is not just the physical attributes that need to be considered, but also deficiencies, solutions, reasons to combine elements, and other intangible aspects of the prior art. A combination using a solution to solve a deficiency is still simply a combination of what is generally known and therefore is obvious. For example, if object 1 contains elements *A*, *B*, and deficiency *C*, and object 2 contains element *D* and solution *E*, then claimed invention 3, which represented $1 + 2$, would simply be an iteration of first degree. The combination would have “existed” already as general knowledge, and hence, it would be obvious.⁴⁷ It merely represents the next step in an evolution of innovation.

¶28 The only subjectivity of the test comes into play where it is necessary to evaluate parts *C* and *E*, the intangible aspects. Solutions, deficiencies, and the like require an interpretation of the art. It may be relatively apparent what the deficiencies or benefits of a given invention are and these may suggest, teach, or motivate a similar combination. It may not be the case in many circumstances; this is where the utilization of the POSITA’s knowledge comes into play. Within this objective framework, a POSITA is utilized to describe how the prior art would have taught, suggested, or motivated him to combine them in the way to make the claimed invention.⁴⁸ This evaluation of obviousness to determine what is more than just a combination of old elements has become known generally as the TSM test. This test is more than just another evaluation for novelty. Novelty analysis evaluates whether or not the claimed invention contains the same elements as the prior art. The TSM test for nonobviousness takes the analysis further and not only evaluates the claimed elements, but also evaluates the “inventive state of mind” of the creator by determining if what is claimed is more than just what the prior art would suggest. It, in essence, “gets into the mind” of the POSITA and determines if what the inventor claims is nothing more than what every POSITA would know to be the next step in the innovative process.

IV. KSR V. TELEFLEX AND CRITICISMS OF THE TSM TEST

A. *The TSM Test is Not Constitutional*

¶29 In the case of *KSR Int’l Co. v. Teleflex Inc.*, the appellants and multiple amices curiae argued that the suggestion test was inappropriate for various reasons. The amices curiae first contended that the TSM test should be invalid because it is found neither in section 103 of the Patent Act, in any other part of the Patent Act, or in any holding of the

⁴⁷ This formulation also includes not just the combination themselves, but also the decision of what prior art to combine and how. What existed as general knowledge at the time of invention may include a general problem to be solved or the decision of what prior art to use.

⁴⁸ Or how deficiency *C* would teach/suggest solution *E*. This keeps the impact of the POSITA’s subjectivity to a minimum within the overarching objective framework, rather than basing the entire determination of patentability on the POSITA’s ex post opinion.

Supreme Court, and therefore has no basis for its existence.⁴⁹ They additionally claimed that the TSM test evolved as a separate doctrine that conflicted with congressional intent and Supreme Court precedent.⁵⁰ They further argued that by making an evaluation of the prior art the exclusive determining factor, it was contrary to the Supreme Court's desire for the obviousness determination to be applied flexibly and without a setting of categorical rules.⁵¹ However, despite the Supreme Court's statement to the contrary,⁵² looking at patent jurisprudence, it is clear that the suggestion test developed out of the court's need for an equitable and objective standard for patentability.

¶30 In 1850, the Supreme Court reviewed a claim for patent infringement of door knobs made out of clay and porcelain.⁵³ In the Court's analysis, the Court noted that doorknobs of other materials were well known and were in use by the public at the time of the patent.⁵⁴ Furthermore, the pottery clay used as the knob material was also well known.⁵⁵ The Court held that, while the selection and adaptation of the materials evidenced judgment and skill, the differences between the prior art and the claim lacked the ingenuity required for a patent.⁵⁶ Because the exchange of one element of the prior art for another exhibited no more skill than that of "an ordinary mechanic acquainted with the business, there was an absence of that degree of skill and ingenuity which constitute essential elements of every invention."⁵⁷

¶31 In 1952, the same year that Congress added the nonobviousness requirement to the Patent Act, the United States Court of Customs and Patent Appeals (a predecessor of the Federal Circuit) evaluated a patent application for an apparatus used in titrating liquids.⁵⁸ The claimed invention substituted an electronic sensor for the electromechanical sensor in an older device.⁵⁹ The court rejected the Patent Board's contention that substitution of one type of sensor for another would have been obvious to a POSITA because the devices were dissimilar and had different effects.⁶⁰ Significantly, the court stated that an

