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MISLEADING PATENT SIGNALS

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ABSTRACT

Patent scholars recognize that patented status conveys information to the public beyond the patent's technical disclosure, suggesting that this creates private value for patent owners in addition to exclusivity, facilitates investments, and reduces information asymmetries between patent owners and the public. But the literature has given only passing thought to the social value of this signaling effect, ignoring or downplaying the way that patents can mislead audiences. This Article collects and catalogs the various ways patents signal information, recognizing that different audiences (e.g., consumers, inventors, sophisticated investors) may perceive patents differently. It also evaluates the accuracy of this information along two axes — (1) theoretical accuracy given the design of the patent system; and (2) practical accuracy based on whether patents correlate with the information in practice. Patented status *should* convey only limited information and do so only weakly due to shortcomings in the patent system. Yet, at least some audiences treat patented status as a proxy for information that patents are neither designed to signal nor reliably correlate with in practice, including government endorsement, quality, superiority, importance, efficacy, safety, innovativeness, financial value, and likely market success.

Recognizing that weak and false patent signals mislead audiences supports the descriptive claim of the patent signals' literature that patents convey information in a way that creates value for the patent owner. But it raises serious doubts about the social value of this signaling effect, as this value is not warranted by contributions to technological progress and comes at the expense of the public. Misleading patent signals also raise questions about patent law's traditional market deference, given that the market looks (to some extent) to patents for the

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same questions that patent law leaves to markets. Ambiguity as to the scope and impact of the patent signal problem — both in terms of audiences affected and impact on actual decision making — prevents any strong, practical recommendations. But misleading patent signals require greater attention to protecting the public, especially consumers, from being misled about the significance of patent protection.

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I. INTRODUCTION

Theranos and its founder Elizabeth Holmes promised groundbreaking at-home blood testing with a single drop of blood from a slight finger prick.[1] This attracted hundreds of millions of dollars in capital from prominent investors, government and large corporate partnerships, and glowing media coverage depicting Holmes as a genius and her technology as revolutionary.[2] Yet, the technology was imagined, and Theranos never came close to building a functioning product.[3]

"Do you have an idea for a new product or invention?," the famous boxer and TV pitchman George Foreman says in a staple cable commercial, "Call my friends at InventHelp!"[4] InventHelp is an invention promotion company that purports to help individual inventors protect and commercialize their ideas.[5] But a class action lawsuit contends that InventHelp's purported services are fraudulent, luring would-be inventors into paying thousands of dollars for trivial or imaginary services.[6]

Theranos and InventHelp are complex stories involving outright fraud by Holmes[7] and alleged fraud by InventHelp,[8] as well as the modern appeal of celebrity. They could be dismissed as the Information Age

1. David Streitfeld, *The Epic Rise and Fall of Elizabeth Holmes*, N.Y. TIMES (Jan. 3, 2022) (describing Holmes's promise that Theranos would deliver at-home blood testing using a tiny needle to get a small drop of blood), https://www.nytimes.com/2022/01/03/technology/elizabeth-holmes-theranos.html [https://perma.cc/E4A7-CUK2].

2. *See generally* JOHN CARREYROU, BAD BLOOD: SECRETS AND LIES IN A SILICON VALLEY STARTUP (2018) (providing comprehensive account of the rise and fall of Theranos).

3. *See generally id.*

4. InventHelp, *InventHelp's New Commercial Featuring George Foreman (60 sec)*, YOUTUBE, https://www.youtube.com/watch?v=_oxPovB51X0 [https://perma.cc/M3F3-YW99].

5. *Get Started*, INVENTHELP, https://inventhelp.com/get-started [https://perma.cc/F29Z-SFMF] [hereinafter *InventHelp Get Started*].

6. Joe Chen, *Judge Won't Give Invent Help Relief from Online and Broadcast Criticisms*, PENNSYLVANIA RECORD (June 24, 2021), https://pennrecord.com/stories/525886321-judge-won-t-give-invent-help-relief-from-online-and-broadcast-criticisms [https://perma.cc/9HA7-KQPS]; *see also If You Purchased Services from InventHelp or Western InventHelp During the Time Period from January 1, 2014 to June 30, 2021, Your Rights May Be Affected by a Class Action Settlement*, INVENTHELP SETTLEMENT, https://ihsettlement.com/ [https://perma.cc/6ER8-WMKW]; Second Amended Complaint at ¶¶ 11–13, 21, Calhoun v. Invention Submission Corp., No. 2:18-cv-01022 (W.D. Pa. Apr. 29, 2019) [hereinafter *InventHelp Complaint*].

7. *See* Streitfeld, *supra* note 1.

8. *InventHelp Complaint*, *supra* note 6.

equivalent of selling you the Brooklyn Bridge[9] or Florida swampland.[10] Less apparent, but important, public perceptions of patents facilitated both schemes. For Theranos, a "key part of the company's mythology" were its dozens of patents, emphasized on its website, in the fawning early media coverage, and even physically in Theranos's lobby.[11] These patents gave Theranos's technology "credibility it didn't deserve,"[12] with the patents viewed as a government endorsement that the invention "really worked" and evidence "that the company was a good bet."[13] InventHelp likewise lured inventors with the insinuation that patent protection would lead to riches, emphasizing the "over 10,000 patents awarded as a result of our patent referral services"[14] and allegedly providing positive-preliminary patentability opinions to lure customers into more expensive commercialization services.[15] The perceptions on which these schemes relied — that patents indicate government endorsement, efficacy or quality, or financial success[16] — are wrong. The patent system does not make such determinations, leaving them to the market.[17]

Theranos and InventHelp are canaries in the patent system's coal mine, alerting us that something is amiss with the public's perception of patents. For over two decades, scholars have recognized that patents convey information to the public beyond merely the technical details about the invention required of the patent document. The patent signals theory contends that patenting, or patented status, serves as a proxy for, or signal of, more difficult to determine information about the invention, the inventor, or the patent owner.[18] The focus of the existing

9. New York Daily News, *Brooklyn Bridge Brings Out the Gullible*, NEW YORK DAILY NEWS (May 16, 2008), https://www.nydailynews.com/2008/05/16/brooklyn-bridge-brings-out-the-gullible/ [https://perma.cc/8CAT-FZEQ].

10. James C. Clark, *Underwater Lots! Swamp Cities! $10 Down! Welcome to Florida, the Land of Sunshine, Surf and Scams*, ORLANDO SENTINEL (Oct. 28, 1990), https://www.orlandosentinel.com/news/os-xpm-1990-10-28-9010261163-story.html [https://perma.cc/C9FX-B24Q].

11. Daniel Nazer, *Theranos: How a Broken Patent System Sustained Its Decade-Long Deception*, ARSTECHNICA (Mar. 4, 2019), https://arstechnica.com/tech-policy/2019/03/theranos-how-a-broken-patent-system-sustained-its-decade-long-deception/ [https://perma.cc/5T2N-R8KP]; *see also* Bruce Berman, *HBO Tells Only Part of 'Inventor' Elizabeth Holmes' Story*, IPWATCHDOG (Sept. 2, 2019), https://ipwatchdog.com/2019/09/02/hbo-tells-part-inventor-elizabeth-holmes-story/id=112816/ [https://perma.cc/88SS-2RL3].

12. Nazer, *supra* note 11.

13. Zachary Silbersher, *The Lesson from Theranos Is That Investors Do Not Know How to Read a Patent*, MARKMAN ADVISORS (Mar. 26, 2019), https://www.markmanadvisors.com/blog/2019/3/26/the-lesson-from-theranos-is-that-investors-do-not-know-what-a-patent-is [https://perma.cc/2U8D-HW87].

14. *InventHelp Get Started*, *supra* note 5.

15. *InventHelp Complaint*, *supra* note 6, at ¶¶ 11–13, 21–23, 27.

16. Nazer, *supra* note 11; Silbersher, *supra* note 13; *InventHelp Complaint*, *supra* note 6, at ¶¶ 21–23, 27.

17. *See infra* Section IV.A.

18. *See infra* Section II.A.

literature is proving the descriptive claim that patented status signals information, thereby creating value for the patent owner beyond the patent's exclusive rights and explaining why patenting occurs despite the few patents that generate direct financial return.[19] Implicitly, the signals literature views the signaling function as normatively positive and justifying patent rights, contending that it reduces information asymmetries between patent owners and audiences and facilitates investments.[20] But Theranos and InventHelp are particularly prominent and colorful examples of a larger problem — patent signals can mislead audiences. This problem warrants reconsideration of the patent signals theory to address several largely overlooked issues: the precise information patented status signals, the accuracy of patent signals, and the social benefit of patent signaling.[21]

This Article undertakes this task by collecting and cataloging the ways in which patented status serves as a proxy for various types of information. In doing so, the Article considers how different audiences (e.g., sophisticated investors, crowdfunders, consumers, and inventors) with different levels of patent knowledge, experience, and sophistication may perceive the information signaled by patented status differently. In addition to collecting the various patent signals, the Article evaluates the accuracy of these signals along two dimensions: (1) theoretical accuracy based on whether patents are designed to convey the information; and (2) practical accuracy based on whether patented status reliably correlates with the information in practice.

The existing literature gives almost no consideration to the first dimension — what information patented status *should* convey given the design of the patent system, the requirements for obtaining patent protection, and the nature of patent rights. The information that patent rights are designed to convey is surprisingly limited, specifically: the claimed invention is technologically distinct from what previously existed, is the type of thing the patent system is meant to address, can be made and used in an operable form from the patent's disclosure, is attributable to the person(s) named on the patent, and can be exclusively provided by the patent owner.[22] But even this information only weakly correlates with patented status in practice because well-recognized flaws in the patent examination process, and lesser recognized structural features of the patent system, prevent the United States Patent and Trademark Office ("Patent Office") from reliably evaluating compliance with the statutory criteria of patentability and prevent patent rights from reliably providing a right to exclude.[23] Sometimes patented status

19. *See infra* Sections II.A–C.
20. *See infra* Section II.C.
21. *See infra* Sections II.B–C.
22. *See infra* Section III.A.
23. *See infra* Section III.B.

accurately correlates with information like technological distinctness and exclusivity, while other times it does not. Therefore, patented status is a noisy signal in practice even for the information patents are designed to convey.[24]

Beyond these theoretically accurate but practically noisy signals, patented status is treated by at least some audiences in at least some circumstances as signaling a wide variety of information that patent rights are neither designed to convey nor reliably correlate with in practice. These false signals include: government endorsement of the technology or invention; the quality, superiority, importance, innovativeness, safety, or efficacy of the technology, invention, product, or firm; and the financial worth and likely market success of the invention or product.[25] A fundamental premise of patent law is that questions like quality, superiority, importance, and financial worth are better left to the market than decided by government bureaucrats at the Patent Office.[26] While some patented products, inventions, and technology are undoubtedly important, innovative, and valuable, patented status alone does not dictate these characteristics. Relatedly, knowing that a patent application is pending in the Patent Office — the common "patent-pending" designation — merely indicates submission of the requisite fee and paperwork to the Patent Office.[27]

Finally, patented status does seem to correlate in practice (though perhaps weakly) with other information, even though patents are not designed to convey such incidental signals. Patented status indicates some level of management sophistication and commitment in navigating the complexity of the patent system, even though the American patent system is supposed to be accessible to all. Patented status further conveys a barrier to entry regardless of the patent's validity because of the cost and difficulty of invalidating patents, even though only valid patents are supposed to deter competition. And because society widely, but falsely, treats patents as an indication of worth or success, patent protection can correlate with social recognition of the inventor's entitlement to citizenship and belonging in the community.[28]

Thus, patent signals can be sorted into the following four groups along the two dimensions of theoretical and practical accuracy:

24. *See infra* Section III.C.
25. *See infra* Section IV.A.
26. *See infra* Sections IV.A, V.A.2.
27. *See infra* Section IV.A.6.
28. *See infra* Section IV.B.

Table 1: Patent Signal Groups

	Designed to Convey	**Not Designed to Convey**
Practically Correlate	True Patent Signals	Incidental Patent Signals
Do Not Practically Correlate	Weak Patent Signals	False Patent Signals

By identifying and cataloging the various ways that patented status conveys information to audiences, this Article supports the descriptive thesis of the patent signals literature that patents serve as information signals and can provide value beyond exclusivity to their owner. At the same time, the Article's evaluation of the accuracy of patent signals raises serious questions about the social value of patents' signaling function. Patents are only supposed to convey limited information and do even that weakly.[29] If audiences correctly understand patented status as only weakly correlating to limited information, patent signaling fails to create much private value for patent owners or facilitate investments.[30] On the other hand, for audiences that underestimate the limits or weakness of patent signals and/or rely on false patent signals, the patent signaling effect will mislead them and exacerbate, not reduce, information asymmetries. This still creates private value for patent owners in the form of consumer premiums, misdirected investments, and the like but that value is unwarranted by the patent owner's contribution to technological progress. It also creates incentives to patent when it otherwise would not be warranted, contributing to the over-patenting problem that burdens the patent system.[31]

Determining the scope of the problem of misleading patent signals is difficult. Logically, the problem is less significant for sophisticated audiences whose significant patent experience and access to expert advisors should mitigate the risk of being misled by weak and false patent signals. Some sophisticated investors do seem to correctly recognize the noise in patent signals, but evidence suggests that others are overly reliant on weak patent signals and influenced by at least some of the

29. *See infra* Part III.
30. *See infra* Section V.B.2.
31. *See infra* Sections V.A.2, IV.B.2.

false patent signals.[32] Conversely, consumers and other less sophisticated audiences should be most vulnerable to misleading patent signals but the empirical evidence is ambiguous, showing that false and weak patent signals significantly impact ordinary individuals' perceptions but maybe not their actual decision making.[33] This ambiguity in the scope of the problem — both in which audiences are impacted and the degree of impact — requires a cautious approach to drawing conclusions from this Article's reconsideration of the patent signals theory.

The Article's primary contribution is theoretical. The basic contribution of the patent signals theory was to identify how patents can provide benefits to patent owners beyond exclusivity. This Article's contribution is to show how these benefits can impose costs on the public beyond monopoly costs. Because patents should only weakly convey limited information, the more value patent signaling provides to patent owners, the more likely the public is being misled. The implicit suggestion in the literature that the signaling effect is socially valuable or a justification for the patent system is thus doubtful. The social value of patents likely resides in the innovation incentives patents provide, not in any significant ability to facilitate communication between patent owners and patent audiences.[34]

More broadly, this Article raises questions about patent law's traditional deference to the market to determine the quality, superiority, importance, and worth of the invention. The identification and analysis of false patent signals shows that at least segments of the market are looking right back at the patent system to determine these characteristics. This circularity should be a data point in debates related to the market-based nature of the patent system, such as whether patents or prizes are better innovation incentives and whether the patent system should better regulate patent owners' use of their exclusive rights.[35]

From a practical perspective, the ambiguous impact of misleading patent signals counsels against fundamental reforms to the patent system. In particular, though relevant to the highly debated question of whether more resources should be expended on ex ante patent examination, the misleading patent signals problem does not provide a clear answer to this question. But the problem of misleading patent signals does suggest a greater need to protect patent audiences, particularly less sophisticated audiences like consumers, from being misled by weak and false patent signals. For example, use of "patented" and "patent-pending" in labeling and advertising should be restricted to the extent it deceptively suggests false patent signals. Additionally, some Patent Office materials directly reinforce false patent signals, while the Patent

32. *See infra* Section V.B.1.
33. *See infra* Section V.A.1.
34. *See infra* Section VI.A.1.
35. *See infra* Section VI.A.2.

