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Devaluing Invention: The Push for Patent Reform

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I. INTRODUCTION

This Comment was not hand written with charcoal on animal skin or even with ink on paper; instead, it was written using state-of-the-art word-processing software operating on state-of-the-art computer hardware. Neither the software nor the hardware arrived fully formed from the mind of a single person. Each is a years-long cumulation of a series of technological advances. Probably, a few of these advances were fundamental, most were incremental—all were essential to making the final product what it is today.

The mechanics of creating and editing a work such as this Comment are much simpler today than it would have been even twenty years ago, when personal computers and easy-to-use word-processing software were virtually nonexistent. In the early 1980s, each version of this paper would likely have been a single-font, typewriter-produced paper copy. Subsequent edited versions would have been retyped from the beginning. In the early 1990s, each paper copy may have been produced by a dedicated electronic word-processing machine with a two- or three-line display. Edits would have been made

in the electronic copy and new versions printed to paper. Today, this Comment can be easily produced, edited, and submitted in a purely electronic format—never reaching paper until published in a print medium.

There are innumerable other examples of recently developed technology which have eased many aspects of the average American's life. One only has to look in the kitchen to see labor-reducing appliances not available at the turn of the last century; or in the hospital to see life-saving equipment and medicine only recently available; or in the garage to see automobile safety features Henry Ford would not have dreamed possible.

While the impact of technological advancement on our individual lives is immense, it also has a profound impact on our economy. As food production and distribution has become more efficient, societal resources have been freed to expend on manufacturing. As manufacturing has become more efficient, societal resources have been freed to expend on creation and manipulation of information. We have become prolific inventors and innovators and, in so doing, we have created an economy dependent on invention and innovation.

Because of the rate at which newly created technology is introduced, we may be tempted to assume that not only is the technology to be expected—i.e., it is not truly inventive—but also that the entire process of invention is as simple as the mechanics involved. Just as the creation of this Comment was much more difficult than typing, editing, and emailing it to the publisher, the creation of the word-processing software used was more difficult than typing, editing, and distributing the code.

While our prolific technological advancement may have created an expectation of invention, it has also created a need for continual invention. The commonality of labor-saving devices has increased our reliance on those devices and the energy necessary to drive them. Similarly, life-extending instruments and medicine have revealed the effects of diseases that were before either unknown or unlikely, further creating a need for life-saving technology that was before unnecessary.

Our need for continual invention can be met only by expending resources on invention. Under the Intellectual Property Clause of the Constitution,¹ Congress has the power to enact laws to stimulate the expenditure of individual and social resources on technological innovation. Article 1, Section 8 of the Constitution grants Congress the power “[t]o 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.”² Here, “Science” refers

1. U.S. CONST. art. I, § 8, cl. 8.

2. *Id.*

to the total knowledge base, and “useful Arts” refers to technology.³ From the Intellectual Property Clause, Congress has created a copyright system to promote the progress of science and a patent system to promote the progress of technology.⁴

Recently, it has been argued that the U.S. patent system is broken and has become a social burden, merely serving to grant unnecessary economic monopolies at the expense of consumers without creating an extra incentive to invent; or worse, that the patent system actually reduces incentive to invent.⁵ These critics contend that, in effect, the patent system functions as both a short- and long-run economic burden on society.⁶ The result has been a strong effort to reduce the extent of patent rights at both the legislative and judicial branches of government.⁷

Some of the proposed reforms, and the policies on which they are based, favor short-run consumer benefits over the long-run goal of continued American invention. These reforms have the potential to lessen the United States’ position as a world economic and technological leader.

A brief model of the economics of invention is presented in Section II of this Comment. In Section III, several aspects of the patent system that serve as incentive to invent are described. Specific common critiques of the patent system are presented in Section IV, along with the proposed reforms and an analysis of their effects on the incentive to invent.

II. THE ECONOMICS OF INVENTION

The act of inventing is comprised of forming an idea with a practical application and reducing the idea to practice.⁸ It has been broadly

3. See Malla Pollack, *What is Congress Supposed to Promote?: Defining “Progress” in Article I, Section 8, Clause 8 of the United States Constitution, or Introducing the Progress Clause*, 80 NEB. L. REV. 754, 756 (2001).

4. See, e.g., Patent Act, 35 U.S.C. §§ 1–376 (2000).

5. See, e.g., *American Innovation at Risk: The Case for Patent Reform, Oversight Hearing Before the Subcomm. on Courts, the Internet, and Intellectual Property of the H. Comm. on the Judiciary*, 110th Cong. 9–15 (2007) [hereinafter Jaffe Hearing] (testimony of Adam B. Jaffe, Prof. of Economics), available at <http://judiciary.house.gov/media/pdfs/printers/110th/33315.pdf>; see *American Innovation at Risk: The Case for Patent Reform: Oversight Hearing on the Patent System Before the Subcomm. on Courts, the Internet, and Intellectual Property of the H. Comm. on the Judiciary*, 110th Cong. 1–4 (2007) (testimony of Daniel B. Ravicher, Exec. Dir. Public Patent Foundation), available at <http://judiciary.house.gov/media/pdfs/ravicher070215.pdf>.

6. See Jaffe Hearing, *supra* note 5.

7. See, e.g., *KSR Int’l Co. v. Teleflex Inc.*, 127 S. Ct. 1727 (2007) (broadening the definition of obviousness); S. 3818, 109th Cong. (2006) (proposing limitations on remedies available for infringement).

8. ALAN L. DURHAM, *PATENT LAW ESSENTIALS: A CONCISE GUIDE* 87 (1999).

defined as the production of information.⁹ The term "invention" has been specifically defined as the "creation of a new product or process."¹⁰ The related term "innovation" has been specifically defined as the "successful introduction and adoption of [an invention]."¹¹ Collectively, invention and innovation is product development.¹²

Successfully inventing is primarily a function of access to, and manipulation of, information.¹³ Where others have derived and published the relevant information, the inventor may find it in the public domain.¹⁴ If access to information in the public domain is too costly, the inventor may also derive such information independently by creating new, duplicating existing, or recreating lost information through exercising her skills and talents.¹⁵

A. *Product Development*

Product development is the process by which: a market opportunity is recognized, a product is created to exploit that opportunity, and the product is produced and sold in the market.¹⁶ The typical product-development process consists of six stages: (1) planning; (2) concept development; (3) system-level design; (4) detail design; (5) testing and refinement; and (6) the ramp-up to production.¹⁷ The first and second stages comprise the invention process; the subsequent stages comprise the innovation process.¹⁸

In the planning stage, the existence and potential size of the market opportunity are estimated; as are the technical, time, and financial constraints on the creation and production of the product.¹⁹ Where more than one opportunity exists and resources are finite, the opportunities must be prioritized.²⁰ Resources are assigned to exploit the highest-priority opportunities.²¹ If the result of the planning stage so

9. Kenneth J. Arrow, *Economic Welfare and the Allocation of Resources for Invention*, in *THE RATE AND DIRECTION OF INVENTIVE ACTIVITY: ECONOMIC AND SOCIAL FACTORS* 609, 616 (1962).

10. See JAMES D. GWARTNEY & RICHARD L. STROUP, *ECONOMICS: PRIVATE AND PUBLIC CHOICE* 41 (7th ed. 1995).

11. See *id.*

12. See KARL T. ULRICH & STEVEN D. EPPINGER, *PRODUCT DESIGN AND DEVELOPMENT* 2 (3d ed. 2004).

13. See Mark A. Lemley, *The Economics of Improvement in Intellectual Property Law*, 75 *TEX. L. REV.* 989, 997 (1997).

14. See ULRICH & EPPINGER, *supra* note 12, at 104–07.

15. See *id.* at 107–10.

16. *Id.* at 2 (defining a product as "something sold by an enterprise to its customers").