⁴⁹ *Brief of IP Law Professors for KSR*, *supra* note 11, at 9; Brief for Cisco Systems et al. as Amici Curiae Supporting Appellants at 6, *KSR Int'l v. Teleflex, Inc.*, 127 S. Ct. 1727 (2007) (2006 WL 2452365) (No. 04-1350) [hereinafter *Brief of Cisco Systems for KSR*].

⁵⁰ *Brief of Cisco Systems for KSR*, *supra* note 49, at 6 ("The suggestion test is not part of this Court's jurisprudence. It evolved as separate doctrine").

⁵¹ Brief for the United States as Amicus Curiae Supporting Petitioner at 9, *KSR Int'l Co. v. Teleflex, Inc.*, 127 S. Ct. 1727 (2007) (No. 04-1350) (2006 WL 1455388) [hereinafter *Brief of the United States for KSR*]; *Brief of IP Law Professors for KSR*, *supra* note 11, at 10; *Brief of Cisco Systems for KSR*, *supra* note 49, at 7 ("[the suggestion test] is a long way removed from the inquiry embodied in Section 103").

⁵² *KSR Int'l Co.*, 127 S. Ct. at 1739. The Supreme Court chastised the Federal Circuit for its rigid application of its TSM test as it neglected other aspects of the Court's obviousness case law. However, the TSM test as described in this paper is not necessarily the exact TSM test applied in every case by the Federal Circuit, but rather, it is a theoretical explanation for the development of and an idealized model of the TSM test based on the obviousness question.

⁵³ *Hotchkiss v. Greenwood*, 52 U.S. 248 (1850).

⁵⁴ *Id.* at 265.

⁵⁵ *Id.* ("If it was [new], a very different question would arise; as it might very well be urged, and successfully urged, that a knob of a new composition of matter, to which this old contrivance had been applied, and which resulted in a new and useful article, was the proper subject of a patent.").

⁵⁶ *Id.* at 266. The Court rejected the invention because it was proven to be only a first-order combination.

⁵⁷ *Id.* at 267.

⁵⁸ *In re Shaffer*, 229 F.2d 476, 480 (C.C.P.A. 1956).

⁵⁹ *Id.* at 478.

⁶⁰ *Id.* at 479.

analysis of patentability cannot be done by looking at the prior art in retrospect after the invention is known; the “art applied should be viewed by itself to see if it fairly disclosed doing what an applicant has done.”⁶¹ The court specifically found that there was no teaching in the prior art that would suggest to a POSITA their combination for the purposes of producing the claimed invention without the exercise of invention.⁶² Additionally, the court addressed the fact that the prior art did not suggest that the problem the claim solved actually existed.⁶³

¶32 The United States Supreme Court had its first opportunity to interpret 35 U.S.C. § 103 in 1966. In *Graham v. John Deere Co.*, the Supreme Court had to consider the patentability of a spring clamp that was attached to plows.⁶⁴ This spring allowed a plow to move upwards when it encountered rocky soil in order to protect it from damage.⁶⁵ The patent at issue was a further modification of a previous patent that applied a spring clamp.⁶⁶ In evaluating what existed in the prior art, the Court found that all of the claims of the new invention were found in the older patent, except for two (the reversal of a hinge plate and a stirrup and bolted connection of a shank to a hinge plate).⁶⁷ The sole contention the Court had to address was whether this new arrangement, which permitted the shank to flex for its entire length as opposed to its partial length, as established in the previous patent, was an obvious difference.⁶⁸ Since the benefit of the new claim was the flexion of the entire length, and the prior art revealed the same device with a less-than-entire flexion due to confinement by a part of the device, the prior art would teach a removal of the part that confined the full flexion of the device.⁶⁹ In fact, an expert testified to the fact that the claim would have been obvious to a POSITA.⁷⁰ The patentability of the claim was therefore rejected.⁷¹ Additionally, the Court did not reject or even mention the suggestion test, even though courts had continued to use the test after the enactment of § 103 fourteen years earlier.