Office's marketing of patents and the patent system more generally contributes to the mythologizing of patenting that causes, in part, misleading patent signals.[36] There is no reason that the government agency with the most patent expertise should be contributing to the misleading patent signals problem. Revising its materials to avoid doing so is a minor and easily implemented reform.[37]

The Article proceeds in five parts. Part II provides an overview of the existing literature on patent signals. Part III identifies the true patent signals and their weaknesses. Part IV describes false and incidental patent signals. Part V tackles the causes, costs, and scope of misleading patent signals for different patent-system audiences. Part VI turns to the theoretical and practical consequences of recognizing misleading patent signals. A brief conclusion follows.

II. PATENTS AS INFORMATION SIGNALS

To obtain a patent, the inventor must file an application with the Patent Office, which examines it for compliance with the statutory criteria of patentability.[38] The claimed invention must be the type of technological advancement for which patent protection is granted ("patent eligible subject matter") and have a real-world, practical function ("utility") under § 101 of the Patent Act. It must be an actual invention that did not previously exist under § 102 ("novelty" or "anticipation") and be sufficiently different from what did exist to warrant patent protection under § 103 ("non-obviousness").[39] Pursuant to § 112, the patent application also must adequately teach a skilled person in the field how to make and use the invention ("enablement"); must demonstrate that the inventor actually possessed the invention ("written description"); and must claim the invention with adequate precision ("definiteness").[40] The Patent Office is required to issue a patent if these statutory criteria are satisfied, without any discretion or further considerations.[41]

A patent provides the right to exclude others from making, using, selling, offering to sell, or importing the invention (or its equivalent) in the United States for twenty years from the filing of the patent application.[42] This theoretically allows the inventor to price the invention at

36. *See infra* Section IV.B.

37. *See infra* Section VI.B.

38. Cuozzo Speed Techs., LLC v. Lee, 579 U.S. 261, 266 (2016).

39. 35 U.S.C. §§ 101–103.

40. 35 U.S.C. § 112(a)–(b). Section 112 also requires disclosure of the best way the inventor knows to implement the invention, but statutory changes have "effectively eliminated the best mode requirement from patent law." Lee Petherbridge & Jason Rantanen, *In Memoriam Best Mode*, 64 STAN. L. REV. ONLINE 125, 126–27 (2012).

41. Sean B. Seymore, *The Presumption of Patentability*, 97 MINN. L. REV. 990, 995 (2013); 35 U.S.C. § 131.

42. 35 U.S.C. § 271(a); 35 U.S.C. § 154(a)(2).

above competitive prices, thereby recovering its research and development costs and incentivizing it (and others) to engage in further innovation.[43] Whether the inventor recovers its research and development costs, or even receives a windfall, depends on consumer demand for the patented product and consumer willingness to pay above competitive prices.[44]

Scholars have increasingly recognized that patents also convey information to those who interact with them. Section II.A introduces this patent signals literature. Section II.B addresses the lack of precision as to what information exactly patents signal. Section II.C discusses how the existing literature's descriptive focus minimizes questions of accuracy and social value.

A. The Signal Theory of Patent Law

Over the past two decades, patent scholars have increasingly contended that patent rights provide value beyond merely the right to exclude.[45] In particular, Clarisa Long argued that the conventional focus on exclusivity and the resulting above competitive prices "presents an incomplete picture of the value and function of patents."[46] To Long, patents helped overcome information asymmetries in capital and labor markets by serving as a signal — a readily observable fact correlated with, or serving as a proxy for, some other fact that is too difficult to determine directly.[47] Patents could credibly advertise information about the invention or the firm to investors who would not expend resources to determine this information directly.[48] This signaling effect purportedly created additional value for the patent owner, explaining why firms patented even when the value of exclusivity alone would not justify it.[49]

Subsequent scholarship on patent signals has followed two paths. First, scholars have used various economic modeling, empirical methods, and data to try to prove Long's basic descriptive account that

43. Mark A. Lemley, *Reconceiving Patents in the Age of Venture Capital*, 4 J. SMALL & EMERGING BUS. L. 137, 139 (2000).

44. W. Nicholson Price II, *The Cost of Novelty*, 120 COLUM. L. REV. 769, 772 (2020).

45. *See, e.g.*, Stuart J.H. Graham & Ted Sichelman, *Why Do Startups Patent?*, 23 BERKELEY TECH. L.J. 1063, 1064–70 (2008) (collecting ten reasons for patenting beyond market exclusivity). Beyond the patent signals literature discussed herein, see, e.g., Clark D. Asay, *The Informational Value of Patents*, 31 BERKELEY TECH. L.J. 259, 263 (2016) ("[P]atents may serve a variety of different informational functions . . . ."); Jeanne C. Fromer, *Expressive Incentives in Intellectual Property*, 98 VA. L. REV. 1745, 1746 (2012) (focusing on inventors' creative interests in their inventions).

46. Clarisa Long, *Patent Signals*, 69 U. CHI. L. REV. 625, 637 (2002).

47. *Id.* at 627, 641, 644–46.

48. *Id.* at 636.

49. *Id.* at 626–27.

patents signal information.[50] According to Dan Burk's review of this literature, "[T]he empirical evidence for the signaling model is mixed, and probably tends not to support that justification — not surprisingly, there is evidence that investors look to more immediate signals of firm competence, such as managerial credentials and experience, to make judgments about the firm."[51]

Second, scholars building on, or working in parallel with, Long have offered variations on patents as information signals. Gideon Parchomovsky and Polk Wagner contended that "individual patents are not very useful signals" but patent portfolios (i.e., collections of related patents) "convey important information about firms."[52] Burk posited that patents demonstrate "adoption of the proper role" in "the expected social order" and are important signals not because they correlate with useful information but because they "demonstrate to venture capitalists, shareholders, creditors, and other constituencies that the firm is behaving as it ought."[53]

Ann Bartow (before Long) recognized that patents also convey information in consumer markets.[54] She described patents used as a "marketing ploy," akin to a celebrity endorsement, to make products "seem more science-based and technologically sophisticated."[55] Likewise, Jonas Anderson noted that "[c]ompanies use their patents as a type of advertising, extolling the virtues of a product or company" by using the patent as a "proxy for other, more difficult to quantify, aspects of a product."[56]

Jason Rantanen and Sarah Jack explored how the individual inventor, not the patent-owning firm, can use patents as a credential showing that "the person named on its face is a real-life, government-certified

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50. *See, e.g.*, Annamaria Conti, Jerry Thursby & Marie Thursby, *Patents As Signals for Startup Financing*, 61 J. INDUS. ECON. 592, 614 (2013) (concluding that "patents are used by startups as a signal and not simply as an input in the startup's value function"); Christopher A. Cotropia, *Patents As Signals of Quality in Crowdfunding*, 2021 U. ILL. L. REV. 193, 196 (finding that patent-pending status, but not patented status, is statistically correlated with crowdfunding success); Hanna Hottenrott, Bronwyn H. Hall & Dirk Czarnitzki, *Patents as quality signals? The Implications for Financing Constraints on R&D*, 25 ECONS. INNOVATION & NEW TECH. 197, 198 (2015) (finding that patents help attract financing for small firms but not larger firms); Ronald J. Mann & Thomas W. Sager, *Patents, Venture Capital, and Software Start-Ups*, 36 RSCH. POL'Y 193, 194, 200–203, 207 (2007) (finding ambiguous results on the role of patents on venture capital funding).

51. Dan L. Burk, *On The Sociology of Patenting*, 101 MINN. L. REV. 421, 426–27 (2016).

52. Gideon Parchomovsky & R. Polk Wagner, *Patent Porfolios*, 154 U. PA. L. REV. 1, 59 (2005).

53. Burk, *supra* note 51, at 442.

54. *See* Ann Bartow, *Separating Marketing Innovation from Actual Invention: A Proposal for a New, Improved, Lighter, and Better-Tasting form of Patent Protection*, 4 J. SMALL & EMERGING BUS. L. 1, 9 (2000).

55. *Id.* at 5, 8.

56. J. Jonas Anderson, *Nontechnical Disclosure*, 69 VAND. L. REV. 1573, 1593–94 (2016).

inventor."[57] This credential "may raise an individual in the eyes of an employer" but also provide "social cache" and "a measure of societal validation of an individual's contribution, bolstering the recipient's innate sense of self-worth."[58]

B. The Information Conveyed by Patents

The question of what precise information patents signal has proven elusive.[59] While primarily leaving it to others to determine, Long speculated that the direct technical disclosure in the patent (or groups of related patents) can "inform observers of the existence of aspects of an invention they would not otherwise know about": experiments and results, complementary products, competing products, research path, future plans, rate of progress, etc.[60] She also hypothesized that the mere fact of patented status and the quantity of patents possessed could signal information about the patent-owning firm itself, such as productivity, innovativeness, firm size, knowledge capital, and research and development ("R&D") achievement.[61]

In recent years, scholars have extensively debated the usefulness of patents' direct technical disclosure.[62] But this debate is separate from the patent signals literature, which (subsequent to Long) has focused on the information conveyed by patented status.[63] The patent's technical disclosure explicitly provides information about the invention that can be directly evaluated, rather than serving as a signal or proxy for other information. It is of comparatively limited use because of the significant time and effort required to review and comprehend this information, which can only be done by other technologists who understand the technical disclosure.[64] By contrast, patented status is cheaply and readily identifiable by anyone and therefore could be a useful proxy for other information that is harder to discover and evaluate.[65]

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57. Jason Rantanen & Sarah E. Jack, *Patents as Credentials*, 76 WASH. & LEE L. REV. 311, 318 (2019).

58. *Id.* at 319–20.

59. *See* Stuart J.H. Graham, Robert P. Merges, Pam Samuelson, & Ted Sichelman, *High Technology Entrepreneurs and the Patent System: Results of the 2008 Berkeley Patent Survey*, 24 BERKELEY TECH. L.J. 1255, 1306 (2009) (noting that the reasons investors rely on patents "are unclear"); Parchomovsky & Wagner, *supra* note 52, at 18–19 (concluding that the reasons are unclear why "firms act as though patents are important"); Burk, *supra* note 51, at 442–43 ("Exactly why venture capitalists prefer to see patents is more of a mystery.").

60. Long, *supra* note 46, at 647–48.

61. *Id.* at 637, 651–52.

62. *See, e.g.*, Lisa Larrimore Ouellette, *Do Patents Disclose Useful Technical Information?*, 25 HARV. J.L. & TECH. 531, 546 (2012) (describing debates).

63. *See supra* Section II.A.

64. Anderson, *supra* note 56, at 1590.

65. *See* Long, *supra* note 46, at 665–66 (noting that patented status is cheaper to identify than information in the technical disclosure); Anderson, *supra* note 56, at 1590–91 (noting

Scholars have widely speculated about, or assumed, what patented status could convey, including quality,[66] technological worth,[67] value,[68] innovativeness,[69] prestige or appeal,[70] and patent owner sophistication.[71] But this question has escaped comprehensive, rigorous consideration. Jessica Silbey did interview dozens of inventors, patent lawyers, entrepreneurs, venture capitalists, and executives in patent-rich fields and, among other things, noted the diversity of messages patents conveyed: "business prosperity," "financial worth," and "financial promise" to investors; management sophistication and a well-functioning business; value of the inventor to the business and the inventor's place as part of the community of "heroic inventors"; and scientific achievement and excellence in the field.[72]

Importantly, the precise information that patented status conveys is not "a monolithic, homogenous construct" because "*audience* matters" and "a patent might have a specific meaning in one community, and a different meaning in another."[73] Prior work tends to focus on one specific audience — for example, Long and much of the literature on sophisticated investors in capital markets and, conversely, Bartow and Anderson on consumers and other less sophisticated audiences. Between these two extremes lie overlooked audiences of varying sophistication: inventors, entrepreneurs, business executives, less sophisticated investors, commercial lenders, etc.[74]

C. Evaluating Patent Signals

The existing signals literature is primarily descriptive work that explores the fundamental question of whether patents convey information in ways that create private value for patent owners and explain why they patent.[75] Little consideration is given to normative questions about

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that patents also provide information to "numerous nonskilled audiences" that do not understand the technical disclosure).

66. Conti et al., *supra* note 50, at 593; Cotropia, *supra* note 50, at 195; Anderson, *supra* note 56, at 1593–94.

67. Cotropia, *supra* note 50, at 199.

68. *Id.* at 195.

69. Anderson, *supra* note 56, at 1593–94.

70. *Id.*

71. Cotropia, *supra* note 50, at 199; Parchomovosky & Wagner, *supra* note 52, at 21–22, 59.

72. Jessica Silbey, *Patent Variation: Discerning Diversity Among Patent Functions*, 45 LOY. U. CHI. L.J. 441, 446, 454–56, 459–60, 459 n.48 (2013).

73. Rantanen & Jack, *supra* note 57, at 348 (emphasis in original).

74. *See infra* Part V.

75. *See, e.g.*, Long, *supra* note 46, at 654 (focusing on "the value of patents as a means of conveying information about the firm"); Burk, *supra* note 51, at 452 (providing "not a justification for intellectual property regimes, but an explanation as to how they are functioning"); Anderson, *supra* note 56, at 1576–77 (focusing on the descriptive thesis that "the existence

the social value of this signaling effect.[76] But, implicitly, scholars tend to be normatively positive, describing the signaling effect's benefits in reducing information asymmetries between patent owners and audiences, facilitating investment, appealing to consumers, and providing recognition to inventors.[77] Some scholars even suggest the signaling function justifies, at least in part, the patent system.[78]

The existing scholarship recognizes the potential inaccuracy in patent signals but ultimately dismisses this concern, with Long, for example, finding it sufficient that "academics, industry analysts and investors, venture capitalists, and firms" treated them as reliable.[79] The literature notes that patents might not reliably correlate to the relevant underlying information if "the PTO lets patents slip through that contain incredible information" about the invention, if observers overestimate the degree of correlation with the underlying information, or if patents do not actually correspond to certain firm attributes or do so more weakly than commonly thought.[80] But scholars show significant faith in the quality of patent examination and the doctrine of inequitable conduct (unenforceability of a patent based on intentional, material misrepresentations or omissions in the Patent Office) to mitigate these concerns.[81] At the very least, Long contended, patents are *comparatively* more reliable and credible than other ways of conveying information, such as press releases.[82]

Existing accuracy concerns are focused on the effectiveness of patent signals in reducing information asymmetries and creating value for the patent owner. Almost entirely overlooked is the opposite

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of nontechnical disclosure tells us something about why people seek patents"); Rantanen & Jack, *supra* note 57, at 318–20 (focusing mainly on the value that credentialing function of patents has to inventors); Parchomovsky & Wagner, *supra* note 52, at 58–59 (focusing exclusively on value that patents provide to their owners).