17. *Id.* at 13–15.

18. See ULRICH & EPPINGER, *supra* note 12, at 13–15. See generally GWARTNEY & STROUP, *supra* note 10, at 41 (discussing the relationship between invention and innovation).

19. See ULRICH & EPPINGER, *supra* note 12, at 34–35, 39, 42–45, 48.

20. *Id.* at 38, 43–45.

21. *Id.*

warrants, the process enters the concept development stage in which the product is specified,²² the target cost is estimated,²³ suitable technologies are found or created,²⁴ and early prototypes are tested.²⁵

The four stages of the development process subsequent to the invention are related to producing and selling the product—the innovation.²⁶ In these latter stages, the development is focused on ensuring that the product can be efficiently produced and delivered to the market.²⁷

At every stage in the product's development, the decision to proceed is based on an economic evaluation of projected revenues and costs—numbers fraught with uncertainty.²⁸ To continue the development process, the projected revenues must sufficiently exceed the projected costs.²⁹ Because economic analyses performed in the early stages of product development, i.e., the inventive stages, involve more speculation than the latter-stage analyses, the uncertainty is greater in the early stages.³⁰

To invest resources into inventing, an inventor must estimate the future invention's present value to be sufficiently greater than the sum of the future costs of inventing (C_I), and innovating (manufacturing and marketing) (C_M).³¹ For the profit-motivated inventor, the net present value of the contemplated invention (NPV), is a function of: the probability of successfully developing the product (P), the expected revenue generated by the product (ER), and the expected future costs ($C_I + C_M$):³²

$$NPV = [P \times ER - (C_I + C_M)].$$

Thus, the greater the costs or the lower the probability of success, the greater the expected revenues need be to warrant investment.

22. *Id.* at 54, 72–83.

23. *See id.* at 86–88, 94–96.

24. *See id.* at 98–100, 124–29.

25. *See id.* at 146–47.

26. *See id.* at 14–15.

27. *Id.*

28. *See id.* at 308–11, 328–30. *See generally id.* at 312–19 (providing an overview of the economic analysis method for estimating the NPV and the factors that affect such an estimate).

29. *See generally id.* at 308–19 (providing an overview of the economic analysis method for estimating the NPV and the factors that affect such an estimate).

30. *Id.*

31. *See generally id.* at 309, 312–13 (discussing and demonstrating the importance of NPV computation in determining major investment decisions).

32. *See id.* at 329–30. *See generally* RICHARD A. POSNER, *ECONOMIC ANALYSIS OF LAW* 10–11 (7th ed. 2007) (discussing the concepts of value, utility, and efficiency, and how such concepts apply in the calculation of both expected costs and benefits).

B. *The Cost of Invention*

The cost of inventing is the lost opportunity of expending the required resources in the next-best way.³³ For example, inventing the integrated circuit required a certain investment of capital and human resources. Those resources could have instead been used to support or expand the transistor market.³⁴ The cost of inventing the integrated circuit included the lost opportunity to realize the value of expanding the transistor market.

This opportunity cost is reflected in present-day valuation of future costs through adoption of a time-dependent present value of resources.³⁵ Projected future costs ($C_I + C_M$) and revenues (ER) are discounted by some rate (the discount rate, r) that corresponds to the opportunity cost over time (t).³⁶ Thus, in the NPV equation,

$$(C_I + C_M) = \frac{(C_I + C_M)_{\text{projected}}}{(1 + r)^t}$$

Inventing is the creation of new information, and creating new information requires the manipulation of existing information. Thus, the cost of inventing is primarily the cost of accessing, using, and creating information.³⁷ Facilitating access to information will lower the cost of invention, while restricting use of the information will increase the cost of invention.³⁸

From the prospective view of the inventor, the future cost of inventing is a fixed cost, i.e., it is neither variable with the quantity of output nor yet a sunk cost.³⁹ Thus, the decision to invent involves weighing the expected revenues from the invention against the expected costs of inventing.⁴⁰

33. See POSNER, *supra* note 32, at 5–6 (distinguishing resources from money, which is merely a “claim on resources”).

34. See Michael Riordan, *How Bell Labs Missed the Microchip*, IEEE SPECTRUM, Dec. 2006, at 37, 40 (describing the situation in which spending their finite resources on transistor development cost Bell Labs the opportunity to develop the integrated circuit).

35. See ULRICH & EPPINGER, *supra* note 12, at 325–28.

36. See *id.* at 327.

37. See Lemley, *supra* note 13, at 997.

38. See *id.*

39. See WILLIAM M. LANDES & RICHARD A. POSNER, *THE ECONOMIC STRUCTURE OF INTELLECTUAL PROPERTY LAW* 23–24 (2003). See generally GWARTNEY & STROUP, *supra* note 10, at 508, 532 (defining “fixed cost”); POSNER, *supra* note 32, at 7 (defining “sunk cost”).

40. See POSNER, *supra* note 32, at 7 (stating that “‘Sunk’ . . . costs do not affect a rational actor’s decisions”).

C. Revenue from the Invention

An invention can generate revenue for the inventor in various ways.⁴¹ For example, the inventor's professional standing, sense of self-worth, or happiness may be enhanced. The inventor may also receive a direct pecuniary benefit by perfecting and selling the product that incorporates the invention or from selling the right to use the invention.⁴² Where the revenue comes from selling the right to use the invention, the invention itself becomes the inventor's developed product.

In a market economy, demand for a product is inversely related to the price;⁴³ therefore, revenue generated is proportional to the demand for the invention. For example, the demand for integrated circuits is large. The pecuniary revenue generated by the integrated circuit in 2005 alone, forty-seven years after its invention, was \$193 billion.⁴⁴ Additionally, the revenue generated by the invention included a National Medal of Science,⁴⁵ a National Medal of Technology,⁴⁶ and a Nobel Prize.⁴⁷

Opportunity costs are also reflected in the time-dependent value of future revenues.⁴⁸ The expected future revenue (ER) is discounted at rate r , reflecting its devaluation with time (t).⁴⁹ Thus, in the NPV equation,

$$ER = \frac{ER_{\text{projected}}}{(1 + r)^t}$$

D. Risk Aversion of the Inventor

Risk has been defined as an "exposure to a proposition of which one is uncertain."⁵⁰ More simply stated, risk is "a chance of things not turning out as expected."⁵¹ Risk is a function of uncertainty.

41. See Arrow, *supra* note 9, at 614, 624.

42. See H. JACKSON KNIGHT, PATENT STRATEGY FOR RESEARCHERS AND RESEARCH MANAGERS 41, 63 (2d ed. 2001).

43. See POSNER, *supra* note 32, at 5.

44. Texas Instruments, Jack St. Clair Kilby: About Jack, <http://www.ti.com/corp/docs/kilbyctr/jackstclair.shtml> (last visited Sept. 14, 2007).

45. 1969 Award Winners Listed, THE CHRISTIAN SCI. MONITOR, Feb. 21, 1970, at 5 (recording the award to Jack Kilby in 1969).

46. Technology Admin., The National Medal of Technology Recipients, <http://www.technology.gov/medal/Recipients.htm> (last visited Oct. 9, 2007) (noting the award to Jack Kilby in 1990).

47. Nobelprize.org, The Nobel Prize in Physics 2000, http://nobelprize.org/nobel_prizes/physics/laureates/2000/index.html (last visited Sept. 14, 2007).