¶33 In 1999, the Federal Circuit addressed the patentability of a large trash bag that was decorated to look like a Halloween pumpkin as an appeal from the Board of Patent Appeals and Interferences.⁷² The Patent Board cited a book of crafts instructing children

⁶¹ *Id.*

⁶² *Id.* at 480. The innovation was unable to be fit into a first-order combination, and therefore it was nonobvious.

⁶³ *Id.* (“In fact, a person having the references before him who was not cognizant of appellant’s disclosure would not be informed that the problem solved by appellant ever existed.”).

⁶⁴ *Graham v. John Deere Co.*, 383 U.S. 1 (1966).

⁶⁵ *Id.* at 20-21.

⁶⁶ *Id.* at 21.

⁶⁷ *Id.* at 22.

⁶⁸ *Id.* at 23-24.

⁶⁹ *Id.* at 25. The Court did mention what would have been obvious to a POSITA; however, the Court was just evaluating the claimed solution in relation to the deficiency in the prior art. This evaluation is more akin to an analysis of the nature of the problem to be solved and the prior art, rather than the more usual evaluation of the knowledge of the POSITA involving an estimation of what actually the POSITA knew. This did not occur in the instant case. This also brings up the sometimes overlapping nature of the analysis.

⁷⁰ *Graham v. John Deere Co.*, 383 U.S. 1, 24 n.12 (1966).

⁷¹ The Court laid out several criteria (which became known as the *Graham* Factors) to be used in evaluating obviousness. These included: (1) the scope of the prior art; (2) differences between the prior art and the claim; (3) the level of ordinary skill in the art; and (4) other secondary factors. *Graham*, 383 U.S. at 17-18.

⁷² *In re Dembiczak*, 175 F.3d 994 (Fed. Cir. 1999). The Federal Circuit has jurisdiction over all federal

how to make a pumpkin out of crepe paper, a book describing how to make a pumpkin out of a paper bag and stuffing it with newspapers, a patent describing a trash bag with folds in the bag material, the patentees previous patents of bags with jack-o-lantern faces, and regular trash bags.⁷³ In affirming the USPTO's denial of a patent, the Board stated that the only difference between the patent and the previous art was just the application of the face to the bags, which would have been obvious.⁷⁴ In its decision, the Federal Circuit criticized the Board for simply describing in detail the similarities between the prior art and the invention, without describing any teaching or motivation to combine the references, or the knowledge of a person of ordinary skill in the art, or the nature of the problem to be solved.⁷⁵ This failure was legally deficient because in order to ascertain obviousness, an evaluation of what was known at the time of invention is required.⁷⁶ The Commissioner of Patents and Trademarks argued that the combination would have been obvious to a POSITA at the time.⁷⁷ However, the Commissioner did not offer any evidence as to the level of skill in the art, nor did he describe any features of the prior art that would have suggested to a POSITA to combine prior art from different fields into the claimed invention.⁷⁸ Because the Board failed to adequately prove obviousness objectively (by not demonstrating that the invention was a first-order combination), the court reversed, and a patent was issued.

¶34

These cases demonstrate that the courts, and even the Supreme Court, have always attempted to evaluate the obviousness question in an equitable and as objective as possible way. The use of objective facts (the prior art, the problem to be solved, and any suggestion) are more important than any subjective evidence that is presented. As in *Dembiczak*, courts consistently reject patent determinations where the evaluation of significant inventiveness is based entirely on a subjective opinion colored by hindsight and not based on objective facts. They attempt, whether consciously or unconsciously, to disprove patentability through the negative test of proving a first-order combination. It is also clear that courts, including the Supreme Court, have been utilizing this framework since the beginning of its patent jurisprudence. Furthermore, the congressional codification of § 103 just reflected the standards already being used; it was not a mandate for change. Therefore, there is no support for the claim that the TSM test is contrary to the Constitution, or that it is contrary to the Supreme Court's holdings, or even that it was recently created by the Federal Circuit.⁷⁹

district court and USPTO patent appeals under 28 U.S.C. § 1295 (2000).