76. *See* Rantanen & Jack, *supra* note 57, at 377–89 (discussing normative considerations in an admittedly preliminary way that leaves it for "future work" to address "more closely"); Long, *supra* note 46, at 675–78 (briefly mentioning considerations for evaluating social value and disclaiming any welfare analysis); Anderson, *supra* note 56, at 1576–77 (flagging in one paragraph reasons to be skeptical about the social value of patent signals).

77. *See* Long, *supra* note 46, at 627, 675, 679 (describing how patent signaling can "reduc[e] informational asymmetries between patentees and observers," reduce information costs in capital markets, and facilitate investments); Bartow, *supra* note 54, at 5, 9 (proposing a new form of patent protection to "better accommodate" use of patents to appeal to consumers); Rantanen & Jack, *supra* note 57, at 320 ("[T]he credentialing function of patents aligns fairly well with recognizing inventors for contributing to that social good.").

78. *See* Lemley, *supra* note 43, at 142–44, 148 (justifying patents despite their shortcomings as innovation incentives because they "serve a lot of useful purposes," including as a signaling mechanism); Anderson, *supra* note 56, at 1575–76 (contending that the signaling effect supports the prospect and commercialization theories of patent law).

79. Long, *supra* note 46, at 651, 661.

80. *Id.* at 660, 667–68; *see also* Rantanen & Jack, *supra* note 57, at 385.

81. Long, *supra* note 46, at 636–37, 649–50, 667–68; Rantanen & Jack, *supra* note 57, at 349–51, 382–83.

82. Long, *supra* note 46, at 650.

possibility: patented status could affirmatively mislead audiences and exacerbate information asymmetries.[83] But the Theranos and InventHelp examples from Part I are high-profile examples of recurring patterns of patented status misleading investors to invest in worthless technology[84] and misleading inventors to buy useless services in the pursuit of riches.[85] Consumers too seem misled by patented status. Companies frequently use "patented" or "patent-pending" as marketing and branding tools to *appeal* to consumers.[86] But the well-recognized trade-off for patents' innovation incentives is *consumer harm* in the form of higher prices, restricted access, and reduced quality.[87] Thus, it is unclear why consumers would value patented status when consumers are the ones who bear the costs of the exclusive rights secured by patents.

III. THE INFORMATION PATENTING SHOULD CONVEY

Two significant gaps exist in the patent signals literature: (1) what precise information patented status conveys; and (2) whether this information is accurate or misleading.[88] To start filling these gaps, Section III.A takes a top-down approach, identifying the information patented status *should* convey in theory. The focus is *not* on what information patents would ideally convey as a matter of first principles. Rather, patent rights exist solely by statute, with their rights, limits, and characteristics defined by the Patent Act.[89] Thus, the information value of patented status *should* reflect the Patent Act's policy objectives and design choices. Knowing the information patented status should convey allows evaluation of the accuracy of patent signals. Sections III.B and

83. *But see* Rantanen & Jack, *supra* note 57, at 386–88 (briefly noting the possibility of "mistaken understandings of the meaning of the [patent] credential," focused on equating patents with financial reward, and "the opportunity for exploitation of those who misunderstand what a patent means"); Anderson, *supra* note 56, at 1576–77 (noting in passing that patents may signal information that "is often vague, misleading, or cannot be verified"); Silbey, *supra* note 72, at 454 (noting briefly a perception among some that patent messages could be "misleading, subjective or even false").

84. *See, e.g.*, Daniel C. Rislove, Note, *A Case Study of Inoperable Inventions: Why Is the USPTO Patenting Pseudoscience?*, 2006 WIS. L. REV. 1275, 1312–13 (2006) (describing the problem of patents on inoperable and impossible inventions duping investors and consumers).

85. *Protect Yourself Against Invention Promotion Scams*, USPTO, https://www.uspto.gov/sites/default/files/documents/ScamPrevent.pdf [https://perma.cc/8LV9-AYRX] ("Every year independent inventors pay thousands of dollars to unscrupulous invention promotion firms.").

86. Bartow, *supra* note 54, at 3 ("[P]atents may be good marketing tools (irrespective of the specific inventions they define) . . . ."); Lemley, *supra* note 41, at 144 ("[S]ometimes patents are used simply as indicators of product differentiation or branding.").

87. *See* Rachel E. Sachs, *The Uneasy Case for Patent Law*, 117 MICH. L. REV. 499, 505 (2018).

88. *See supra* Sections II.B–C.

89. *See* Oil States Energy Servs., LLC v. Greene's Energy Grp., LLC, 584 U.S. 325, 335–38 (2018).

III.C evaluate whether, in practice, patented status reliably correlates with the information it should convey.

A. The Signals Patents Are Designed to Give

An invention obtains patented status only upon examination and issuance of the patent document by the Patent Office.[90] Section 131 of the Patent Act requires the Patent Office to examine submitted patent applications and "if on such examination it appears that the applicant is entitled to a patent under the law, the Director *shall issue* a patent therefor."[91] Thus, the statute *requires* the Patent Office to issue a patent if, and only if, the statutory requirements of patentability are satisfied.[92] Thus, patented status indicates that the patent has been examined, found in compliance with the statutory prerequisites, and issued by the Patent Office.

The Patent Office's finding of patentability should correlate with four basic pieces of information. One, the invention is technologically distinct from what previously existed. Section 102 of the Patent Act requires that the invention be "novel," meaning that it must be new and cannot have been previously "patented, described in a printed publication, [claimed in a patent application that was later published or issued as a patent,] or in public use, on sale, or otherwise available to the public."[93] Non-obviousness under § 103 further requires that the invention be different enough from what previously existed to warrant patent protection, providing that even if "not identically disclosed" before, patent protection is not warranted "if the differences between the claimed invention and the prior art are such that the claimed invention as a whole would have been obvious . . . to a person having ordinary skill" in the field.[94]

Two, the invention is the type of thing appropriate for patent protection. Section 101, and the Supreme Court's interpretation of it, requires that a patented invention be a "process, machine, manufacture, or composition of matter" that is not a law of nature, product of nature, or abstract idea.[95] This information is mostly relevant to inventors,

90. Cuozzo Speed Techs., LLC v. Lee, 579 U.S. 261, 266 (2016).

91. 35 U.S.C. § 131 (emphasis added).

92. Markman v. Westview Instruments, Inc., 52 F.3d 967, 985 n.14 (Fed. Cir. 1995) (en banc) ("There is no discretion on the part of the PTO as to whether or not to grant the patent — if the statutory requirements are met, a patent is issued."), *rev'd on other grounds*, 517 U.S. 370 (1996).

93. 35 U.S.C. § 102(a)–(b).

94. 35 U.S.C. § 103.

95. 35 U.S.C. § 101; *see* Mayo Collaborative Servs. v. Prometheus Lab'ys, Inc., 566 U.S. 66, 70–71 (2012).

indicating the types of innovation valued by society.[96] Of more relevance to others, § 101 mandates that the invention be "useful." Utility requires that the invention "actually achieve some intended result" — that it would not violate the laws of nature or otherwise be impossible.[97] It also requires that the invention have an actual, specific use to the public, rather than just being basic research, being a subject for further study, or having a speculative future use.[98] Ultimately, the utility bar is "extremely low" and merely requires that the invention "operate[s] as described and potentially provide[s] some de minimis public benefit."[99]

Three, a working embodiment of the invention can be made and used from the description in the patent document. Section 112(a) of the Patent Act requires that the patent describe the "manner and process of making and using [the invention], in such full, clear, concise, and exact terms as to enable any person skilled in the art . . . to make and use the [invention]."[100] Relatedly, the operable utility requirement of § 101 also requires that the claimed invention be able to actually achieve its intended result.[101]

Four, the patent document must list the inventor, and that inventor must have had a definite idea of the invention and be responsible for what is claimed.[102] Section 112(a) requires that the patent provide a "written description of the invention." To satisfy this requirement, the patent document must show the inventor had possession of the invention at the time of patent filing, i.e., actually invented the subject matter subsequently claimed.[103] Additionally, §§ 115 and 116 require the patent application to list the inventor or inventors of the claimed subject matter and require these inventors to submit an oath or declaration that they in fact invented the claimed subject matter.[104] Inventorship is determined based on conception, which is "the formation in the mind of the inventor, of a definite and permanent idea of the complete and operative invention."[105] Patent applications are required to list all those, and only those, who meet the conception test of inventorship.[106]

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96. *Cf.* Timothy R. Holbrook, *The Expressive Impact of Patents*, 84 WASH. U. L. REV. 573, 577–78 (2006) (noting how patents can signal what types of invention are normatively or morally good).

97. Michael Risch, *Reinventing Usefulness*, 2010 BYU L. REV. 1195, 1202 (2010).

98. Michael Risch, *A Surprisingly Useful Requirement*, 19 GEO. MASON L. REV. 57, 66–67 (2011).

99. *Id.* at 58.

100. 35 U.S.C. § 112(a).

101. *See* Risch, *supra* note 97, at 1202.

102. Rantanen & Jack, *supra* note 57, at 355–56.

103. Ariad Pharms., Inc. v. Eli Lilly & Co., 598 F.3d 1336, 1351 (Fed. Cir. 2010) (en banc).

104. 35 U.S.C. §§ 115–116.

105. Burroughs Wellcome Co. v. Barr Lab'ys, Inc., 40 F. 3d 1223, 1227–28 (Fed. Cir. 1994) (quoting Hybritech, Inc. v. Monoclonal Antibodies, Inc., 802 F.2d 1367, 1376 (Fed. Cir. 1986)).

106. *Id.* at 1227–28; 35 U.S.C. § 116.

Beyond the patentability requirements, patented status also indicates that the patent owner is the only possible source for the patented item, whether through its commercial product or by licensing others. The Patent Act gives a patent owner the right to prevent others from making, using, selling, offering to sell, and importing the patented invention within the United States for the term of the patent, making it an act of infringement for others to do so and providing a remedy for such infringement via a civil action.[107]

In summary, patented status should signal the following information: (1) the invention is technologically distinct from what previously existed; (2) the invention is of the type deemed appropriate for patenting; (3) the invention is capable of operating as it says it does, with some practical use; (4) an operable embodiment of the invention can be made and used from the patent's disclosure; (5) the named inventor(s) actually thought up the invention; and (6) the patent owner is the only possible source of the invention's commercial embodiment. The Patent Office has no power to impose additional requirements or refuse patent issuance for reasons other than these statutory conditions of patentability.[108] Likewise, patents only provide a right to exclude, not any affirmative rights, such as the right to use the invention.[109] Thus, patented status is *only* designed to convey this clearly defined and limited information.

B. Practical Shortcomings in the Designed Patent Signals

Patented status theoretically *should* signal the information discussed in the prior section, but whether patented status is an accurate proxy for this information in practice depends on the effectiveness of patent examination and patent exclusivity. Recent scholarship casts serious doubt on the reliability of the signals patented status should convey.[110]

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107. 35 U.S.C. §§ 271, 281.

108. Greg Reilly, *Power Over the Patent Right*, 95 TUL. L. REV. 211, 222 (2021).

109. Siemens Med. Sols. USA, Inc. v. Saint-Gobain Ceramics & Plastics, Inc., 647 F.3d 1373, 1374–75 (Fed. Cir. 2011) (Lourie, J., concurring in denial of rehearing en banc) (noting the "well-established law" that each patent "grants only the right to exclude," not the "right to make or use or sell" the invention).

110. Nor does the inequitable conduct doctrine, on which the existing literature also relies, seem up to the task. *See* Christopher A. Cotropia, *Modernizing Patent Law's Inequitable Conduct Doctrine*, 24 BERKELEY TECH. L.J. 723, 741–44 (2009) (questioning inequitable conduct's effectiveness); Therasense v. Becton, Dickinson & Co., 649 F.3d 1276 (Fed. Cir. 2011) (en banc) (weakening the inequitable conduct doctrine).

1. The Weakness of the Technological Distinctness Signal

There is a widespread belief that "the PTO does a poor job of examining patents, allowing significant numbers of invalid patents to issue."[111] The shortcomings of patent examination are primarily seen as interfering with the Patent Office's ability to "correctly determine whether a claimed invention is novel and nonobvious."[112] Because "examiners grant many patents on inventions that either had already been invented or were obvious when they were conceived,"[113] patented status does not necessarily correlate with technological distinctness in practice.

There are many possible reasons for these problems. Patent applications are presumed patentable, with the burden on the examiner to establish unpatentability.[114] The Patent Office faces constraints — finite resources, a large volume of patent applications, and challenges hiring and retaining quality patent examiners.[115] Examiners only have eighteen hours on average per application, which is widely seen as inadequate for all of the tasks of examination.[116] The Patent Office generally, and examiners specifically, have had incentives that favor patent issuance, including the near impossibility of definite rejection of a patent application; appellate review of patent denials but not grants; the Patent Office's budgetary dependence on post-issuance fees; the additional work required for an examiner to explain a denial not required for a grant; and a skewed examiner compensation system that rewarded examiners for grants.[117] Moreover, patent examination is not structurally suited to give a full evaluation of patentability. Examiners search online libraries and databases but lack the ability to search and identify prior art not captured in such sources, including real-world uses and sales of the invention, trade publications, and obscure documents.[118] Nor does the examiner have the inquisitorial powers — investigators,

111. Jonathan Masur, *Patent Inflation*, 121 YALE L.J. 470, 477 (2011).

112. Cotropia, *supra* note 110, at 749–50.

113. Roger Allan Ford, *The Patent Spiral*, 164 U. PA. L. REV. 827, 843 (2016).

114. *See* Seymore, *supra* note 41, at 995.

115. St. Regis Mohawk Tribe v. Mylan Pharms., 896 F.3d 1322, 1331–32 (Fed. Cir. 2018) (Dyk, J., concurring).

116. Michael Frakes & Melissa F. Wasserman, *Irrational Ignorance at the Patent Office*, 72 VAND. L. REV. 975, 978 (2019). Time allotted per application varies among technology classifications and examiner experience levels. *Id.* at 982–83.