48. See ULRICH & EPPINGER, *supra* note 12, at 325-28.

49. See *id.*

50. Glyn A. Holton, *Defining Risk*, FIN. ANALYSTS J., Nov.-Dec. 2004, 19, 22.

51. Economist.com, Research Tools: Economics A-Z, <http://www.economist.com/research/Economics/alphabetic.cfm?letter=R> (last visited Sept. 14, 2007).

General economic theory holds that the greater the risk, the greater must be the expected return to warrant investment.⁵² Thus, in choosing between two investments, the first involving a higher risk than the second, the investor would choose the first only if its expected return was sufficiently higher than the second's expected return.⁵³ The investor's risk aversion (RA) is subjective and typically lowers the incentive to invest (i.e., $RA \leq 1$, where $RA=1$ defines a risk neutral investor).

In product development, the greater the uncertainty in the NPV parameters—P, ER, C_i , and C_M —the more difficult it is to determine the expected result—the NPV. Thus, the incentive to invent (INC) is a product of the NPV and the investing inventor's risk aversion (RA):

$$INC = NPV \times RA.$$

Because early-stage NPV estimates are inherently less certain than latter-stage estimates,⁵⁴ early-stage decisions involve more risk and thus require a greater expected return—a larger NPV—to warrant investment.

E. *The Incentive to Invent*

The maximum profit the inventor may receive is when the marginal revenue from the invention (the rate of change of revenue with quantity sold) is equal to the marginal cost of production (the cost of producing one more sale).⁵⁵ In a perfectly competitive market in equilibrium (where the inventor controls the amount she produces but not the price of the product), the marginal revenue equals the price of the invention, and the price of the invention is equal to the highest marginal cost amongst the competitors.⁵⁶ Where she has a monopoly, the inventor can affect the price of the invention by varying the quantity produced; if she is able to exploit the variance of demand with respect to price, she can realize greater profits than in a perfectly competitive market.⁵⁷

The NPV parameters will vary depending on how the inventor attempts to realize revenue from her investment. The early-stage NPV estimate will be less certain for development processes with more complex latter stages. For example, planning to enter the market as a

52. *See id.*

53. Complex models of economic behavior under uncertainty, such as the Cumulative Prospect Theory or the Rank-Dependent Expected Utility Model, are beyond the scope of this comment.

54. *See generally* ULRICH & EPPINGER, *supra* note 12, at 308–09 (providing an overview of the economic analysis method for estimating the NPV and the factors that affect such an estimate).

55. GWARTNEY & STROUP, *supra* note 10, at 532.

56. *See id.* at 531–34; POSNER, *supra* note 32, at 8–9.

57. *See* GWARTNEY & STROUP, *supra* note 10, at 558–65; POSNER, *supra* note 32, at 279–83.

manufacturer or service provider likely entails greater projected costs and greater uncertainty than planning to sell the rights to the invention at the completion of the product development's invention stage.⁵⁸ Because entering the market with copies of the invention is a higher risk proposition than selling the rights to the invention, the expected NPV must be greater to warrant such investment.

1. Competitive Market

A free-rider situation arises if the inventor's competitors are able to practice the invention equally with the inventor.⁵⁹ In this scenario, the inventor bears the fixed costs of inventing but is subject to market pricing—based on marginal production costs—for the output of the invention.⁶⁰ Therefore, an inventor competing in such a market must rely on lower marginal costs than her competitors in order to recoup her fixed costs, costs her competitors have not incurred.⁶¹ Also, because competitors may freely practice the invention, the inventor does not have the option to sell rights to the invention and must enter the competitive market to recover the costs of inventing. In such a market, the incentive is not to invent but to lower costs of production, an incentive that exists independent of any incentive to invent.⁶²

In this scenario, because there is no market for the invention separate from the product that incorporates it, the NPV of the invention considered separately from the product is negative. The decision to invent must therefore be based on a complete product-development process—invention and innovation—a higher risk prospect than invention alone.

2. Inventor-Controlled Market

If the inventor is introducing an invention for which there are no then-existing substitutes,⁶³ she may use the first-to-market advantage to reap profits prior to competition arising and to establish an advantageous market position with brand recognition.⁶⁴ Relying on being the first to market with the invention in order to recoup investment

58. See generally ULRICH & EPPINGER, *supra* note 12, at 308–19 (providing an overview of the economic analysis method for estimating the NPV and the factors that affect such an estimate).

59. See ADAM B. JAFFE & JOSH LERNER, *INNOVATION AND ITS DISCONTENTS* 8 (2004); LANDES & POSNER, *supra* note 39, at 23–24 (2003).

60. See LANDES & POSNER, *supra* note 39, at 22–24.

61. See POSNER, *supra* note 32, at 10.

62. See GWARTNEY & STROUP, *supra* note 10, at 550. See generally ULRICH & EPPINGER, *supra* note 12, at 308–19 (providing an overview of the economic analysis method for estimating the NPV, a method that enables analysis of production costs).

63. See GWARTNEY & STROUP, *supra* note 10, at 470 (defining a substitute for the invention as a product for which the demand will rise as the price of the invention rises).

64. See Michele Boldrin & David K. Levine, *The Economics of Ideas and Intellectual Property*, 102 *PROCS. OF THE NAT'L ACAD. OF SCI.* 1252, 1254 (2005).

will likely require increased costs to initially establish and meet consumer demand prior to competitors entering the market.⁶⁵ Efficient fast followers, those firms who enter the market soon after its establishment, may minimize profits that result from the first-to-market advantage.⁶⁶

If the nature of the invention allows, the inventor may choose to keep her invention secret and prolong the first-to-market advantage.⁶⁷ Keeping a trade secret requires expending resources on maintaining secrecy and thus increases the product development costs.⁶⁸ Profiting from trade secrecy is limited to the extent that the secret can be kept.⁶⁹ The secret information embodied in certain inventions can often be revealed through reverse engineering, a process by which a competitor can discover the information by examining the invention.⁷⁰ Reverse engineering “reduces development costs and eases market entry” by allowing the competitor to capitalize on the prior efforts of the inventor.⁷¹ Further, failure to publicly disclose the secret may actually hinder the first inventor if a subsequent independent inventor secures patent protection.⁷²

Another way the inventor may prolong the first-to-market advantage is a government grant to the exclusive rights to the invention for a limited time—a patent.⁷³ Prosecuting, maintaining, licensing, and enforcing a patent will increase the inventor’s costs.⁷⁴ In addition, the inventor must disclose the invention to the public in such detail that

65. See MICHAEL E. MCGRATH, *PRODUCT STRATEGY FOR HIGH-TECHNOLOGY COMPANIES* 230 (2d ed. 2001) (“New markets . . . must be educated. This is an expensive process, and its costs are usually borne by the first company to market.”). See generally ULRICH & EPPINGER, *supra* note 12, at 308–319 (providing an overview of the economic analysis method for estimating the NPV and the factors that affect such an estimate).

66. See MCGRATH, *supra* note 65, at 230–31 (“Fast-follower strategies can be particularly successful in new markets created by advances in technology, since nobody really knows how customers will eventually use the product or what they will prefer.”).

67. See LANDES & POSNER, *supra* note 39, at 356–59.

68. See *id.* at 357, 360.

69. See Vincenzo Denicolò & Luigi Alberto Franzoni, *The Contract Theory of Patents*, 23 INT’L REV. L. & ECON. 365, 369 (2003).