⁷³ *In re Dembiczak*, 175 F.3d at 997.

⁷⁴ *Id.* at 998.

⁷⁵ *Id.* at 1000 (“Because we do not discern any finding by the Board that there was a suggestion, teaching, or motivation to combine the prior art references cited against the pending claims, the Board’s conclusion of obviousness, as a matter of law, cannot stand.”).

⁷⁶ *Id.* at 999 (an obviousness measurement “requires the oft-difficult but critical step of casting the mind back to the time of invention, to consider the thinking of one of ordinary skill in the art, guided only by the prior art references and the then-accepted wisdom in the field.”).

⁷⁷ *Id.* at 1001.

⁷⁸ *Id.* The court does state that the Commissioner cited references supporting the teaching of placing graphical information onto colored bags. However, the court declined to consider the argument because it was not part of the record before the USPTO on appeal.

⁷⁹ The contention that the test relies too heavily upon the prior art is refuted by the need for an objective test as elucidated in the previous sections.

B. *The Suggestion Test Does Not Ignore the Expertise of a POSITA*

¶35 The amices curiae also argued, and the Supreme Court complained, that the TSM test failed to take into consideration the expertise of the USPTO examiner or the knowledge of a POSITA.⁸⁰ They claimed that the TSM test’s focus on what existed in the prior art “substitutes the perspective of a skilled librarian for that of the skilled practitioner.”⁸¹ Because evidence of the prior art’s teaching, motivation, or suggestion is required in order to reject a patent due to obviousness, the TSM test ignores the USPTO examiners’ personal expertise and unduly restricts their ability to reject obvious patents.⁸² The amices want a POSITA to be able to look at an invention and determine whether or not he believes it would have been obvious. But such a system the amices would be fraught with the various issues discussed previously. The Supreme Court itself stated that the variability in patents was due to the “free reign often exercised by Examiners in their use of the concept of ‘invention’.”⁸³ The TSM test does limit the influence of subjective opinions of the POSITA in the analysis, as discussed above, in order to maintain an objective determination of patentability. The Supreme Court in the *KSR* decision did state that “the question is not whether the combination was obvious to the patentee but whether the combination was obvious to a person with ordinary skill in the art.”⁸⁴ This criticism only addresses the Federal Circuit’s improper application of the TSM test, not the “ideal” objective analysis described above in section III.

C. *The Test Does Not Fail in Rapidly Changing and Diverse Fields*

¶36 The amices argued that the test cannot adequately respond to rapid changes in science and technology because the TSM test is not flexible and only considers what the prior art demonstrates.⁸⁵ It is possible that in fields that are rapidly evolving, new developments may not have had time to make it into the prior art or trivial advances may have had no reason to be documented as such.⁸⁶ While this may be true, the TSM test is not based solely on the prior art; instead, it evaluates the state of total knowledge that existed at the time of invention and its relation to the claimed invention in order to determine the sufficiency of the leap in reference to the POSITA. A POSITA can establish the current state of knowledge in the art, and can offer guidance where it is not adequately reflected in the prior art.⁸⁷

¶37 The amices also contended that the strictness of the factual inquiry of the suggestion test neglects to take into consideration that the level of innovation necessary

⁸⁰ *Brief of IP Law Professors for KSR*, *supra* note 11, at 7. *Brief of the United States for KSR*, *supra* note 51, at 10 (“The test . . . places unjustified constraints on the necessary exercise of discerning judgment . . . [And] it underestimates the capabilities of courts and patent examiners to avoid improper reliance on hindsight.”).

⁸¹ Brief for Amici Curiae Time Warner Inc., et al. in Support of Petitioner at 10, *KSR Int’l Co. v. Teleflex, Inc.*, 127 S. Ct. 1727 (2007) (No. 04-1350) [hereinafter *Brief of Time Warner et al. for KSR*].

⁸² *Brief of the United States for KSR*, *supra* note 51, at 13.

⁸³ *Graham v. John Deere Co.*, 383 U.S. 1, 18-19 (1966).