117. *See* Jonathan S. Masur, *Costly Screens and Patent Examination*, 2 J. LEGAL ANALYSIS 687, 692–95 (2010); Ford, *supra* note 113, at 837–39 (describing prior examiner compensation system that based bonuses on number of applications completed, which favored grants because rejections create more work and prevent application completion); Melissa F. Wasserman, *The PTO's Asymmetric Incentives: Pressure to Expand Substantive Patent Law*, 72 OHIO ST. L. REV. 379, 401–20 (2011).

118. Greg Reilly, *The Complicated Relationship of Patent Examination and Invalidation*, 69 AM. U. L. REV. 1095, 1099–1100 (2020).

depositions, compulsory process, cross-examination — necessary to fully evaluate patentability.[119]

2. The Weakness of the Technical Information Signal

Though less recognized than problems with technological distinctness, scholars increasingly criticize the quality of the technical information disclosed in patents.[120] For starters, the patentability requirements are not stringent enough to generate reliable technical information.[121] Enablement does not require the patent to "include many of the details of the invention's implementation"[122] but rather allows a "fair amount of experimentation."[123] An applicant is not required to conduct experiments or build a working model[124] and can even use "prophetic examples," or guesses as to what would happen if the invention were built and used.[125] Nor is the applicant required to disclose (or even know) the scientific principles or theory of operation for why or how the invention works.[126] Operability also is a low threshold, easily overcome by all but fantastical inventions, because it does not require perfected operation but only that the invention not violate basic scientific principles or otherwise be impossible.[127]

Applicant incentives further undermine the patent's technical disclosure. Because patent doctrines encourage early filing, the patent's technical information is often early stage research, preliminary experiments, or even speculation about the invention and its functionality, which more intensive work may later prove wrong.[128] Early filing also means the patent may lack useful technical information about feasibility, production techniques, and the precise implementation for commercial viability.[129] Patent applicants also have an incentive to disclose the least amount of information needed to satisfy the disclosure doctrines

119. *Id.*

120. *See, e.g.*, Janet Freilich, *The Replicability Crisis in Patent Law*, 95 IND. L.J. 431, 437 (2020).

121. Christopher A. Cotropia, *The Folly of Early Filing in Patent Law*, 61 HASTINGS L.J. 65, 93 (2009).

122. *Id.* at 74.

123. Mark A. Lemley, *Ready for Patenting*, 96 B.U. L. REV. 1171, 1178–79 (2016).

124. Lisa L. Ouellette, Pierson*, Peer Review, and Patent Law*, 69 VAND. L. REV. 1825, 1826 (2019).

125. Lemley, *supra* note 123, at 1179.

126. Sean B. Seymore, *Patenting the Unexplained*, 96 WASH. U. L. REV. 707, 720 (2019).

127. Rislove, *supra* note 84, at 1286; Janet Freilich, *Ignoring Information Quality*, 89 FORDHAM L. REV. 2113, 2126 (2021); *see* Jacob S. Sherkow, *Patent Law's Reproducibility Paradox*, 66 DUKE L.J. 845, 879 (2017). *But see* Sean B. Seymore, *Patently Impossible*, 64 VAND. L. REV. 1491, 1541–42 (2011) (contending that the operability is too stringent for pathbreaking inventions that deviate from established principles or achieve the formerly impossible).

128. *See* Freilich, *supra* note 120, at 435; Cotropia, *supra* note 121, at 93; Sherkow, *supra* note 127, at 883–84.

129. Cotropia, *supra* note 121, at 93–95.

and therefore withhold key details — the "secret sauce" that makes the invention work — to retain a competitive advantage in the industry.[130]

Finally, shortcomings in patent examination lead to the unreliability of the patent's technical information.[131] The patent's technical disclosure is presumed true and the invention presumed operable, even in the absence of any evidence.[132] The examiner can only challenge the patent's assertions if "utterly impossible" under known scientific principles, not merely because the examiner has reason to doubt the accuracy.[133] In doing so, the examiner must point to specific evidence — such as scientific journal articles — and cannot rely on common knowledge in the field or even ask the applicant to explain how the invention works.[134] They also lack the time, laboratories, or equipment needed to conduct experiments or otherwise test the patent's technical information.[135] More fundamentally, examiners typically lack the extraordinary skill, not just ordinary skill, needed to recognize problems with the technical details just from reading the disclosure itself.[136]

In sum, patent examination insures that the patent has reasonably detailed technical information but does not ensure its quality or scientific merit.[137] A patent applicant need only "cram a patent application full of legitimate-sounding scientific references, diagrams and descriptions of how one might *wish* the invention worked, without ever having checked that it actually did work."[138] Janet Freilich has empirically estimated that ninety percent of the experiments described in life sciences patents are not replicable.[139] Even more concerning, Freilich and Soomi Kim found that when scientific papers were retracted for inaccuracy, applicants for corresponding patents almost never informed the Patent Office, examiners rarely discovered it, and applicants continued their

130. Sherkow, *supra* note 127, at 858–59, 867–68 (explaining that the enablement does not ensure that key details needed to reproduce inventions will be disclosed in the patent because the doctrine does not necessarily require disclosure of post-filing knowledge, does not always require a broad scope of enablement, and only requires disclosure to show the invention is theoretically possible, not reproducible).

131. *See* Ouellette, *supra* note 124, at 1828.

132. *See* Seymore, *supra* note 127, at 1501–02; Sean B. Seymore, *Heightened Enablement in the Unpredictable Arts*, 56 UCLA L. REV. 127, 140–41 (2008).

133. Freilich, *supra* note 127, at 2126; *see* Seymore, *supra* note 127, at 1501–02.

134. Seymore, *supra* note 127, at 1501–02.

135. Jorge L. Contreras, *Patent Reality Checks: Eliminating Patents on Fake, Impossible and Other Inoperative Inventions*, 102 J. PAT. & TRADEMARK OFF. SOC'Y 2, 11 (2021).

136. Ouellette, *supra* note 124, at 1828, 1836.

137. *See* Sherkow, *supra* note 127, at 874–75; Freilich, *supra* note 127, at 2127 (sampling 100 enablement rejections and finding all were based on absence of information, not accuracy of information); Contreras, *supra* note 135, at 11–12.

138. Jorge L. Contreras, *Patent Fakes: How Fraudulent Inventions Threaten Public Health, Innovation, and the Economy*, BILL OF HEALTH (July 1, 2020), https://blog.petrieflom.law.harvard.edu/2020/07/01/patent-fakes-fraud-inventions-covid/ [https://perma.cc/YG6Y-GV4P].

139. Freilich, *supra* note 120, at 466–67, 471. Though focusing on life science patents, Freilich concluded that "replicability is likely a problem across all industries." *Id.* at 435.

patenting efforts nearly two-thirds of the time.[140] The unreliability of the patent's technical information casts doubt, in practice, on the accuracy of a patent's signal that an operable invention can be made and used from the technical information.[141] Moreover, these problems undermine confidence that the named inventor actually did what they said they did in the patent document, undermining the signal attributing the invention to the named individual.[142]

3. The Weakness of the Exclusive Rights Signal

Despite the bedrock principle of patent law that a patent confers a right to exclude, patents only confer "a right to *try* to exclude by asserting the patent in court."[143] Patents are probabilistic rights, with a degree of uncertainty surrounding them that exceeds that of other property rights.[144]

First, the existence and stability of a patent's exclusive rights is uncertain. Patent examination is not conclusive, and patents are subject to invalidation in court or Patent Office post-issuance proceedings on the same statutory criteria of patentability considered in examination.[145] An invalid patent is deemed void ab initio, i.e., as if it had never existed, and extinguishes even claims for infringement that arose before invalidation.[146] Nearly half of patents that are litigated to judgment in federal court are invalidated, though this is partially explained by selection effects of litigation and settlement.[147] The expansion of post-issuance Patent Office proceedings in recent years has enhanced the potential for invalidation and the resulting uncertainty of exclusive rights, with a 400 percent increase since 2011 in the yearly number of patents invalidated on prior art grounds.[148]

Second, the scope of a patent's exclusive rights is uncertain.[149] The patent owner's exclusive rights are strictly defined by the specific

140. Janet Freilich & Soomi Kim, *Is the Patent System Sensitive to Incorrect Information?*, REV. ECON. & STATS. (forthcoming) (manuscript at 2, 6, 12–13).

141. Freilich, *supra* note 120, at 436–37 (2020) (noting that disclosure shortcomings mean granted patents do not always enable skilled people to make inventions).

142. *Id.* at 439 (noting that disclosure shortcomings undermine attribution of invention to the individual named because "the inventor is generally thought of as the person who makes the invention work").

143. Mark A. Lemley & Carl Shapiro, *Probabilistic Patents*, 19 J. ECON. PERSPS. 75, 75 (2005) (emphasis in original).

144. *Id.* at 76.

145. Greg Reilly, *The Justiciability of Cancelled Patents*, 79 WASH. & LEE L. REV. 253, 265–69 (2022).

146. *Id.* at 269–70.

147. Lemley & Shapiro, *supra* note 143, at 80.

148. Stephen Yelderman, *Prior Art in Inter Partes Review*, 104 IOWA L. REV. 2705, 2706 (2019).

149. Lemley & Shapiro, *supra* note 143, at 76.

claims written in the patent document.[150] The claims must cover an operable invention, not just the key inventive features, and a competing product must include every feature to violate the exclusive rights.[151] Thus, a competitor could make a fairly small change and fall outside the scope of the patent's exclusive rights.[152] And it is hard to know in advance the exact claim scope and whether a competing product falls within it.[153] Patent claims are complex, single sentence efforts to verbalize the inventive idea, not just a specific implementation or embodiment of it.[154] The interpretation of claims further involves a complex legal doctrine known as claim construction, which is full of inconsistent and arcane legal rules.[155] The doctrine of equivalents is meant to mitigate uncertainty by extending the patent scope to cover equivalents of the claimed invention but is itself an unpredictable doctrine that has waned in recent years.[156]

Third, the effectiveness of the patent owner's exclusive rights is uncertain. The technological exclusivity conferred by a patent does not necessarily equate to market exclusivity because patents do not prevent competition if that competition is technologically distinct.[157] For example, a patent on a compound to treat a particular medical condition does not provide exclusive rights to treat that medical condition if alternatives exist that use other means to achieve the same result. Whether a patent effectively prevents competition and provides market exclusivity will depend on what alternatives exist and their suitability for the purposes of the claimed invention.[158]

Thus, although patented status is designed to signal technical exclusivity, in practice, it does not reliably signal that the patent owner is the only source in the market. Actual market exclusivity depends on the strength of the patent, the scope of the claims, market conditions, and the suitability of alternatives.

C. True or Weak Patent Signals?

Undoubtedly, the Patent Office issues many patents on inventions that are technologically distinct, have real-world use, can be made and used from the disclosure in the patent document, are properly attributed

150. *See* JONATHAN S. MASUR & LISA LARRIMORE OUELLETTE, PATENT LAW: CASES, PROBLEMS, AND MATERIALS 24 (3d ed. 2023).

151. *See id.* at 27–28; *see also supra* Section III.A (describing operability requirement).

152. Price, *supra* note 44, at 792–93 (explaining how trivial changes can sometimes avoid infringement liability).

153. Greg Reilly, *Judicial Capacities and Patent Claim Construction: An Ordinary Reader Standard*, 20 MICH. TELECOMM. & TECH. L. REV. 243, 253–55 (2014).

154. *Id.* at 254.

155. *Id.* at 256–60.

156. *See* Price, *supra* note 44, at 793.

157. *See* Christopher R. Leslie, *Patents of Damocles*, 83 IND. L.J. 133, 135–36 (2008).

158. *See id.*

to the named inventor, and ensure that the owner is the exclusive source of the covered product. In these cases, patented status functions as a reliable proxy for the information patents are designed to convey. Such "true patent signals" can provide relevant information to audiences in a more accessible and reliable way than other means, providing value to the patent owner and facilitating information exchange in a way that could be socially beneficial.[159] On the other hand, Section III.B showed that patented status does not always correlate with the information patents are designed to convey, due to flaws in examination and the structure of the patent system and patent rights. If patent audiences do not recognize the possibility of such "weak patent signals," they could be misled, treating patents as proxies for information to which they should correlate but do not reliably do so in practice.[160]

A level of noise — or inaccuracy — is inevitable in any type of signal.[161] The key question in determining whether patent signals are too noisy to be useful is how often patents correlate with their underlying characteristics and how often they do not — how often they are true signals and how often they are weak signals. The existing signals literature concludes that, despite some noise, patented status is "probably credible"[162] and provides "strong evidence,"[163] making it more reliable than other sources.[164]

But the scholarship discussed in Section III.B suggests that these conclusions are overly optimistic and patented status is a quite noisy signal.[165] There is consensus that a significant number of patents are invalid and therefore do not accurately signal one or more of the pieces of information patents should convey.[166] Using empirical evidence and econometric modeling, Shawn Miller estimated a number of years ago that twenty-eight percent of all patents then in force would be invalidated for lack of novelty or for obviousness if challenged, demonstrating the unreliability of the technological distinctness signal.[167] Though lacking empirical estimates, scholars similarly contend that it is "a roll of the dice" whether a patented invention will function as the technical

159. *See* Long, *supra* note 46, at 675–76 (noting positive welfare effects if patents are reliable signals); Rantanen & Jack, *supra* note 57, at 381–82 (suggesting patents might be normatively valuable because they convey information more reliably than other sources).

160. *See* Long, *supra* note 46, at 660 (noting audiences could be misled if "they overestimate the correlation between the patent signal and underlying firm quality"); Rantanen & Jack, *supra* note 57, at 384–85 (recognizing the potential for overreliance on patents as credentials).

161. Long, *supra* note 46, at 654; Rantanen & Jack, *supra* note 57, at 383–84.

162. Long, *supra* note 46, at 650.

163. Rantanen & Jack, *supra* note 57, at 381–84.

164. *See id.* at 381; Long, *supra* note 46, at 650.

165. *See supra* Section III.B.

166. Parchomovsky & Wagner, *supra* note 52, at 21–22 (noting that the "potential signaling value" of patents is "weakened" by the inadequacy of patent examination).

167. Shawn P. Miller, *Where's the Innovation: An Analysis of the Quantity and Qualities of Anticipated and Obvious Patents*, 18 VA. J.L. & TECH. 1, 6–7 (2013).

disclosure says it will.[168] And a patent's exclusivity is famously probabilistic.[169]

Ultimately, patented status does not necessarily correlate even with the information patents are formally designed to convey. A patent could satisfy all of the statutory requirements and therefore accurately convey the information patented status is supposed to convey. Or it could be, for example, one of the every four patents that Miller estimated would be invalid for anticipation or obviousness and therefore not accurately convey technologically distinctness. Practical accuracy of patent signals might vary in consistent ways in different contexts, for example, between industries,[170] such that the combination of patented status with other easily ascertainable information provides a reliable signal. But patented status alone is a weak signal even for the theoretically accurate signals that patents are designed to give.