70. Terry Ludlow, *Judicial Support for Semiconductor Reverse Engineering*, IPL NEWSL (ABA Section of Intellectual Property Law), Fall 2006, at 1; see MCGRATH, *supra* note 65, at 231.

71. See MCGRATH, *supra* note 65, at 231.

72. See LANDES & POSNER, *supra* note 39, at 358, 360–61.

73. See 35 U.S.C. § 154(a)(1) (2000).

74. See, e.g., Eugene R. Quinn, Jr., IPWatchdog.com, *Cost of Obtaining a Patent*, http://www.ipwatchdog.com/patent_cost.html (last visited Sept. 15, 2007); Eugene R. Quinn, Jr., IPWatchdog, *Cost of Obtaining a Patent, Maintenance Fees*, http://www.ipwatchdog.com/maintenance_fees.html (last visited Sept. 15, 2007); see Bruce Berman, *Patent Litigation Costs*, IPFRONTLINE.COM, Sept. 18, 2002, <http://www.ipfrontline.com/depts/article.asp?id=627&deptid=4>.

competitors will be able to practice the invention or invent a substitute with minimal research costs and negligible risk.⁷⁵

While the temporary market control gained by being the first-to-market may increase the expected revenues, it also may increase the expected costs. Additionally, there exists increased uncertainty in the NPV in that the duration and effectiveness of the market control, as well as the size of the market, are not well-defined in a first-to-market scenario. Thus, the NPV may be greater for a first-to-market plan than for a plan to enter a competitive market, but so too is the risk.

Risk is reduced by decreased uncertainty in the duration and effectiveness of the market control. It is also reduced by decreased uncertainty in the NPV if the invention is saleable independent of further product development.

III. THE PATENT SYSTEM AS INCENTIVE

In granting exclusive rights to an invention for a limited time, the patent system is meant to increase the expected profit from the invention so as to warrant private investment into a risky, costly, and socially beneficial endeavor.⁷⁶ Ideally, the system balances the profit-enhancing exclusive rights against the probability of success, the cost of inventing, and the risk of investment; thereby creating an NPV sufficient to act as incentive to the inventor, but not so great as to impose undue social costs.

A. *Constitutional Foundation*

Unique among the constitutionally enumerated powers of Congress, the Intellectual Property clause states both its purpose—“[t]o Promote the Progress of Science and useful Arts”—and the means by which to achieve its purpose— “by securing for limited times to authors and inventors the exclusive right to their respective writings and discoveries.”⁷⁷ The Supreme Court has interpreted the Intellectual Property (IP) clause to both empower and limit the government.⁷⁸ Congress has the authority to grant exclusive rights to authors and inventors in the form of copyrights and patents, but only for the purpose of promoting the progress of science (knowledge) and the useful arts (technology), respectively.⁷⁹

75. See LANDES & POSNER, *supra* note 39, at 298–99, 360.

76. See generally, Arrow, *supra* note 9 (discussing the economics of investment resource allocation under uncertainty).

77. U.S. CONST. art. I, § 8, cl. 8.

78. *Graham v. John Deere Co.*, 383 U.S. 1, 5 (1966); see also, Dotan Olier, *Making Sense of the Intellectual Property Clause: Promotion of Progress as a Limitation on Congress's Intellectual Property Power*, 94 GEO. L.J. 1771 (2006) (arguing the Framers intended the Progress Clause as a limitation on Congress's intellectual property power).

79. Pollack, *supra* note 3, at 756.

Because patent laws are positive in nature, i.e., they are not a legislative recognition of a natural right to the exclusive ownership of the fruit of one's intellect,⁸⁰ the patent system is meant to serve a specific governmental purpose.⁸¹ In *Graham v. John Deere*, the Supreme Court held that "innovation, advancement, and things which add to the sum of useful knowledge" are essential elements of an invention for it to qualify for a patent; thus, Congress may not enact patent laws that do not serve the ends of furthering "innovation, advancement or social benefit."⁸² More recently, in *Eldred v. Ashcroft*,⁸³ the Court applied *Graham* to copyright law and stated that Congress may enact laws to protect intellectual property only to the extent that those laws serve to "promote the Progress of Science [and the useful Arts]."⁸⁴

Although some suggest that the original intent of the IP clause was to facilitate the dissemination of knowledge and the introduction of invention to the market (innovation),⁸⁵ the most common justifications for intellectual property rights include facilitating invention in addition to dissemination and innovation.⁸⁶ Thus, the patent laws are meant to create an incentive to invent, to bring the invention to market, and to disseminate the information embodied in the invention.

Congress and the federal courts have the task of creating a patent system that promotes the progress of technology—stimulates invention, innovation, and dissemination—for the social good without unduly burdening society. In defending the IP clause of the Constitution, James Madison stated that assignation to the inventor of exclusive rights to the invention "fully coincides" with the "public good."⁸⁷ The Court in *Graham*, analyzing Thomas Jefferson's contribution to the formation of the American patent system, reasoned that the public benefits from a patent system only if the exclusive rights of a patent grant are limited to "inventions which would not be disclosed or devised but for the inducement of a patent."⁸⁸

Both Congress and the Supreme Court recognize that the search for profits facilitates invention, innovation, and the dissemination of in-

80. See *Graham*, 383 U.S. at 9.

81. See *id.*

82. See *id.* at 6.

83. *Eldred v. Ashcroft*, 537 U.S. 186 (2003).

84. See *id.* at 212 (citing *Graham*).

85. See Pollack, *supra* note 3 at 755–56 (arguing that "progress" means "spread").

86. See FED. TRADE COMM'N, TO PROMOTE INNOVATION: THE PROPER BALANCE OF COMPETITION AND PATENT LAW AND POLICY, ch. 1 at 4, 6–7, ch. 2 at 6 (2003) [hereinafter FED. TRADE COMM'N]; Rebecca S. Eisenberg, *Patents and the Progress of Science: Exclusive Rights and Experimental Use*, 56 U. CHI. L. REV. 1017, 1024 (1989).

87. THE FEDERALIST NO. 43, at 261 (James Madison) (Bantam Classic Reissue, 2003).

88. See *Graham v. John Deere Co.*, 383 U.S. 1, 10–11 (1966).

formation.⁸⁹ In *Eldred*, the Court reiterated its view that the best way to benefit the public through an inventor's talents is to encourage the individual effort of the inventor with the potential for personal gain.⁹⁰ Granting exclusive and alienable rights to her invention potentially increases the magnitude and certainty of the inventor's estimate of the invention's NPV prior to the invention—thus increasing the incentive to invent. In exchange, the government requires full public disclosure of the invention.⁹¹

B. *Probability of Success*

The first factor in the inventor's estimate of the invention's NPV is the probability of successfully inventing. This probability is primarily a function of the inventor's access to information and her ability to manipulate it in such a way as to create new information.⁹² All else being equal, as the probability of success increases, so too does the NPV. As the NPV increases, there is less need for government-created incentive to develop the product, although there may still be a need to encourage dissemination of the created information.

The relationship between the inventor's uncertainty and the need for incentive is recognized in the patent system's requirement that an invention be novel⁹³ and nonobvious⁹⁴ to qualify for patent protection. There is no need to create and disseminate, through invention and disclosure, information that already exists in the public domain. Similarly, there is no need to add incentive to create and disseminate information that can be readily derived from existing information through application of ordinary skills.

The probability of successfully "creating" information through invention is 100% if that information is openly available. If the information embodied in the invention is already in the public domain, through prior disclosure or open use of the invention, the invention is not novel.⁹⁵ For prior use of the invention to destroy novelty, the information contained in the invention must be readily ascertainable to the public through the use.⁹⁶ Because there is no need to encourage creation or dissemination of information that has already been created and disseminated, an invention that is not novel does not qualify for patent protection.