⁸⁴ *KSR Int’l Co. v. Teleflex, Inc.*, 127 S. Ct. 1727, 1742 (2007).

⁸⁵ *Brief of the United States for KSR*, *supra* note 51, at 10.

⁸⁶ *Brief of Time Warner et al. for KSR*, *supra* note 81, at 6 (“[R]apid advances are not recorded in peer-reviewed journals or government regulatory submissions . . .”); *Brief of the United States for KSR*, *supra* note 51, at 19.

⁸⁷ See, e.g., *Princeton Biochemicals, Inc. v. Beckman Coulter, Inc.*, 411 F.3d 1332 (Fed. Cir. 2005).

to deserve a patent may be variable between technologies.⁸⁸ Areas that are highly incremental (such as software) may require more than just the melding together of previous works, while other areas (such as pharmaceuticals) may require years of research and large investments to make significant advances.⁸⁹ Again, this argument neglects the problems associated with subjectivity. The amount of innovation necessary to achieve patentability needs to be standardized to answer the question of *whether* the invention is an innovation, not the *quality* of innovation. Furthermore, it is not relevant how much investment goes into the invention, only that the invention is beneficial. These necessities are reflected in § 103 where Congress reinforced the notion that the nonobviousness requirement was one of “inquiry, not quality,” so that it was irrelevant whether the invention “resulted from long toil and experimentation or from a flash of genius.”⁹⁰

D. The TSM Test Overall Does Not Allow for Too Many Obvious Patents

¶38 The overriding complaint of the amicus and critics in general was that the TSM test set the threshold too low for patentability, allowing for the issuance of obvious patents, which contravenes public policy.⁹¹ Whether these individual arguments are adequately addressed would be irrelevant if the critic’s overall claim — that the TSM test allows for the patenting of too many obvious inventions — were in fact true. Aside from descriptively trying to convey that “trivial” inventions have passed the TSM test⁹² (as those in favor of reversing the Federal Circuit’s decision in this case had done) no evidence has been offered that actually demonstrates that the use of the TSM test has allowed too many obvious inventions to be patented.⁹³ Furthermore, claiming something is obvious just because one thinks it is reflects the subjective determinations and hindsight bias that the TSM test attempts to avoid. To create a patent system that is equitable and not subjected to the whims of those making the determinations, these flaws have to be avoided.

¶39 More significantly, empirical evidence shows that the TSM test adds reliability to a determination of patentability.⁹⁴ If too many obvious patents were being issued, the Federal Circuit’s decisions of patent appeals based on obviousness should statistically favor nonobviousness. Over a three-year period (2002-2005), the overall percentage of patents found to be nonobvious was only slightly higher than those found to be obvious

⁸⁸ *Brief of IP Law Professors for KSR*, *supra* note 11, at 8.

⁸⁹ *Id.*

⁹⁰ *Graham v. John Deere Co.*, 383 U.S. 1, 16-17 (1966).

⁹¹ *Brief of IP Law Professors for KSR*, *supra* note 11, at 7, 9; *Brief of Cisco Systems et al. for KSR*, *supra* note 49, at 2, 3 (the suggestion test’s low bar to patentability made patents of technologically trivial subject matter possible); *Brief of the United States for KSR*, *supra* note 51, at 10 (the suggestion test “exerts a heavy cost in the form of unwarranted extension of patent protection to obvious subject matter.”).

⁹² This also ignores any legal/procedural problems that might have led the court to reject an obviousness claim.

⁹³ Any patent that is issued is by definition nonobvious and since obviousness outside of the suggestion test is a subjective evaluation, it is difficult to prove this beyond stating one’s opinion.

⁹⁴ Christopher Cotropia, *Nonobviousness and the Federal Circuit: An Empirical Analysis of Recent Case Law*, 82 NOTRE DAME L.REV. 940 (2007).