IV. UNINTENDED INFORMATION PATENTING DOES CONVEY

Patented status is only designed to convey a limited and clearly defined set of information and does even that weakly in practice. However, at least some who interact with patent rights view patented status as having much greater informational significance. This Part identifies and catalogs these unintended patent signals. Not everyone who interacts with patent rights will perceive all, or even any, of these unintended signals. A fuller discussion of the differing effects of patent signals on different audiences is saved for Part V. For now, Section IV.A identifies false patent signals — information that is both theoretically inaccurate and unreliable in practice. Section IV.B identifies incidental patent signals — information that patented status is not designed to convey but correlates with in practice.

A. False Patent Signals

This Section provides anecdotal and some empirical evidence demonstrating that false patent signals are a significant and widespread problem, with various audiences misled by a variety of false signals.

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168. Freilich, *supra* note 120, at 474.

169. *See supra* Section III.B.3.

170. *See* Miller, *supra* note 167, at 46–49 (suggesting industry variation in the likely novelty and non-obviousness of issued patents); Sherkow, *supra* note 127, at 883–85 (focusing criticism of accuracy of technical disclosure on drug patents). *But cf.* Freilich, *supra* note 120, at 435 (focusing criticism of technical disclosure on life science patents but suggesting similar problems in other industries).

1. Invention or Product Quality

Public perception often treats patented status as indicating that the *invention or technology* is important, superior, or even revolutionary as compared to previously existing technology.[171] Relatedly, the frequent use of "patented" in product advertising reflects the perceived consumer perception that patented status indicates that the *product* is desirable, superior to market alternatives, and better quality than an unpatented product would be.[172] Companies in some industries are believed to obtain patents solely or primarily to indicate the quality or superiority of their product.[173] Consumers or the general public are typically identified as the audience that equates patented status with quality and superiority. But there is also anecdotal evidence that at least some investors see patents as "an important signal of quality in an uncertain investment environment."[174] And economists studying the patent system sometimes use patents as a measure of the quality of the invention or technology.[175]

In terms of empirical support, Alexander Billy and Neel Sukhatme found that study participants who saw a "patented" label "perceived their products to be more innovative and of higher quality" than participants who saw the same product without the "patented" label.[176] Michael Mattioli found that the 631 Twitter advertisements referring to

171. *See, e.g.*, 7 DONALD CHISUM, CHISUM ON PATENTS § 20.03[7][c][vii] (2021) (noting impression that patented status means "the product is technologically superior to previously available ones"); Anderson, *supra* note 56, at 1594 (suggesting that patented status could indicate "that what one has done is innovative/well-made/sexy"); Graham & Sichelman, *supra* note 45, at 1083 (noting that patented status might provide "an aura of importance").

172. *See, e.g.*, Anderson, *supra* note 56, at 1594 (describing use of patented status in ads as leveraging the public's esteem of patenting towards the product at issue); Michael Mattioli, *Conjuring the Flag: The Problem of Implied Government Endorsements*, 83 MD. L. REV. 707, 728 (describing use of patented status "to persuade consumers that their products are of high quality"); Bonnie Grant, Note, *Deficiencies and Proposed Recommendations to the False Marking Statute: Controlling Use of the Term 'Patent Pending*,*'* 12 J. INTELL. PROP. L. 283, 289 (2004) (arguing that advertising patented status can cause consumers to "believe a product is somehow better because it is patented" and "of superior quality to other [unpatented] products on the market"); Oliphant v. Salem Flouring Mills Co., 18 F.Cas. 647, 648 (D. Or. 1878) (describing the "impression" that patented status "ordinarily makes" — that the product is "more useful or desirable" than unpatented products).

173. Bartow, *supra* note 54, at 3–8 (providing example of widespread patenting of toothbrushes and hair brushes, with narrow claims in crowded fields).

174. Graham et al., *supra* note 59, at 1306; *see also* Brenda M. Simon, *Patents, Information, and Innovation*, 85 BROOK. L. REV. 727, 743 (2020) (noting that patents are seen as validating the technology to investors).

175. *See* Conti et al., *supra* note 50, at 618 (using "the number of patents filed" as a measure of "better technologies"); Simona Fabrizi, Steffen Lippert, Pehr-Johan Norbäck & Lars Persson, *Venture Capitalists and the Patenting of Innovations*, 61 J. INDUS. ECON. 623, 624 (2013) ("[I]nnovations of higher quality . . . are [more] likely to fulfill the patentability criteria in the patent law (novelty, non-obviousness and usefulness) . . . .").

176. Alexander Billy & Neel U. Sukhatme, *Perception Pending: What Do Patents Signal to Consumers?*, at 5, 12 (June 6, 2023) (unpublished manuscript), https://ssrn.com/abstract=4471087 [https://perma.cc/2Z4Q-QUC2].

patented status were concentrated in areas where safety or efficacy might be particularly important to consumers — products applied to or ingested into the body but not subject to government pre-market approval.[177] Mattioli concluded that patented status in these ads signaled to consumers the product's quality, credibility, and effectiveness.[178]

However, patented status should not signify anything about the technology or product's quality or superiority. An invention can be technologically distinct — sufficiently different in its combination of features and/or operation from what previously existed to be novel and nonobvious — even though these differences are neutral or even worse than existing technology or market alternatives.[179] Likewise, utility does not police the quantity of usefulness or "require superiority to existing technology."[180] An invention can be useful for patent law purposes — have a practical, real-world use — even if it has no commercial or social worth or is inferior to existing products.[181] The patent system purposefully leaves it to the market to determine whether inventions are significant, desirable, better than what existed, and worth the price.[182]

Nor does patented status reliably correlate in practice to quality, importance, or superiority. Due to the patent system's emphasis on distinctness, not improvement, "[o]ften . . . we get innovations that are new purely for the sake of being new, and not better at all."[183] The overwhelming majority of patents — estimated to be upwards of ninety percent — are never litigated, licensed, or otherwise used.[184] The fact that so few patents ever become relevant undermines any claim that patented status indicates that the invention is high quality, important, or superior.

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177. Mattioli, *supra* note 172, at 726–29.

178. *Id.* at 729–31.

179. *See* Price, *supra* note 44, at 771 ("Patent doctrine focuses on the search for new and different innovation without emphasizing improving technology or increasing welfare.").

180. *Id.* at 788; *see* Andrew Gilden & Sarah R. Wasserman Rajec, *Pleasure Patents*, 63 B.C. L. REV. 571, 610–11 (2022) (describing black letter law that utility does not require that the "patented invention be demonstrably superior to that which was already known"); Risch, *supra* note 98, at 67–68 ("Currently, a patent may issue even if its benefits do not 'supersede all other inventions now in practice' . . . .").

181. *See* Cotropia, *supra* note 121, at 76 (outlining how patent law does not require commercial or social worth, thereby lowering the barrier to file for a patent); Risch, *supra* note 97, at 1195–96 (discussing how patent law does not require commercial usefulness).

182. Price, *supra* note 44, at 772 ("Patent law relies on the market to sort out the value of inventions."); Risch, *supra* note 97, at 1206 ("[T]he market decides whether an invention is commercially useful.").

183. Price, *supra* note 44, at 771.

184. Mark A. Lemley, *Rational Ignorance at the Patent Office*, 95 NW. U. L. REV. 1495, 1497, 1507, 1511 (2001).

2. Product Efficacy & Safety

The patented status of a product is sometimes treated as communicating safety or effectiveness for the intended use.[185] This is most common with medical and quasi-medical products, where the "aura of safety and legitimacy" is particularly important to consumers.[186] Companies purposefully leverage this perception, "using patent rights as proxies for safety and clinical efficacy" in advertisements.[187] Mattioli's Twitter study found that patented status was most commonly used in advertisements "for products that are ingested or applied to the body by consumers," such as supplements, skincare products, and insect sprays.[188] Given the lack or limited regulatory oversight of these products and the particular concerns people might have about such products, Mattioli interpreted this data as evidence that consumers viewed patents as "signal[s] conveying that the products are effective, trustworthy, or safe."[189]

However, a patent should not "prove anything about the product's efficacy or safety."[190] Though patented status should signal that the invention is operable and has some practical use,[191] a patent on a product or chemical composition (as opposed to a method of treatment) does not indicate practical effectiveness for the product's advertised or stated purpose.[192] Likewise, the beneficial utility doctrine used to bar patents on inventions that were injurious to the public, but its impact waned and it was ultimately abandoned.[193] Thus, a product can be "useful" as a matter of patent law even though it is dangerous, risky, or has significant side effects.[194] Nor does patented status reliably correlate to safety and efficacy in practice. The patent process does not implicate these issues, which are left to other federal agencies (e.g., the FDA) under

185. *See* Isenstead v. Watson, 157 F.Supp. 7, 9 (D.D.C. 1957) (contending that "some members of the public are likely to rely" on a patent as a "certificate that the medicine to which it relates is a good medicine and will cure the disease or successfully make the test which it was intended to do"); Leslie, *supra* note 157, at 144 (noting that some advertisements use patented status to indicate that the "product is actually effective").

186. Mattioli, *supra* note 172, at 712.

187. *Id.* at 713.

188. *Id.* at 728.

189. *Id.* at 729.

190. *Id.* at 731.

191. *See supra* Section III.A.

192. *See* Application of Hartop, 311 F.2d 249, 263 (C.C.P.A. 1962) (observing that "the issuance of a patent is not in fact an 'imprimatur' as to the safety and effectiveness of any . . . product"); Isenstead v. Watson, 157 F.Supp. 7, 9 (D.D.C. 1957) (explaining that a patent is not "a certificate that the medicine to which it relates is a good medicine and will cure the disease or successfully make the test which it was intended to do").

193. Gilden & Rajec, *supra* note 180, at 573–74; *see also* Risch, *supra* note 97, at 1204–05 (describing historical use of beneficial, or moral, utility but noting that it is basically ignored today).

194. *See Hartop*, 311 F.2d at 255.

other statutory powers and to the states' general police powers.[195] The perception that patented status indicates safety or efficacy is false.

3. Innovativeness and R&D Success

Patents are widely treated as a signal of innovativeness and research success. Some in capital markets — venture capitalists, shareholders, creditors — treat patent protection as indicating that the firm is "technologically progressive and innovative, worthy of the trust that investment or employment entails."[196] Firms may obtain patents, at least in part, specifically to signal innovativeness to investors.[197] Beyond capital markets, Rantanen and Jack theorized that patents signal to employers and the public that the named inventor has innovative capacities.[198] Relatedly, some have suggested that firms use patents internally to measure the productivity and performance of their employees, a notoriously difficult task.[199] And marketing companies suggest that the "patented" label signals innovativeness to consumers.[200] Even economists and others studying the patent system use patent counts to support "historical claims about technological progress and innovation generally."[201] Empirically, Billy and Sukhatme found that consumers who saw a product with a "patented" label viewed the product as "more innovative" than those who did not see "patented" status.[202] Silbey's interviews likewise indicated that inventors and their companies treated patents as a signal of the inventor's scientific achievement and excellence in their field.[203]

Patent issuance should *not* indicate innovativeness or technological success as commonly understood. Narrowly defined as just technological newness or difference, Part III explained that patented status is designed to signal technological distinctness, though does so weakly in

195. *See id.* at 257–59 ("We believe that Congress has recognized this problem and has clearly expressed its intent to give statutory authority and responsibility in this area to Federal agencies different than that given to the Patent Office.").

196. Burk, *supra* note 51, at 442; *see also* Anderson, *supra* note 56, at 1596 (contending that patents might signal to investors "how innovative a company may be.").

197. *See* Simon, *supra* note 174, at 761 (finding that medical device companies "obtained a patent before they enter into negotiations with potential investors to signal their innovativeness"); Ted Sichelman & Stuart J. Graham, *Patenting by Entrepreneurs: An Empirical Study*, 17 MICH. TELECOMM. & TECH. L. REV. 111, 131 (2010) (suggesting that startup companies might obtain patents as a signal of "the technical capabilities of the firm").

198. Rantanen & Jack, *supra* note 57, at 379.

199. Parchomovsky & Wagner, *supra* note 52, at 22–23.

200. *The Value of Patents in Your Marketing Strategy*, LAUNCH TEAM, INC., (Sept. 28, 2024, 12:55 PM), https://www.launchteaminc.com/blog/the-value-of-patents-in-your-marketing-strategy [https://perma.cc/G55N-UGWD].

201. Rantanen & Jack, *supra* note 57, at 348.

202. Billy & Sukhatme, *supra* note 57, at 12.

203. Silbey, *supra* note 72, at 455.

practice.[204] However, innovation is typically equated with technological improvement and progress, not mere novelty.[205] The patent system as a whole is undoubtedly intended to promote innovation, technological improvement, and progress.[206] But the technological distinctness required for each individual patent does not equate to technological improvement or progress.[207] Patents are granted on technologically distinct inventions on the assumption that some of these inventions will be innovative, not that they all or even most will be.[208] Technologically distinct inventions could lead to technological improvement by creating new solutions to existing problems or because the technological difference results in improved performance.[209] However, the change required for technological distinctness "may be good or bad; the size of the change says nothing about whether it is an improvement, a worsening, or neither."[210] Patented status alone does not indicate improvement or progress, i.e., innovation.

Additionally, the technological divergence required for patentability could be something "markedly different" that moves far away from existing technology but equally could be a more minor (though nonobvious) variation that is "just 'new for the sake of new.'"[211] The patent system is not particularly demanding as to "the level of . . . inventiveness that went into an invention"[212] and instead allows patents even for "rather pedestrian innovations."[213] Thus, "patents and other incentives can drive toward an unhappy medium of differentiating, proliferating, nonsuperior technologies."[214]

Nor does patented status necessarily correlate with technological innovation, productivity, or success in practice. Patent issuance is "an unwieldy measure of [technological] productivity because the PTO ultimately approves almost all of the applications it receives," allowing easy manipulation of the patenting process.[215] R&D employees and other inventors can "over represent their productivity by simply

204. *See supra* Sections III.A, III.B.1, III.C.

205. *See* Price, *supra* note 44, at 771 ("But mere novelty is not the aim of innovation policy — improvement is."); *see also id.* at 780 (describing the innovation desired by society as "develop[ing] new, better technologies").

206. Price, *supra* note 44, at 779–80.

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

208. *Cf.* Kara W. Swanson, *Beyond the Progress of the Useful Arts: The Inventor as Useful Citizen*, 60 HOUS. L. REV. 363, 380 (2022) ("Most patents in the twenty-first century are never commercialized or licensed, and the U.S. patent system, in its very accessibility, was designed to produce more of such 'worthless patents' than previous systems.").

209. Price, *supra* note 44, at 794–95.

210. *Id.* at 775.