89. See *Eldred v. Ashcroft*, 537 U.S. 186, 212 n.18 (2003) (quoting *Mazer v. Stein*, 347 U.S. 201, 219 (1954)).

90. See *id.*

91. See 35 U.S.C. § 112 (2000).

92. See Lemley, *supra* note 13, at 997.

93. § 102 (2000 & Supp. 2005).

94. § 103 (2000).

95. See § 102(a), (e).

96. *Gaylor v. Wilder*, 51 U.S. (10 How.) 477, 496–97 (1850).

If the created information is an obvious extension of information in the public domain, the probability of successfully creating information through invention is 100%, or at least quite high. An invention is obvious if at the time of its formation, the created information would have been obvious to a person of ordinary skill in the art.⁹⁷ Post-success, determining whether an invention was obvious when created is quite difficult. Obviousness is a function of several factors: (1) the level of ordinary skill in the art; (2) the scope and content of the prior art; (3) the differences between the invention and the prior art; and (4) factors such as a then long-existing and unfulfilled need satisfied by the invention.⁹⁸ In these so-called *Graham*-factors, the prior art consists of the legally available information (i.e., not concealed information), regardless of whether it was known to the inventor, or even the general public, at the time of the invention.⁹⁹

The patent system proactively attempts to increase the probability of success for product development by requiring the patent application to fully disclose the technology utilized in the invention.¹⁰⁰ Specifically, the disclosure must be such that a person having ordinary skill in the relevant art will be able to practice the invention without undue experimentation.¹⁰¹ The public may easily access published patent applications¹⁰²—which means increased access to information for prospective inventors, and therefore increased probability of successfully developing the product.

The prospective probability of success is not the subjective determination of the inventor, but rather the subjective determination of one who has ordinary skill in the art and access to the relevant and legally available information. In requiring patent applicants to fully disclose the invention to the public, the patent system increases the ease with which one can find the relevant information. Thus, the patent system adds incentive to undertake the creation of new information and, at the same time, recognizes that there is no incentive needed when the information already exists in the public domain or is certain to exist in the public domain within a reasonable time.

C. *Expected Profits*

The second factor in the inventor's prospective valuation of the invention is the expected profit from a successful invention. This expected profit is primarily a function of market conditions—all else

97. See § 103(a).

98. See *Graham v. John Deere Co.*, 383 U.S. 1, 17 (1966).

99. See *Hazeltine Research, Inc. v. Brenner*, 382 U.S. 252, 254–56 (1965).

100. See § 112.

101. See *id.*; *In re Wands*, 858 F.2d 731, 737 (Fed. Cir. 1988).

102. See, e.g., U.S. Patent and Trademark Office, Patent Full-Text and Full-Page Image Databases, <http://www.uspto.gov/patft/index.html> (last visited Sept. 14, 2007); Free Patents Online, Patent Searching Database, <http://www.freepatentsonline.com/search.html> (last visited Sept. 14, 2007).

being equal, the greater the inventor's control of the market, the greater should be her expected profits. Thus, the government can create incentive to invent by granting the inventor, or her assigns, the right to invoke the powers of government to raise a barrier to market competition.

This barrier to competition takes the form of an alienable grant of the "right to exclude others from making, using, offering for sale, or selling the invention"—a patent.¹⁰³ Because the right to exclude extends to equivalents of the invention but not to substitutes for the invention, the patent owner's control of the market is imperfect—i.e., a patent does not necessarily create a monopoly.¹⁰⁴ Information that is only insubstantially different from that embodied in the invention is considered the equivalent of the invention.¹⁰⁵ A substitute is a product that serves the same market as the invention but does so in a different way (e.g., cable television is a substitute for satellite television).¹⁰⁶

The patent owner's right to exclude is enforced by the ability to exact a cost on those who violate the right—those who infringe the patent.¹⁰⁷ Whether there is infringement, and the appropriate cost required to deter infringement, are determined in a civil action brought by the patent owner.¹⁰⁸ The cost exacted may be in the form of damages,¹⁰⁹ or it may be in the form of a court injunction on further infringement.¹¹⁰

The damages are calculated to place the patent owner in the same financial position as she would have been had the infringement not occurred.¹¹¹ If the patent owner actively competed in the market with the infringer, restitution may amount to the profits lost because of the infringement.¹¹² Alternately, and minimally,¹¹³ the restitution may

103. See § 154(a)(1).

104. See *Graver Tank & Mfg. Co. v. Linde Air Prods. Co.*, 339 U.S. 605, 608–09 (1950).

105. *Id.* at 608–10.

106. See *Grain Processing Corp. v. Am. Maize-Prods. Co.*, 185 F.3d 1341, 1355 (Fed. Cir. 1999); see also GWARTNEY & STROUP, *supra* note 10, at 470 (defining a substitute for the invention as a product for which the demand will rise as the price of the invention rises).

107. See §§ 271, 281 (2000 & Supp. 2005).

108. § 281.

109. § 284 (2000).

110. § 283.

111. *Aro Mfg. Co. v. Convertible Top Replacement Co.*, 377 U.S. 476, 507 (1964).

112. See *Rite-Hite Corp. v. Kelley Co.*, 56 F.3d 1538, 1550 (Fed. Cir. 1995) (en banc) (holding that lost profits include lost sales on unpatented items that, with the patented item form a "single functioning unit"); *Standard Havens Prods., Inc. v. Gencor Indus., Inc.*, 953 F.2d 1360, 1373 (Fed. Cir. 1991) (discussing jury award of lost profits attributable to sales by infringer).

113. § 284 (stating that the minimum compensation for infringement is a reasonable royalty).

amount to the royalty the infringer and patent owner, prior to the infringement, would have negotiated to license the invention.¹¹⁴

A court grants an injunction according to the “principles of equity.”¹¹⁵ To justify an equitable grant of injunction, courts require that: (1) the continued infringement will cause irreparable harm to the patent owner; (2) the available legal remedies are not adequate to compensate the patent owner; (3) the patent owner will suffer more harm from the continuing infringement than would the infringer from an injunction; and (4) the “public interest would not be disserved” by the injunction.¹¹⁶

Because the responsibility of enforcing patent rights falls to the patent owner, she bears the cost of detecting and discouraging infringement—costs that are exacerbated by the disclosure requirements of patent qualification.¹¹⁷ In disclosing the created information for which patent protection is sought,¹¹⁸ the inventor reduces the initial cost of infringement and increases the need to police the market for infringement.¹¹⁹

Along with the potential for increased policing costs associated with disclosure is the potential for decreased profits. The disclosed information may reduce the cost of a competitor’s invention of a substitute, thereby reducing the patent owner’s control over the market by lowering the barrier to competitive entry.¹²⁰ As the scope of the patent protection increases, the more difficult it is to create a non-equivalent product and the less the disclosure eases market entry with a competitive substitute.¹²¹

The patent owner’s ability to exact a cost on competitors entering the market with an equivalent to the invention gives the patent owner a certain control over the market for the patent’s duration. As the cost she can exact on infringing competitors increases, so too does her control of the market and the greater should be her profits—and the greater the invention’s NPV. Thus, the inventor’s incentive to invest resources into product development having an uncertain result, and to disseminate any resulting information, is proportional to her ability to use a patent to keep others from free-riding on her inventive efforts.