(36.27 percent versus 28.43 percent).⁹⁵ However, as issued patents are presumed to be valid and nonobvious (and therefore the party asserting invalidity has the burden to prove obviousness by clear and convincing evidence)⁹⁶ there should be a natural tendency for a greater number of nonobviousness findings. As the analysis establishes basically an even split between obvious and nonobvious determinations by the Federal Circuit in review of district court determinations, the bias in the Federal Circuit appears to favor findings of obviousness. In appeals from the USPTO, the Federal Circuit affirmed all of the determinations of nonobviousness and 86.79 percent of the findings of obviousness.⁹⁷ The Federal Circuit not only has affirmed the decisions of the USPTO in the majority of cases, but the agreement was over finding of obviousness.⁹⁸ These empirical findings cast doubt on the claims of critics who say that the Federal Circuit TSM test's threshold for finding nonobviousness is too low, and that its use allows too many obvious inventions to be patented.

V. CONCLUSION

¶40 Primarily, the role of the judiciary is to apply objective standards of law. The realm of patents is no exception. As evidenced by the discussion of prior Supreme Court and other court decisions regarding obviousness, courts from the beginning have attempted to define an objective standard by which obviousness can be determined. The core of this standard is to objectify what exactly is a sufficient leap beyond current knowledge to justify a patent. What everyone agrees upon is that whatever is the next step in the evolution of an innovation⁹⁹ is not inventive enough to warrant a patent. The disagreement, however, comes down to how to determine what exactly is the next step.

¶41 The analysis in section III tries to objectify the “inventive process” and, arguably, what is going on inside the inventor’s mind. If every new thought or idea is a combination of old ideas, the first iteration ($A+B=C$) is just a “mathematical” representation of that new idea. The TSM test is an assessment of all the information that would be available to the inventor (i.e., all the prior art, the nature of the problem to be solved, the skill of the POSITA, etc.) and a determination of whether the new claimed invention is just a first-order iteration. The TSM test, therefore, is an objective proxy for determining what constitutes a first-order iteration. Because non-obviousness is subjective, it cannot be quantified, courts, and people (either consciously or unconsciously) must try to determine whether the new invention is something more than the next step in the innovative process. Use of the TSM test encases this analysis in an objective framework.

⁹⁵ Of nonobvious determinations by the district court, 62.5 percent were affirmed by the Federal circuit, 6.25 percent were reversed, and 31.25 percent were vacated and remanded. The Federal Circuit affirmed 48.15 percent of obvious determinations, reversed 12.96 percent, and vacated 38.89 percent. This difference was found not to be statistically significant. *Fisher's exact T-test* $p=0.1668$. *Id.* at 931-933.

⁹⁶ 35 U.S.C. § 282 (2006); *Beckson Marine, Inc. v. NFM, Inc.*, 292 F.3d 718, 725 (Fed. Cir. 2002); *Ruiz v. A.B. Chance Co.*, 234 F.3d 654, 663 (Fed. Cir. 2000).

⁹⁷ $p=0.0000546$. *Cotropia*, *supra* note 94, at 937.

⁹⁸ This data also suggests that the Federal Circuit does take into consideration the expertise of the USPTO examiners.

⁹⁹ Or the next iteration of the innovative process ($A + B=C$).

¶42 Unfortunately, application of the TSM test by the Federal Circuit has been inconsistent.¹⁰⁰ Therefore, the Supreme Court's decision in *KSR v. Teleflex* and its condemnation of the TSM test was too harsh. An idealized TSM test, described above, is exactly what the Court and courts should actually apply, and in fact (as stated in Section IV) is what the *Graham* factors represent. The Federal Circuit's limited use of the TSM test in relation to the problem to be solved, as the Supreme Court stated in *KSR*,¹⁰¹ was an improper use of the test. However, this should not relegate the proper use of the TSM test to a contravention of law. Because the TSM test is the objective determination of obviousness that actually is in use, and because continued statements allowing for subjective determinations of obviousness are counterproductive, the Supreme Court should in fact accept the TSM test as an objective answer to the problem of obviousness.

¹⁰⁰ *KSR Int'l Co. v. Teleflex, Inc.*, 127 S. Ct. 1727, 1741 (2007) (“[T]he Court of Appeals no doubt has applied the test in accord with these principles in many cases.”).

¹⁰¹ *Id.* at 1742.