211. *Id.*

212. Bartow, *supra* note 54, at 10–11.

213. Anderson, *supra* note 56, at 1595.

214. Price, *supra* note 44, at 774.

215. Parchomovsky & Wagner, *supra* note 52, at 24.

increasing the number of applications they produce."[216] The same is true of firms, with the number of patents as likely to reflect the sophistication of patenting strategy as innovativeness or technological success.[217] Specifically, inventors and firms can split a single invention into multiple patents covering slightly different aspects or can patent every minor difference they conceive, even if insignificant or useless.[218] Silbey's interview participants described how a few of a company's patents tended to be valuable, with others just filler or additional weight to make the company appear important.[219] The fact that patenting has increased at the same time actual R&D expenditures have decreased is evidence that patenting correlates as much with patenting strategy as it does with R&D commitment or success or technological innovation.[220] Thus, patents and patent count are a false signal for a person's or company's general innovativeness or technological success.

4. Market Success and Financial Reward

Scholars contend that patent-owning companies and their investors treat patents as a signal that the invention is "likely to be viable" by having commercial potential and market value.[221] Empirically, entrepreneurs in Silbey's interviews believed patents signaled to investors the promise of business prosperity and financial worth.[222] Medical device executives interviewed by Brenda Simon similarly noted that patents signaled to investors that "the product will be viable in the marketplace."[223] And software startup investors interviewed by Ronald Mann described patents as the "magic dust" or "secret sauce" for return on the investment.[224]

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216. *Id.*

217. *See* Lemley, *supra* note 43, at 140 (noting popular view that in some industries big companies patent and small entities are "at the forefront of technological innovation" but lack sophisticated patenting strategies); *id.* at 141 (noting that what licensing shops "mostly seem to 'produce' are patents and patent licenses," not innovations).

218. Long, *supra* note 46, at 676. The doctrine of obviousness-type double patenting could mitigate this concern because it addresses patents with minor variations in scope. Terminal Disclaimer Practice To Obviate Nonstatutory Double Patenting, 89 Fed. Reg. 40439, 40439 (May 10, 2024) (proposed for rulemaking). However, a patent owner can typically overcome obviousness-type double patenting concerns by filing a terminal disclaimer, such that all patents on minor variants expire on the same day. *Id.* Such terminal disclaimers allow a patent owner to own multiple patents on minor variations of the same invention.

219. Silbey, *supra* note 72, at 460.

220. Lemley, *supra* note 44, at 140.

221. *See* Simon, *supra* note 174, at 742–43.

222. Silbey, *supra* note 72, at 458–59.

223. Simon, *supra* note 174, at 761.

224. *See* Ronald J. Mann, *Do Patents Facilitate Financing in the Software Industry?*, 83 TEX. L. REV. 961, 976 (2005).

Likewise, individual inventors can confuse patent protection with a guarantee or promise of financial reward,[225] wrongly assuming that patent protection is "a sure-win get-rich ticket."[226] Nearly a hundred years ago, a patent lawyer described the problem of the individual inventor who believes a patent will create value even for "something no one wants" by proving how ingenious it is and causing people to "buy the device merely because it is patented."[227] Even some economists studying the patent system treat patented status as indicative of higher market value for an invention.[228]

Comparatively, a patented product is likely to have greater value than the same product unpatented. Patents provide a right to exclude, and financial returns should be higher without competition.[229] This exclusivity signal is consistent with the patent system's design, though weak in practice.[230] Some observers do seem to limit their reliance on patented status to indicate value and financial success to this narrow exclusivity signal.[231]

But at least some audiences treat patented status as a broader signal of actual market potential, value, or likely financial return,[232] a signal patented status should not convey. Patents provide the space, or exclusivity, to allow the owner to recoup whatever intrinsic value is possessed by the underlying invention.[233] The patent itself does not create or guarantee value or financial reward.[234] Rather, the patent system relies on the market "to sort out the valuable innovations from a mélange of patented inventions" based on whether there is consumer demand and willingness to pay for the invention.[235]

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225. *See* Donald H. Sweet, *A Few Common Misconceptions about Patents*, 6 CHI.-KENT L. REV. 18, 18–19 (1927); Rantanen & Jack, *supra* note 57, at 386–87 (noting concern that individual inventors will mistakenly view a patent as a guarantee of financial success).

226. Rantanen & Jack, *supra* note 57, at 388.

227. Sweet, *supra* note 225, at 18–19.

228. Fabrizi et al., *supra* note 175, at 624–25 (suggesting that meeting the patentability requirements indicates higher market value).

229. *See supra* Section III.A.

230. *See supra* Sections III.A, III.B.3.

231. *See* Simon, *supra* note 174, at 743 (describing view in medical device field that patent exclusivity "indicates that investors have a better chance of obtaining a return on their investment"); *id.* at 761 (noting view that patent exclusivity will allow medical device firm to "gain market share and create a 'new niche or carv[e] into a competitor's space'") (quotations and alterations omitted); *see also* Mann, *supra* note 224, at 975–76 (suggesting that investors should value patents because of the monopoly that generates extra profits).

232. *See* Mann, *supra* note 224, at 976–77 (noting that some investors deemed patents as "important" and as contributing to "sustainable differentiation," the "secret sauce," or "magic dust" that would lead to return on investment).

233. *See* Sweet, *supra* note 225, at 19 ("[P]atents cannot create value, but can merely protect such new creations as have a value of their own and therefore need the protection.").

234. *See* Parchomovsky & Wagner, *supra* note 52, at 21 ("[P]atent applications convey little information about the potential commercial value of the invention.").

235. Price, *supra* note 44, at 772; *see also* Benjamin N. Roin, *Intellectual Property Versus Prizes: Reframing the Debate*, 81 U. CHI. L. REV. 999, 1027–28 (2014).

Nor is patented status a reliable proxy for value or likely financial success in practice. "[A]ll available evidence demonstrates that the average expected value of a patent is extremely small . . . [and] the overwhelming majority of patents have no value whatsoever."[236] Of the patents that have value, most only allow the inventor to break even by recouping the research and development costs; comparatively few patents are highly valuable or provide significant market success.[237] Patents therefore have been compared to lotteries, with a low probability of significant financial success.[238] Like lottery tickets, patented status itself provides no reliable indication of likely commercial value or financial success. Any assumption that it does is a false signal.

5. Government Endorsement

Patents are often treated as a "government imprimatur" or endorsement of the invention or underlying technology.[239] To some extent, this is a stronger version of other false signals, with patent issuance treated as a neutral and expert government agency's certification of the quality, innovativeness, or likely market success of the invention.[240] Specifically, companies use patented status in their advertisements, at least in part, "to suggest that the products advertised are better because the government approved them."[241] More broadly, some assume patented status is the government's endorsement that the invention is worthy or special, given that the government found it entitled to twenty years of exclusivity.[242] Patented status is similarly treated as government

236. Parchomovsky & Wagner, *supra* note 52, at 5.

237. Dennis D. Crouch, *The Patent Lottery: Exploiting Behavioral Economics for the Common Good*, 16 GEO. MASON L. REV. 141, 142 (2008).

238. *See id.* at 148–54.

239. Margo A. Bagley, *Patent First, Ask Questions Later: Morality and Biotechnology in Patent Law*, 45 WM. & MARY L. REV. 469, 476 (2003); *see* Cynthia M. Ho, *Splicing Morality and Patent Law: Issues Arising from Mixing Mice and Men*, 2 WASH. U. J.L. & POL'Y 247, 253 n.29 (2000) (describing misunderstanding of patents as government endorsement of the technology).

240. *See, e.g.*, Burk, *supra* note 51, at 425 (describing view that patents are "assurances of quality by virtue of their governmental examination and certification."); Graham et al., *supra* note 59, at 1306 (describing how investors might view patents as an "important signal of quality" that reflects the "independent expertise of the Patent Office"); Isenstead v. Watson, 157 F.Supp. 7, 9 (D.D.C. 1957) (explaining potential public reliance on patents as "official imprimatur" of quality and efficacy of patented medicine).

241. Mattioli, *supra* note 172, at 738; *see also* Leslie, *supra* note 157, at 144 (identifying advertising of patent protection to suggest "the government's endorsement or imprimatur that the advertised product is actually effective").

242. *See* Elizabeth I. Winston, *The Flawed Nature of the False Marking Statute*, 77 TENN. L. REV. 111, 133 (2009) (identifying a "segment of the public that thinks of patents as an imprimatur of the U.S. government indicating something special" about the invention); Simon, *supra* note 174, at 743 ("An issued patent provides an independent metric that the USPTO found the invention worthy of a patent."); Oliphant v. Salem Flouring Mills Co., 18 F.Cas. 647, 647–48 (D. Or. 1878) (describing patented status as indicating "some peculiar value or merit sufficient to induce the government" to grant the patent).

certification that the named inventor is "exceptional," with the patent seen as a "real red ribbon" of achievement because it "bears the government's own seal" and has "widespread recognition and legitimacy."[243]

More generally, observers perceive patented status as government endorsement of the underlying technology area or field of research, providing technological and normative legitimacy even if unearned.[244] Specifically, Margo Bagley suggested that patents can provide a "government imprimatur" that research and innovation in highly-controversial biotechnologies (e.g., cloning or embryonic stem cells) is morally legitimate.[245] Tim Holbrook likewise noted that patents can "express governmental preferences for, disfavor towards, or even condemnation of various members of society," such as "patents on genes and processes that influence behaviors, activities, or conditions" that could suggest that things like deafness, autism, or sexual orientation should be prevented, treated, or cured.[246]

However, "the issuance of a patent is not in fact an 'imprimatur'" or a "guarantee of anything" by the government beyond the statutory criteria of patentability, i.e., the signals patents are designed to give.[247] Patent issuance is "as of right based on statutory criteria reflecting only technological considerations, without Patent Office discretion, policy weighing, cost-benefit analysis, evaluation of social merit, or other ad hoc decision making."[248] The Patent Office does not evaluate the quality, importance, specialness, worthiness, social value, or financial value of the invention, inventor, or technology.[249] The Patent Office's issuance of hundreds of thousands of patents each year[250] demonstrates how patented status does not correlate in practice to any governmental endorsement of specialness, exceptionality, or worth.

Nor does patent issuance signify governmental endorsement of the underlying technology area or its morality. The United States takes a "patent first, ask questions later" approach where new technologies are presumptively patent-eligible without regard to social values or

243. Rantanen & Jack, *supra* note 57, at 319, 345, 349.

244. Holbrook, *supra* note 96, at 577; *see also* Graham & Sichelman, *supra* note 45, at 1083 (noting that patented status could lend technological credibility by certifying compliance with supposedly stringent standards); Bagley, *supra* note 239, at 516 ("The grant of a patent also covers the [controversial] subject matter with a veneer of legitimacy."); Peter Lee, *Patents, Paradigm Shifts, and Progress in Biomedical Science*, 114 YALE L.J. 659, 676 (2004) ("[T]he government imprimatur of patents helps legitimate novel technologies and the [scientific] theories they apply.").

245. Bagley, *supra* note 239, at 475–76, 535.

246. Holbrook, *supra* note 96, at 578–81.

247. Application of Hartop, 311 F.2d 249, 263 (C.C.P.A. 1962).

248. Reilly, *supra* note 108, at 222.

249. *See id.* at 222; Bagley, *supra* note 239, at 477 ("[N]o explicit basis exists for denying patent protection to otherwise patentable, morally controversial subject matter.").

250. Mark A. Lemley, *The Surprising Resilience of the Patent System*, 95 TEX. L. REV. 1, 15 (2016).

norms.[251] As previously noted, the Patent Office historically could use the beneficial utility doctrine to deny patents that facilitated illegal, immoral, or deceptive activity, but that doctrine faded and was ultimately eliminated.[252] Thus, treating patented status as government endorsement of anything but the statutory criteria is a false patent signal.[253]

6. Patent-Pending

Even before patent issuance, companies frequently advertise their product as "patent-pending," believing it to be an effective marketing tool to consumers and investors.[254] Like patented status, patent-pending status can provide credibility about the quality, safety, and efficacy of the associated product,[255] as well as signal that the product[256] and/or company[257] are innovative. And some audiences treat patent-pending status as an indication that the invention is so special, worthy, or great that the patent owner is "in line to win a patent."[258] In a survey by Chris Cotropia, 15.9 percent of respondents said they were more likely to buy a product if it was patent-pending and approximately one-third said they were more likely to invest in it.[259] And in his study of both mock and actual crowdfunding campaigns, products designated patent-pending were more successful in reaching their crowdfunding goals.[260]

Patent-pending is a false signal for quality, importance, safety, efficacy, and innovativeness for the same reasons patented status is.[261] Moreover, all a company needs to do to have a "patent-pending" is to file an application in the Patent Office. In fact, the company just needs to file a streamlined provisional patent application under § 111(b), which gives the applicant priority to obtain the patent but allows them

251. Bagley, *supra* note 239, at 474.

252. *See supra* Section IV.A.2.

253. *See* Gilden & Rajec, *supra* note 180, at 608 ("[T]he patent system is not, for the most part, designed to judge either the market or moral value of an invention.").

254. *See, e.g.*, Anderson, *supra* note 56, at 1594–95; Christopher Heer, Annette Latoszewska, Rares Minecan, Michelle Huong, Ryan De Vries & Daryna Kutysna, *The Benefits of Use of "Patent Pending*,*"* HEER LAW (Oct. 2, 2020), https://www.heerlaw.com/benefits-patent-pending [https://perma.cc/T6H3-FYX9].

255. *See* LAUNCH TEAM, INC., *supra* note 195.

256. Anderson, *supra* note 56, at 1595 (noting that patent-pending can "reassure consumers that they are purchasing something innovative").

257. *See* LAUNCH TEAM, INC., *supra* note 200 (noting that "patent-pending" can "establish[] you as an innovator in your field"); Heer et al., *supra* note 254 (explaining that patent-pending can be used to "indicate that you or your company are innovative").

258. Winston, *supra* note 242, at 124.

259. Cotropia, *supra* note 50, at 209.

260. *Id.* at 196.

261. *See supra* Section IV.A.1–5.

a year to file the full application and start examination.[262] Although provisionals are supposed to comply with the enablement and written description requirements,[263] practitioners indicate that the quantity and quality of the information are often limited.[264] Nor does the Patent Office conduct any review of the alleged invention or application before accepting it for examination — that is the purpose of examination. In fact, patent applicants have tools to keep an application pending by forcing continued examination even after the Patent Office examines it and finds it unpatentable.[265] Therefore, unlike patented status, patent-pending should not provide any signals related to the statutory criteria of patentability (such as technological distinctness, functioning embodiment, etc.).