114. See *Ga-Pac. Corp. v. U.S. Plywood Corp.*, 318 F. Supp. 1116, 1120 (S.D.N.Y. 1970).

115. § 283.

116. *eBay Inc. v. MercExchange, L.L.C.*, 126 S. Ct. 1837, 1839 (2006).

117. See LANDES & POSNER, *supra* note 39, at 298–99.

118. See § 122(b) (requiring the inventor to take special steps, such as abandoning the application or promising not to file for patent protection in a foreign country, to avoid publication within 18 months of filing).

119. See LANDES & POSNER, *supra* note 39, at 298–99.

120. See *id.*

121. See *id.* at 299.

D. Cost

The incentive condition requires that the NPV be sufficiently large to warrant the risk of invention.¹²² Because the patent system increases the availability of information through public disclosure requirements, it decreases the cost of information gathering.¹²³ The patent system, however, also places restrictions on the use of patented information, which increases the cost of information manipulation.¹²⁴ In order to encourage invention and disclosure, the patent system should not increase costs of inventing disproportionate to the enhanced revenue benefits of patent protection.

E. Risk Aversion

The final factor in determining the incentive to invent is the inventor's aversion to risk. This purely subjective parameter is likely related to the other incentive parameters: the expected cost of the invention, the probability of failure, and the expected profits.¹²⁵ Further, the element of uncertainty increases the risk and lowers the incentive for the risk-averse inventor.¹²⁶ In order to overcome the aversion to risk and encourage invention, the patent system should decrease the level of uncertainty.

Uncertainty is inherent in the estimate of the future invention's NPV because of the nature of creating new information.¹²⁷ To lessen the uncertainty in patent law, Congress has established the U.S. Patent and Trademark Office (USPTO) to examine and grant patents,¹²⁸ and it delegated the Federal Circuit as the appellate court with exclusive jurisdiction over patent issues.¹²⁹ The prosecution procedure of the USPTO fosters certainty that granted patents have satisfied the statutory requirements, a certainty that takes the form of a presumption of patent validity rebuttable only by clear and convincing evidence.¹³⁰ The Federal Circuit further fosters certainty by creating or clarifying rules of law to be followed by the various district courts.¹³¹

122. *Supra* Section II.D.

123. See LANDES & POSNER, *supra* note 39, at 298–99.

124. *See id.*

125. *Supra* Section II.D.

126. *Id.*

127. Arrow, *supra* note 9, at 610–14.

128. 35 U.S.C. § 1(a) (2000) (establishing the USPTO).

129. 28 U.S.C. § 1295(a) (2000); Emmette F. Hale, III, *The "Arising Under" Jurisdiction of the Federal Circuit: An Opportunity for Uniformity in Patent Law*, 14 FLA. ST. U. L. REV. 229, 238–39 (1986).

130. *See Orthokinetics, Inc. v. Safety Travel Chairs, Inc.*, 806 F.2d 1565, 1570 (Fed. Cir. 1986).

131. Donald R. Dunner, *A Retrospective of the Federal Circuit's First 25 Years*, IPL NEWSL. (ABA Section of Intellectual Property Law), Summer 2007, at 1, 10; *see* Gregory N. Mandel, *Patently Non-Obvious: Empirical Demonstration that the Hindsight Bias Renders Patent Decisions Irrational*, 67 OHIO ST. L.J. 1391, 1395 (2006) [hereinafter *Patently Non-Obvious I*].

Two important aspects of patent law that are prone to uncertainty are: (1) whether the claimed invention is an obvious extension of the prior art; and (2) what damages are available for continued infringement.

Perhaps the major uncertainty of a post-grant obviousness determination is the difficulty in determining, after success, the prospective probability of success at the decision to invent.¹³² To deal with the dangers of this so-called hindsight bias, the Federal Circuit has explicitly required some motivation to combine information existing in the prior art references (relevant documents) before such references imply obviousness¹³³ and has emphasized the importance of commercial success as an indicator of nonobviousness.¹³⁴ The motivation to combine the separately disclosed information as in the new invention may be explicitly disclosed in the references or may arise from “common knowledge, the prior art as a whole, or the nature of the problem” sought to be addressed by the invention.¹³⁵ Establishing a motivation, based on information within the common knowledge of one with ordinary skill in the art, is evidentiary rather than legal—the common knowledge and the motive within must be established by evidence rather than assumption.¹³⁶

A major uncertainty in the calculation of prospective profits is the patent owner’s ability to raise barriers to market entry. Until recently,¹³⁷ in recognition that the right to bar a competitor’s entry into the market has a significant impact on the valuation of the invention, a court was likely to grant an injunction except in exceptional circumstances regarding public welfare—equity was presumed to favor the patent owner.¹³⁸ This long-standing presumption was explicitly overruled by the Supreme Court in *eBay Inc. v. MercExchange, L.L.C.*,¹³⁹ and the availability of injunctive relief—and thus the NPV of the prospective invention—is now less certain.

132. See *Patently Non-Obvious I*, *supra* note 131, at 1395; Gregory N. Mandel, *Patently Non-Obvious II: Experimental Study on the Hindsight Issue Before the Supreme Court in KSR v. Teleflex*, 9 YALE J.L. & TECH. 1, 3–5 (2007), available at www.yjolt.org/9/fall/mandel-1.

133. *DyStar Textilfarben GmbH & Co. Deutschland KG v. C.H. Patrick Co.*, 464 F.3d 1356, 1360 (Fed. Cir. 2006).

134. See *Merck & Co. v. Biocraft Labs., Inc.*, 874 F.2d 804, 809 n.* (Fed. Cir. 1989) (“Commercial success is an indication of nonobviousness that must be considered in a patentability analysis.”); *Hybritech Inc. v. Monoclonal Antibodies, Inc.*, 802 F.2d 1367, 1380 (Fed. Cir. 1986) (“Objective [indicia] such as commercial success . . . must be considered *before* a conclusion on obviousness is reached . . .”).

135. See *DyStar*, 464 F.3d at 1361.

136. See *id.* at 1366–67.

137. See *eBay Inc. v. MercExchange, L.L.C.*, 126 S. Ct. 1837, 1841 (2006) (holding that there is not a categorical rule to grant an injunction once infringement has been established).

138. See *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1247 (Fed. Cir. 1989); *Smith Int’l, Inc. v. Hughes Tool Co.*, 718 F.2d 1573, 1577 (Fed. Cir. 1983).

139. See *eBay*, 126 S. Ct. at 1841.

IV. THE PATENT SYSTEM AS A BURDEN

A. *Too Many Patents*

1. The Problem

A common critique of the current patent system is that it actually serves to impede invention and innovation by granting patents on incremental improvements or obvious inventions.¹⁴⁰ The resultant “patent thicket” impedes use of the patented information either in the inventive process or in generating revenue from an invention that is inextricably linked to other patented information.¹⁴¹ By shifting resources to patent-related transaction costs, the resources available to spend on invention are less.¹⁴² The incentive to invent is lessened by the increased costs of inventing around prior patents and the lower expected profits due to licensing or litigation costs.

Many inventors engage in the practice of defensive or offensive patenting.¹⁴³ Several patents that claim protection for a narrow range of information can be collectively and offensively used to keep a competitor from improving on his invention without licensing (patent clustering) or to block competitors from entering the market through improvements on the original invention (patent blanketing).¹⁴⁴ Patent blanketing can also be used defensively against patent clustering, ensuring that the original inventor retains the right to improve his invention.¹⁴⁵ Low standards for patentability encourage such strategic behavior, which diverts resources from invention and raises cost barriers to inventive activity.¹⁴⁶

The disincentive created by strategic patenting is said to be accentuated in technological areas that are rapidly advancing.¹⁴⁷ Proponents of this theory argue that at any instance in time, the state of these arts is not well documented, existing predominantly in the common knowledge of the practitioners of the art.¹⁴⁸

140. FED. TRADE COMM’N, *supra* note 86, Executive Summary at 5–7 (2003).

141. *See id.* ch. 2 at 25–33.