Nor does patent-pending status provide patented status's exclusivity signal, since enforceable rights only arise upon patent issuance.[266] While it may indicate likely future exclusivity,[267] it provides little information about the substance of that exclusivity. Applications remain confidential for eighteen months from filing and are often amended to change their scope before issuance.[268] And provisional applications do not even include claims to identify the potential scope of future exclusivity.[269]

In sum, patent-pending status provides little useful information beyond the fact that the owner submitted the requisite fees and documentation to the Patent Office, perhaps only the very low fee ($300, $120 for small entities) and more limited documentation necessary for a

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262. *Provisional Application for Patent*, USPTO, https://www.uspto.gov/patents/basics/types-patent-applications/provisional-application-patent [https://perma.cc/SF6T-SEV5] [hereinafter *Provisional*] (noting that provisional applications allow use of the "patent-pending" designation).

263. *See* 35 U.S.C. §§ 111(b), 112(a).

264. *See* Russ Krajec, *Advertising and Marketing Uses for Patents and the Deterrent Factor*, KRAJEC PATENT OFFICES, https://krajec.com/advertising-and-marketing-uses-for-patents-and-the-deterrent-factor/ [https://perma.cc/RWJ3-KQMK] (noting because of the lack of examination, there is little policing of the information in provisionals, and a "coarse" description is often enough); *cf.* Todd L. Juneau, *The Siren Song: Misconceptions Concerning Provisional Patent Applications*, AUTM NEWSLETTER, Mar./Apr. 2003, at 10, 11 (describing university practice of submitting scientific journal articles as provisional applications despite differences from patent law requirements).

265. *See* Mark A. Lemley & Kimberly A. Moore, *Ending Abuse of Patent Continuations*, 84 B.U. L. REV. 63, 64 (2004).

266. *See supra* Section III.A. Section 154(d) of the Patent Act does provide a limited opportunity to recover damages for infringement between application publication and issuance, but even this right arises only upon patent issuance.

267. *See* Parchomovsky & Wagner, *supra* note 52, at 24 ("[T]he PTO ultimately approves almost all of the applications it receives.").

268. *See* Greg Reilly, *Amending Patent Claims*, 32 HARV. J.L. & TECH. 1, 9–11, 24 (2018); 35 U.S.C. § 122(a)–(b); Simon, *supra* note 174, at 764 (noting that sophisticated medical device investors put little weight on provisional applications given significant differences between the claims as filed and what ultimately issues).

269. *See Provisional*, *supra* note 262.

provisional application.[270] It could also indicate managerial sophistication from knowing how to operate the patent system or a deterrent to competitors from knowing that someone else is already in line for exclusive rights, possibilities addressed in the next section. But treating patent-pending as a proxy for much else is a false signal.

B. Incidental Patent Signals

The final category of signals conveyed by patented status are incidental patent signals. Like false patent signals, incidental signals are not information that patented status *should* convey based on the design of the patent system, patent examination, and patent rights. But for incidental signals, patented status does correlate with the underlying information in practice, even if potentially weakly or noisily.

1. Management Qualities

The patent signals literature commonly treats patented (or patent-pending) status as signaling positive characteristics about the company's management, such as that the business is well-managed;[271] that management "understands the modern business environment";[272] and that management is committed to, and believes in, the product or endeavor.[273] The empirical evidence is supportive. Simon's medical device interviewees viewed patents as indicating executive sophistication, including forethought and follow-through in applying for and obtaining patents.[274] Silbey's interviewees understood patents to demonstrate that companies were well-run, systematic, well-functioning, and industrious, having sophisticated and effective leaders with a plan.[275] And Mann's software interviewees saw patents as signaling management's focus and execution, engineering discipline, and understanding of the company's value proposition.[276]

Patented status is not supposed to correlate with sophisticated executives or well-managed companies. The American patent system was designed to democratize invention, allowing access to those lacking

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270. *Cf.* Anderson, *supra* note 56, at 1594–95 (noting that patent-pending has "no legal justification" or legal significance). Perhaps the pending patent shows the company's willingness to invest in drafting and prosecution costs, though the cost of drafting a provisional application can be quite low, as explained in the text. Moreover, prosecution is slow, and a patent can be pending for some time without incurring significant prosecution costs.

271. Lemley, *supra* note 184, at 1505–06.

272. Parchomovsky & Wagner, *supra* note 52, at 59.

273. *See* Long, *supra* note 46, at 654 (contending that patents indicate confidence and financial commitment to the research and its success).

274. Simon, *supra* note 174, at 771.

275. Silbey, *supra* note 72, at 460.

276. Mann, *supra* note 224, at 993–94.

connections, resources, or business sophistication[277] — though not necessarily women and people of color in the 19th century.[278] Comparatively lower fees and a simpler process opened the patent system up to people from all walks of life.[279] In its early days, Congress and the Patent Office made purposeful design choices to "deliberately encourage[] broad participation in the patent system."[280] Even today, the Patent Office encourages patenting outside of large corporations by substantially discounting fees for small entities, providing tailored resources for individuals and small businesses, and glorifying individual invention.[281] Congress too continues to emphasize the importance of, and provide protections for, smaller and less sophisticated inventors.[282]

Yet, in practice, patented status does correlate, to some extent, with management commitment, sophistication, planning, and effectiveness. Since the American patent system is an examination, not registration, system, an applicant must navigate the complicated and costly examinational process to obtain patent protection. With the average cost of obtaining a patent being approximately $22,000,[283] patent issuance indicates a level of resources and financial commitment. Moreover, many of the requirements of the patent system differ from typical scientific publishing norms.[284] Also complicating the process is that most patent applications are initially rejected, with the applicant having to either persuade the examiner to withdraw the rejection or amend their claims to obtain patent protection.[285] Effectively navigating this unfamiliar and complicated process requires sophistication, organization, planning, and commitment.[286]

The strength of the correlation between patenting and positive management characteristics is debatable,[287] making it a noisy and

277. B. ZORINA KHAN, THE DEMOCRATIZATION OF INVENTION: PATENTS AND COPYRIGHTS IN AMERICAN ECONOMIC DEVELOPMENT, 1790–1920 2 (2005) (describing how the early American patent system "value[d] the contributions from the less exceptional" regardless of "class, patronage, or privilege"); *id.* at 125–26 (noting that early patenting was not concentrated in "commercial/professional occupations, urban residents, and individuals with multiple career patents").

278. *See* Swanson, *supra* note 208, at 399.

279. KHAN, *supra* note 277, at 49–61.

280. Swanson, *supra* note 208, at 376.

281. *See* Christopher A. Cotropia, *The Individual Inventor Motif in the Age of the Patent Troll*, 12 YALE J.L. & TECH. 52, 60 (2009).

282. *See id.* at 59–60.

283. Masur, *supra* note 117, at 699–700.

284. Juneau, *supra* note 264, at 10.

285. *See* Stephen Yelderman, *Improving Patent Quality with Applicant Incentives*, 28 HARV. J.L. & TECH. 77, 82 (2014).

286. *Cf.* Parchomovsky & Wagner, *supra* note 52, at 22 ("[T]he most important information signaled by patent portfolios is . . . the ability of the holder to understand the modern patent system and to take advantage of it.").

287. *Cf.* Burk, *supra* note 51, at 427 (noting evidence that investors look increasingly towards "more immediate signals of firm competence, such as managerial credentials and experience").

potentially weak signal. But, unlike the false signals, a correlation does exist in practice, making patented status an inadvertent signal for management characteristics.

2. Deterrence

Patented (or even patent-pending) status, particularly portfolios of patents, can signal competitors to avoid certain activity. Patent protection can be a barrier to entry, deterring competitors from entering a particular field or product line.[288] Though closely related, this barrier to entry signal is distinct from a patent's exclusivity signal. The exclusivity signal identifies the patent owner as the exclusive source to those who want to buy, use, or license the technology.[289] The barrier to entry signal is relevant only to potential competitors and warns them to stay away from a particular product line, market, or technology area.[290] Competitors know that competing with the patented invention risks litigation and infringement damages. In fact, they may not even want to incur the costs necessary to evaluate the scope and validity of the patent and conclude that they have freedom to operate because the risk of infringement damages is low.[291] Patented status can also scare off a competitor's potential customers or investors because of the risk of infringement liability or mere uncertainty from the patent rights.[292]

Patented status can also deter competitors from bringing patent litigation *against* the patent owner. The well-recognized practice of defensive patenting allows a party sued for infringement to counterclaim for infringement of its own arsenal of patents, gaining significant leverage in the litigation.[293] This is a substantive use of patents not dependent on the signaling effect. But patented status (and particularly portfolios of patents) can have a related signaling effect, deterring would-be plaintiffs from ever suing the patent owner for infringement because of the threat of such counterclaims.[294]

Unlike the exclusivity signal, these deterrent signals do not depend on the validity of the patent because uncertainty and cost are often enough to deter.[295] Because patent invalidity is unpredictable, difficult

288. *See* Lemley, *supra* note 43, at 141.

289. *See supra* Section III.A.

290. *See* Christopher R. Leslie, *The Anticompetitive Effects of Unenforced Invalid Patents*, 91 MINN. L. REV. 101, 115–16 (2006) (analogizing patented status as a "head on a pike" or "scarecrow" to competitors).

291. *See id.* at 119–20.

292. *See id.* at 125–27.

293. *See* Graham & Sichelman, *supra* note 45, at 1079–80.

294. *See* Parchomovsky & Wagner, *supra* note 52, at 26 (noting that "firms acquire patents to ward off possible lawsuits").

295. *See, e.g.*, Leslie, *supra* note 290, at 115–16 (explaining that even invalid patents "can give pause to potential competitors"); Graham & Sichelman, *supra* note 45, at 1079 (noting that even "weak patent[s]" can be effective defensively).

to assess, and may depend on information inaccessible to the public, it is typically difficult for a competitor to know whether or not the patent is invalid.[296] Even if the competitor recognizes the invalidity of the patent, patented status may still deter competition or litigation because of the unpredictability of litigation and the potential downside — infringement damages — if the invalidity defense is unsuccessful.[297] Moreover, even successfully invalidating a patent is a costly endeavor, which will either deter competitors from doing so or impose a hurdle that they have to overcome to compete or litigate.[298]

Patents are undoubtedly designed to signal a barrier to entry and threat of infringement damages for a product line, market, or technology area.[299] That is the very essence of the patent's exclusive rights.[300] However, the patent system presumes that only valid patents provide exclusivity, with the costs of deterring competition outweighed by the benefits of incentivizing innovation.[301] By contrast, the deterrent posed by even those patents that fail the statutory criteria of patentability is contrary to the underlying design of the patent system because it suppresses competition without any offsetting innovation benefits, upsetting the patent system's fundamental balance.[302]

And yet patented status (regardless of validity) does seem to function as a deterrent in practice. Silbey's interviews demonstrated a belief that patents "stall[] or . . . scare other businesses from coming near," serve as a "smoke screen" to "divert[] or slow[]-down competitors," and prevent infringement suits against the company.[303] The pharmaceutical industry provides the best practical example, with companies required to list patents on FDA-approved medicines in the "Orange Book" and potential generic competitors required to certify an absence of unexpired listed patents or the non-infringement or invalidity of the listed patents.[304] This typically leads to an infringement suit, which results in a thirty-month stay of generic entry and is a complicated and costly procedure.[305] "[T]he structure of the regulatory regime means that any patent, no matter how weak, poses a significant obstacle to generic market entry."[306]

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296. *See* Leslie, *supra* note 290, at 116–17, 129–32; *cf.* Graham & Sichelman, *supra* note 45, at 1080–81 ("Thus even knowing that their patents may be weak, large companies can often exploit them in strategic fashion to prevent competition from upstarts.").

297. *See* Leslie, *supra* note 290, at 116–17, 132–37.

298. *See id.* at 117, 134.

299. *See id.* at 114–15.

300. *See id.*; *see also supra* Section III.A.

301. *See* Leslie, *supra* note 290, at 115.

302. *See id.*

303. Silbey, *supra* note 72, at 462–63, 466.

304. *See* S. Sean Tu & Mark A. Lemley, *What Litigators Can Teach the Patent Office About Pharmaceutical Patents*, 99 WASH. U. L. REV. 1673, 1680–81 (2022).

305. *See id.* at 1681–82.

306. *Id.* at 1682.

In sum, the patent system is only designed to deter competition based on the exclusivity conveyed by valid patents. However, in practice, patent protection provides a deterrence signal, at least to some extent, not dependent on the patent's likely validity.[307]

3. Community Belonging and Citizenship

Kara Swanson has shown that patents can signal community belonging and capacity for citizenship.[308] Historically, patents were used to indicate that inventors were "useful citizens . . . with the ability to perform the necessary work of democratic self-governance" important to establishing a new country.[309] Patents "served as credentials of the ability to participate in self-governance, proof of the ability to think independently and have the quality of mind needed to exercise the franchise, hold office, and serve on juries."[310]

Conversely, patents were used to signal exclusion from civic participation, with the fact that, historically, named inventors were predominantly White men used as evidence that women and people of color lacked the capacities to be useful citizens.[311] At the same time, racial justice and Black civil rights movements frequently used patents obtained by Black inventors to counter stereotypes about the intellectual capacity of Black people and to demonstrate the equal intellectual abilities to develop original ideas thought necessary to entitle equal participation in civic life.[312]

Even today, patents continue to serve as a signal of civic capabilities by "those advocating for group inclusion."[313] For example, "patents collectively granted to immigrants are offered as evidence of their worthiness to join the United States community."[314] The perceived correlation between patents and community belonging also motivates efforts to address under-inclusion of underrepresented groups in the patent system.[315]

The theoretical and practical accuracy of this belonging and citizenship signal is nuanced. Narrowly, patents were used to counter the "widespread belief among Americans that white women and Black women and men"[316] lacked the mental capacity to "originate new

307. Laura Dolbow suggested to me the barrier to entry signal and Orange Book example.

308. *See* Kara W. Swanson, *Race and Selective Legal Memory: Reflections on* Invention of a Slave, 120 COLUM. L. REV. 1077, 1082 (2020); *see also* Swanson, *supra* note 208, at 395–97.

309. Swanson, *supra* note 208, at 395–96.

310. *Id.* at 397.

311. *See id.* at 399.

312. *See* Swanson, *supra* note 308, at 1092–104, 1109–10.

313. *Id.* at 1115–16.

314. *Id.* at 1116.

315. *Id.* at 1116–17.