142. *See* Brief of Intel Corp. and Micron Technology Inc., as Amici Curiae in Support of Petitioner at 5, *KSR Int’l Co. v. Teleflex Inc.*, 127 S. Ct. 1727 (2007) (No. 04-1350).

143. *See* KNIGHT, *supra* note 42, at 48–53; LANDES & POSNER, *supra* note 39, at 320–22.

144. *See* KNIGHT, *supra* note 42, at 48–53; LANDES & POSNER, *supra* note 39, at 320–22.

145. *See* KNIGHT, *supra* note 42, at 48–53; LANDES & POSNER, *supra* note 39, at 320–22.

146. *See* FED. TRADE COMM’N, *supra* note 86, Executive Summary at 5–7 (potential liability and costs of patent avoidance is enough to keep some inventors from engaging in particular avenues of research); LANDES & POSNER, *supra* note 39, at 320–21.

147. *See* Brief for Amici Curiae Time Warner Inc., IAC / Interactive Corp., and Viacom, Inc. in Support of Petitioner at 4, *KSR Int’l Co. v. Teleflex Inc.*, 127 S. Ct. 1727 (2007) (No. 04-1350).

148. *See id.* at 4–5.

2. The Reform

Two suggested reforms for a patent system criticized for allowing too many patents on marginal advances are: (1) apply a more stringent test of nonobviousness¹⁴⁹ and (2) ease the burden of proving a patent invalid.¹⁵⁰ One focus of the obviousness reform is to lessen the deference that the Federal Circuit gives to commercial success in determining whether an invention is an obvious extension of the prior art; and, at trial, to switch the burden of proving a relationship (or lack thereof) between commercial success and obviousness from the patent opponent to the patent proponent.¹⁵¹ The other focus is to alter or overturn the Federal Circuit's motivation test to more readily find a combination of information disclosed in prior art references obvious because of the abilities of ordinary practitioners of the art to create and manipulate information.¹⁵² Related to the reform of obviousness is the push to lower the burden of overcoming the presumption of validity by allowing an invalidation of a patent by a preponderance of the evidence rather than the current clear-and-convincing standard.¹⁵³

In *KSR Int'l Co. v. Teleflex*, the Supreme Court adopted a more subjective test for obviousness than the Federal Circuit's motivation test.¹⁵⁴ The Court, in ruling on the obviousness of an invention that consists of a combination of prior-art elements, noted that the "inferences" and "creative steps" that an ordinary practitioner of the art would make can render a combination of existing elements obvious.¹⁵⁵ Stating that an ordinary practitioner is "a person of ordinary creativity," the Court went on to note that a combination may be obvious if market forces or design needs motivate the ordinary practitioner to try combining existing elements.¹⁵⁶ The only limit on this obviousness analysis seems to be that there be a finite number of combinations (i.e., not an infinite number of combinations) and that the results of the combination be predictable.¹⁵⁷

Applying a more subjective test than the Federal Circuit's motivation test likely will increase the risk of hindsight bias and thus the uncertainty in the estimate of the prospective invention's NPV. Examining the ordinary artisan's knowledge and ability to create information is a subjective inquiry that will come well after the invention is

149. See FED. TRADE COMM'N, *supra* note 86, ch. 4 at 8–19.

150. See *id.* ch. 5 at 28.

151. See *id.* ch. 4 at 19.

152. See, e.g., *id.*; Brief of Intellectual Property Law Professors as Amici Curiae in Support of Petitioner at 4, *KSR Int'l Co. v. Teleflex Inc.*, 127 S. Ct. 1727 (2007) (No. 04-1350).

153. FED. TRADE COMM'N, *supra* note 86, ch. 5 at 28.

154. See *KSR Int'l Co. v. Teleflex Inc.*, 127 S. Ct. 1727, 1742–43 (2007).

155. *Id.* at 1741.

156. *Id.* at 1742.

157. See *id.*

complete and the knowledge disseminated. Such a subjective test will expose investors to greater risks and thus decrease their incentive to invest into invention. Although the subjective test may decrease the cost of obvious incremental invention, and thus increase the availability of products while lowering consumer costs, it may also decrease the incentive to invest in non-incremental activities for fear that any inventions will later be deemed incremental.

The inventive stages of product development involve both the creation of product concept and the recognition of the market need for the product. The proposed obviousness standard (partially adopted in *KSR Int'l Co.*) incorrectly excludes the recognition of need from the inventive process. Recognizing and defining the market need (identifying the problem to be solved) is an essential first step in the process of creating the product concept (solving the problem). Refusing to consider commercial success as an indicator of nonobviousness assumes the problem-searching step and thus reduces the incentive to search for problems to be solved, ultimately reducing the incentive to invent.

The obviousness issue as it applies to rapidly advancing technology might be solved with increased publication of the relevant information, increasing the dissemination of knowledge outside the circle of practitioners of what may be an esoteric art. Acquiring patent protection or ensuring that another may not acquire patent protection may provide an incentive to disseminate.¹⁵⁸ While the short-run ramifications may be the increased costs of dissemination, the long-run benefits include a broader base of information accessible to the public—enabling more and greater invention in the future.

B. *Too Powerful Patents*

1. The Problem

A common critique of the current patent system is that it actually serves to impede invention and innovation by creating remedies to infringement disproportionate to the value that the patented product adds to an infringing device.¹⁵⁹ An extension of this critique is that the value of the patent is enhanced disproportionately to the value of the invention to society and that certain remedies may impose an unbearable social cost.¹⁶⁰ There are two common threads to the critique

158. See, e.g., 35 U.S.C. § 157 (2000) (defining the statutory invention registration publication which grants the defensive powers of a patent (as prior art) but not its offensive powers (right to exclude)).

159. See, e.g., Brief of Business Software Alliance et al. as Amici Curiae in Support of Petitioners at 6–12, *eBay Inc. v. MercExchange, L.L.C.*, 126 S. Ct. 1837 (2006) (No. 05-130) [hereinafter *Software Alliance*].

160. See, e.g., Amicus Brief of Malla Pollack and Other Legal Scholars Supporting *eBay Inc. et al.*, at 4, 9–11, *eBay Inc. v. MercExchange, L.L.C.*, 126 S. Ct. 1837 (2006) (No. 05-130) [hereinafter *Legal Scholars*].

of the power of patents: (1) the availability of enhanced damages or injunctive relief creates a disparity in negotiating positions of the patent holder and potential licensee—making an arm’s-length agreement unlikely,¹⁶¹ and (2) injunctive relief is inappropriate when it removes the invention from the market.¹⁶²

2. The Reform

Two suggested reforms for a patent system said to give too much power to patent owners, particularly non-practicing patent holders, are to: (1) lower the available damages¹⁶³ and (2) make specific remedies contingent upon whether the party asserting the patent practices the disclosed invention.¹⁶⁴ One policy goal of this reform is to encourage inventors and developers to search patent publications and make use of the prior art without exposing themselves to enhanced damages for willful infringement, a remedy that would then require deliberate copying of the protected invention instead of the current knowledge-of-the-patent standard.¹⁶⁵ Another policy goal of this proposed reform is to protect, or establish, a public right to the technological advances that embody the patented information by limiting the availability of an injunction of further infringing action.¹⁶⁶

While the issue of enhanced damages has yet to be addressed, the Supreme Court has addressed the issue of injunction awards—to some degree. In *eBay Inc. v. MercExchange, L.L.C.*, the Court overruled the Federal Circuit’s rule that injunctions would be granted barring a showing of exceptional circumstances related to public welfare.¹⁶⁷ Arguing that the traditional four-factor equity test was to apply without presumption, the Court did not explicitly create a presumption against non-practicing patent owners. Justice Kennedy’s concurrence, however, stated that legal remedies “may well be sufficient” for non-practicing patent owners who use the threat of injunction to maximize licensing fees.¹⁶⁸

Since the *eBay* decision, district courts applying the four-factor equity test have routinely denied injunctive relief to non-practicing or

161. See, e.g., Software Alliance, *supra* note 159, at 8–9.

162. See e.g., Legal Scholars, *supra* note 160, at 17–20.

163. See, e.g., S. 3818, 109th Cong. § 5 (2006) (amending Title 35’s provisions regarding remedies for infringement); H.R. 2795, 109th Cong. § 6 (2005) (amending Title 35’s provisions regarding the inventor’s right to obtain damages).

164. See, e.g., Legal Scholars, *supra* note 160, at 17–20.

165. FED. TRADE COMM’N, *supra* note 86, ch. 5 at 30–31.

166. See *Patent Act of 2005: Hearing on H.R. 2795 Before the Subcomm. on Courts, the Internet, and Intellectual Property of the H. Comm. on the Judiciary*, 109th Cong. 36–37 (2005) (statement of Daniel B. Ravicher, Executive Director, Public Patent Foundation).

167. *eBay Inc. v. MercExchange, L.L.C.*, 126 S. Ct. 1837, 1839 (2006).

168. *Id.* at 1842 (Kennedy, J., concurring).

non-competing patent owners.¹⁶⁹ For example, the district court in *z4 Technologies, Inc. v. Microsoft Corp.*¹⁷⁰ reasoned that there was no threat of irreparable harm to the patent holder by Microsoft's continued, willful infringement because z4 and Microsoft were not competing for the same market.¹⁷¹ Similarly, the district court in *Paice LLC v. Toyota Motor Corp.*¹⁷² refused to enjoin Toyota from further infringement because Paice did not compete with Toyota in the market where infringement was occurring and because Paice failed to prove that its efforts to license its invention were hampered by Toyota's infringement.¹⁷³

In effect, *eBay* seems to require that where a third party is willing to practice the invention, the patent owner must: (1) license it; (2) accept infringement; (3) bear the cost of litigation to determine a reasonable royalty (and risk patent invalidation); or (4) enter the market by practicing the invention in competition with any potential infringers.

Because of the uncertainty in litigation, the inventor's position in license negotiations is weaker under *eBay* than it was under the presumptive-injunction jurisprudence; thus, *eBay* has reduced the NPV of the prospective invention-as-the-product. Because the market value for licensing has been reduced, the incentive for those who are unwilling or unable to produce and market a fully developed product is also reduced. Investors contemplating a product development now must proceed based on a lower NPV of invention licensing, or assume the increased risks of a full product development.

The NPV of the prospective invention is reduced if enhanced damages are less readily available. Since exacting a cost in the form of damages for infringement is the primary mode by which the patent holder may raise barriers to market entry, the patent holder's control of the market and his expected profit are reduced by lower available damages.

Further, the prospective cost and the associated uncertainty for invention and innovation combined are greater than for invention alone. The increased cost, decreased expected profits, and increased uncertainty all serve to lower the incentive to invest into invention. Since the uncertainty of the innovation stages may be less for investors with a strong production capability and market presence (such as Microsoft and Toyota), the *eBay* ruling will disproportionately affect start-ups and invention-only firms.

169. See Jonathan Muenkal & Eric Lee, *The eBay Effect: Real Change or Status Quo? An Examination of Requests for Injunctive Relief in Patent Actions Since eBay v. MercExchange*, 25 IPL NEWSL (ABA Section of Intellectual Property Law), Fall 2006, at 14, 20.

170. *z4 Techs., Inc., v. Microsoft Corp.*, 434 F. Supp. 2d 437 (E.D. Tex. 2006).

171. *Id.* at 440.

172. *Paice LLC v. Toyota Motor Corp.*, No. 2:04-CV-211-DF, 2006 U.S. Dist. LEXIS 61600 (E.D. Tex. Aug. 16, 2006).

173. *Id.* at *14.

As described in Section II.B, *supra*, the cost of inventing is the lost opportunity to use those resources in some other way (the next best use). The expectation of recouping actual costs is not a sufficient incentive to invest; there must be enough expected return on investment to warrant the cost of invention over some other investment. Similarly, as described in Section II.D, *supra*, the incentive to invest decreases as the risk increases; there must be enough expected return on investment to warrant the risk. Reducing the availability of enhanced damages lowers the expected profits from the invention, and reducing the availability of injunction lowers both the expected profits and increases the uncertainty in the NPV estimate. These changes to available remedies for infringement have both increased the risk and decreased the NPV, thus doubly decreasing the incentive to invest into invention.

Because of lower infringement costs, those in a better position to bring the invention to market, like Microsoft or Toyota, will now be able to do so at a lower immediate cost to the consumer. However, this short-run benefit may be at the expense of the long-run cost of a reduced overall investment into invention.

V. CONCLUSION

The push for reform of the U.S. patent system may be placing short-run economic benefits, in the form of reduced cost and increased availability of current technology, over the long-run benefits from a constant source of new and useful technology.

In its attempt to replace the evidentiary standard of the Federal Circuit's motivation test, the patent-reform lobby argues that granting fewer patents will reduce product development costs. They argue that many inventions for which patents are granted are merely obvious extensions of the body of knowledge and skill common to ordinary practitioners of the particular art; that restrictions on use of the invention impede technological process and consumer access to such technology.¹⁷⁴ The patent-reform lobby fails to acknowledge the effect of certainty granted by the motivation test on an investor's incentive to invent. Nor does it acknowledge that the motivation test acts as incentive to defensively publish technical information—one of the goals of the patent system. Moving to a less certain measure of obviousness increases the risk of investment and therefore reduces the incentive to invent. Reduced incentive to invent will reduce the number of investors willing to assume the risk of invention.

In its attempt to limit the availability of injunction and enhanced damages, the patent-reform lobby argues that restricting the remedies available to an infringer-patent owner will reduce the infringer's de-

174. See *supra* Section IV.A.1.

velopment costs.¹⁷⁵ The infringer's reduced development costs may result in reduced consumer costs or in increased infringer profits. Reducing the patent owner's available remedies lowers his ability to control the market, thus reducing the expected revenues from the invention and the estimated NPV of the prospective invention. Reducing available remedies decreases the expected return on investment and therefore reduces the incentive to invent. Reduced incentive to invent will lower the number of investors willing to assume the risk of invention.

While the patent-reform lobby argues that the patent system is functioning contrary to its purpose, the suggested reforms seem aimed at reducing innovation costs at the expense of the incentive to invent. These reforms would likely have the effect of lower short-run costs to the consumer for products based on existing technology, but perhaps at the expense of reduced incentive to create products based on yet-to-be-developed technology. This raises the question: What will the next generation of law students use to write papers on then-existing patent-law crises? Perhaps a thought-to-print product, or merely a lower-cost version of the 2006-era computer and software?

Don Tiller

175. See *supra* Section IV.B.1.