316. Swanson, *supra* note 208, at 399.

creations or technologies"[317] and instead "were limited to imitation."[318] Patents were treated "as certification of inventive ability, that is, the ability to originate and not just imitate."[319] Patents undoubtedly are designed to signal originality (i.e., technological distinctness), not imitation,[320] though this technological distinctness signal is weak in practice. At the same time, treating patents as evidence not just of originality but also importance, superiority, or innovativeness would be a false signal.[321]

The broader association of patented status with community belonging and citizenship represents an incidental signal that the modern patent system is not designed to give but patented status does correlate with in practice, at least to some extent. Swanson contends that the early American patent system was designed to promote this correlation between patents and citizenship.[322] Even if true historically, the modern American patent system is not designed to signal community belonging, citizenship, or civic worth. Patentability focuses solely on technological criteria without regard to merit, worth, public policy, or similar considerations.[323] The only criteria for inventorship is a contribution to conception — the formation of a definite and permanent idea of the invention — without any evaluation of the quality of the named inventor.[324] Moreover, American patents are freely available to foreign citizens living abroad, with over half issued each year since 2011 having foreign origin.[325]

Yet, Swanson offers persuasive evidence from recent decades of patents still being used in practice to signal community belonging, citizenship, and civic capabilities.[326] Because these questions are ultimately a matter of perception and community values, the actual correlation between the capabilities required for patenting and civic capabilities is irrelevant. If members define their community as including, or being limited to, those with the capabilities required for patenting, then patenting serves as a real-world signal of community belonging and civic merit.

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317. Swanson, *supra* note 308, at 1109
318. Swanson, *supra* note 208, at 399.
319. Swanson, *supra* note 308, at 1112.
320. *See supra* Section III.A.
321. *See supra* Section IV.A.
322. Swanson, *supra* note 208, at 375–81.
323. *See supra* Section IV.A.
324. *See supra* Section III.A.
325. *Patent Essentials*, USPTO, https://www.uspto.gov/patents/basics/essentials [https://perma.cc/Y24Y-SU6Q]; *U.S. Patent Statistics Chart Calendar Years 1963–2020*, USPTO, https://www.uspto.gov/web/offices/ac/ido/oeip/taf/us_stat.htm [https://perma.cc/8BP7-45PF].
326. *See* Swanson, *supra* note 308, at 1098–103, 1116–17.

V. THE SPECTRUM OF AUDIENCE & THE PATENT SIGNAL PROBLEMS

This Part evaluates the problems created by the weak and false patent signals identified in Parts III and IV, asking three questions. First, what is the scope of the misleading signals problem, and, second, what is its costs? Misleading patent signals might not be a significant problem if they do not impact behavior or cause harm or if they only affect outliers, since communication always has a rate of error. Third, what causes misleading patent signals? This Part can only hypothesize likely causes, since a definitive answer (or answers) would require sophisticated, and perhaps impossible, social science work.

In evaluating these questions, this Part takes up the key question, largely bracketed until now, of how patent signaling varies across the different audiences for patent rights, either in the signals they perceive or their sense of the signals' reliability.[327] Common sense and some empirical evidence suggests a dichotomy where misleading patent signals are a problem for unsophisticated patent audiences but not sophisticated investors who should have the knowledge and experience to not be misled by patented status.[328] This Part finds this dichotomy too simplistic. The evidence raises doubts both about how affected lay audiences are by misleading patent signals *and* about whether sophisticated investors are immune from being misled. Rantanen and Jack suggested there was "enough commonality of the social meaning of a patent for it to have a widely-recognized effect."[329] The same seems true with misleading patent signals — it is more a difference in degree among audiences than a difference in kind, and the audience question is best viewed as a spectrum. Sections V.A and V.B evaluate the causes, scope, and costs of the patent signal problem for the two poles of this spectrum — the least sophisticated ordinary individuals and the most sophisticated investors and executives, respectively. Section V.C addresses the spectrum's varied middle.

A. Ordinary Individuals

Though not typically central to patent system debates, ordinary individuals are an important patent audience. Part IV showed that consumers perceive false signals related to quality, superiority, efficacy, safety, innovativeness, and patent-pending status, while individual

327. *See supra* Section II.B.

328. *See, e.g.*, Cotropia, *supra* note 50, at 209 (finding that "patent-pending" had less effect on investment and buying decisions of patent knowledgeable respondents); Lemley, *supra* note 184, at 1514 (contending that sophisticated investors understand patents' shortcomings and can properly discount their information value).

329. Rantanen & Jack, *supra* note 57, at 348.

inventors can equate patented status with market success and financial reward.[330] Beyond these examples, ordinary people might rely on patented status as employees in the labor market or within a business, as investors in the more democratized world of crowdfunding and retail investing, and as peers of individual patent owners. Ordinary individuals tend to have limited knowledge of and experience with the patent system, though they are not monolithic and some undoubtedly fall into the varied middle of sophistication discussed below.[331] This Section focuses on the ordinary people who constitute the least sophisticated pole of the patent-audience spectrum.

1. Scope

Significant evidence supports the intuition that ordinary individuals receive misleading patent signals, though there is ambiguity as to the impact on their actual behavior. Businesses think ordinary individuals are impacted by false patent signals, making heavy use of patented status in advertising to indicate quality, superiority, safety, efficacy, and innovativeness.[332] Patented status is even referenced in hundreds of registered trademarks.[333] Assuming a modicum of business rationality, this advertising provides indirect evidence that misleading patent signals impact consumers. Likewise, the ongoing presence and financial success of patent promotion firms provides at least some evidence that individual inventors treat patents as a proxy for market success and financial reward.[334]

More directly, Billy and Sukhatme found that ordinary people who responded to a survey through Amazon Mechanical Turk and viewed the "patented" label "were more likely to view the patented item as more innovative and of higher quality."[335] Cotropia's empirical work related to crowdfunding is also supportive, given that crowdfunders are closer to ordinary individuals like consumers than sophisticated investors.[336] Cotropia found that thirty-five percent of crowdfunding survey respondents said they would be more likely to buy the product due to "patented" status and sixty-four percent said they would be more likely to invest.[337] Similarly, sixteen percent said they would be more likely

330. *See supra* Section IV.A.

331. *See infra* Section V.C.

332. *See, e.g.*, Anderson, *supra* note 56, at 1593–95; Bartow, *supra* note 54, at 3; Mattioli, *supra* note 172, at 728.

333. Mattioli, *supra* note 172, at 735–37.

334. Rantanen & Jack, *supra* note 57, at 386–88 (using invention promotion firms as evidence that inventors mistakenly equate patents with financial riches).

335. Billy & Sukhatme, *supra* note 176, at 4.

336. *See* Cotropia, *supra* note 50, at 214 ("Even though some scholars indicate that Kickstarter backers view themselves as investors, the better comparison is viewing them like buyers.").

337. *Id.* at 208–09.

to buy and nearly one-third said they would be more likely to invest due to "patent-pending" status.[338] And Cotropia's analysis of actual crowdfunding campaigns and data from his mock crowdfunding campaign indicated that "patent-pending" status led to a statistically significant increase in the success of the crowdfunding campaign.[339]

But the data is not universal when it comes to actual behavior. Billy and Sukhatme found that "while patents might signal quality, consumers appear to be, at best, indifferent to patent status in terms of their purchasing behavior."[340] Both in survey results and in an in-store experiment, they found no statistically meaningful increased propensity to purchase or use a product with the "patented" label.[341] Despite what survey respondents said about their expected behavior, Cotropia likewise found that patented status, unlike patent-pending status, had no statistically significant effect on crowdfunding success in actual crowdfunding campaigns and experimental mock campaigns.[342]

In sum, strong anecdotal and some empirical evidence indicates that regular individuals, such as consumers and individual inventors, are swayed by misleading patent signals. The limited existing quantitative data on actual behavior is supportive for patent-pending, but not patented, status. Thus, the exact impact of misleading patent signals on ordinary individuals is ambiguous, warranting further study.[343]

2. Costs

To the extent ordinary individuals act based on misleading patent signals, the costs are straightforward. Consumers may pay a price premium if they are misled into valuing the product higher or preferring it to competing products.[344] Competitive harms also may result if consumers are misled away from otherwise superior products or prices.[345] And consumers misled by false patent signals of quality, safety, efficacy, or government endorsement may not independently evaluate these issues, exposing themselves to risk.[346] Employees similarly could be misled into accepting particular employment or a lower salary, misdirecting labor from competitors. And retail investors could make unwarranted investments, misdirecting capital from more promising enterprises.[347]

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338. *Id.*
339. *Id.* at 214, 217.
340. Billy & Sukhatme, *supra* note 176, at 4.
341. *Id.* at 12–13, 29.
342. Cotropia, *supra* note 50, at 214, 217.
343. *Id.* at 214–15.
344. Mattioli, *supra* note 172, at 737–40.
345. *Id.* at 740–42.
346. *Id.* at 740.
347. *See infra* Section V.B.2.

Likewise, individual inventors misled by false signals of market success or financial reward may make imprudent investments and expenditures.[348] Invention promotion firms are the starkest example, luring unsophisticated inventors into spending thousands of dollars on useless services.[349] But individual inventors misled by the false signal of financial reward may spend unwarranted money even on legitimate patent attorneys and legitimate patent applications that they otherwise would not. The significant percentage of patents that lack any value (or at least greater value than the cost of acquisition)[350] provides some evidence this is occurring.

Finally, the benefits patent owners can reap from patent signals that mislead ordinary individuals could incentivize patenting when it otherwise would not be warranted.[351] At least some companies seek at least some patents seemingly just to advertise to consumers based on misleading patent signals.[352] The result is overpatenting — patenting activity that exceeds socially optimal levels because it is based only on the private value of the false signals to the owner, not the social value of the contribution to technological progress.[353] In fact, although incidental patent signals are not necessarily misleading in practice, they too contribute to overpatenting since inventors seek patent protection for reasons (e.g., to signal belonging or managerial competence) unrelated to the patent system's goal of technological progress. Overpatenting consumes the Patent Office's resources and reduces the time and effort examiners can give to other applications.[354] Overpatenting also creates patent thickets, requiring licensing of numerous patents on different aspects of the same technology, and raises the difficulty of finding relevant patents and determining freedom to operate or needed licensing.[355]

In sum, when consumers and other ordinary individuals are misled by weak and false patent signals, patented status can create private value for the patent owner. But this private value is a wealth transfer from consumers or the public to patent owners unwarranted by their contributions to technological progress.

348. *See* Rantanen & Jack, *supra* note 57, at 387–88.

349. *See id.*

350. *See supra* Section IV.A.4.

351. Toshihiro Tsuchihashi, *Using Patents in Promotional Activities*, 6 THEORETICAL ECON. LETTERS 907, 914 (2016) (explaining that "firms obtain many *useless* or *insignificant* patents" for promotional purposes not based on "contributions to technological progress and monopoly profit").

352. *See* Mattioli, *supra* note 172, at 738–39; Bartow, *supra* note 54, at 3.

353. *See* Long, *supra* note 46, at 676.

354. *See* Cotropia, *supra* note 121, at 104–05.

355. *Id.* at 105–06.

3. Causes

For the ordinary individuals at the least sophisticated end of the audience spectrum, the cause of the patent signal problem seems relatively straightforward. With the least knowledge and experience of the patent system, this audience is likely to misunderstand the nature of patent examination and patent rights and therefore what patented status does and does not signify.[356] Even if this audience has a rudimentary understanding of patent principles — e.g., the novelty requirement — they likely lack the knowledge and experience to recognize the shortcomings in the patent system that significantly weaken the signals patented status are designed to give.

The mythologizing of patenting in American society exacerbates ordinary individuals' vulnerability to misleading patent signals. In popular discourse, patents and inventions are treated almost as synonyms, linking the "glory of invention" to patents.[357] The Patent Office reinforces the link of invention with patent by expending resources to build the collective mythology of invention, inventors, and patenting.[358] History and popular culture likewise equate invention and patenting.[359] The glorification of invention and linking of invention and patenting promotes the false patent signals of importance, specialness, innovativeness, and government endorsement of the technology or product.

Patent mythologizing also contributes to the false signal of market success and financial reward. As Dennis Crouch explained, "the popular press and blogosphere mask the challenges, impediments, and improbable success faced by a hopeful innovator by heavily focusing on the small minority of patent cases that result in substantial returns."[360] This mythologizing could lead to an "availability heuristic" that "may well increase the perception of the likelihood of future success."[361] While encouraging invention, inventors, and innovation might be socially positive, equating invention and patenting contributes to misleading patent signals, at least for less sophisticated patent audiences.

B. Sophisticated Investors and Executives

At the opposite end of the audience spectrum lies the most sophisticated people who interact with the patent system — large corporate

356. *See* Cotropia, *supra* note 50, at 209 (finding increased patent knowledge leads to more accurate perceptions of patented status).

357. Rantanen & Jack, *supra* note 57, at 340–41.

358. *See USPTO Kids*, USPTO (Oct. 27, 2014, 9:09 AM), https://www.uspto.gov/kids/index.html [https://perma.cc/5YGZ-C6YG].

359. Rantanen & Jack, *supra* note 57, at 341–48.

360. Crouch, *supra* note 237, at 152.

361. *Id.*

executives, serial startup founders, venture capitalists, angel investors, and institutional investors.

1. Scope

Some evidence supports the intuition that the patent signals problem has limited impact on sophisticated investors and executives. Surveys of sophisticated investors and executives often emphasize exclusivity — preventing copying and creating market space — as the importance of patent protection.[362] Exclusivity is a signal that patent protection *should* give. Some respondents also recognize the noise or weakness of the exclusivity signal, indicating that patent protection only enhances the likelihood, but does not guarantee, some period of exclusivity.[363] Some respondents further properly discount the importance of provisional patent applications because of uncertainty about their scope and significance.[364] And some showed recognition that patented status does not equate with the importance or innovativeness of the invention and is not a reliable indicator of likely value or financial success.[365] Perhaps sophisticated actors do properly understand and discount the information patented status conveys, limiting the misleading patent signals problem to less sophisticated audiences.

Yet, the evidence does not permit that conclusion. The importance of patent protection to sophisticated investors is largely unquestioned.[366] Qualitative data shows that patent protection is especially important to the most sophisticated investors — venture capital funds[367] — and that a pending patent application is a virtual prerequisite to getting early stage financing in some industries.[368] Quantitative evidence shows that software startups with patents had better venture capital funding outcomes.[369] And the evidence also indicates that exclusivity and market space are not the driver, or at least primary driver, of sophisticated investors' heavy reliance on patented status. "[E]mpirical research consistently demonstrates that industry participants do not

362. *See* Sichelman & Graham, *supra* note 197, at 114 (finding that "the main motivation for patenting" among startup executives was to prevent copying); Mann, *supra* note 224, at 976 (suggesting that software VCs valued patents to prevent competition and create "sustainable differentiation").

363. *See* Simon, *supra* note 174, at 765.

364. *Id.* at 764.

365. Silbey, *supra* note 72, at 457, 460.

366. *See* Graham et al., *supra* note 59, at 1306 ("It is widely held that VC investors rely on patents in their investment decisions."); Parchomovsky & Wagner, *supra* note 52, at 18–19 ("It is abundantly clear that firms act as though patents are important."); Burk, *supra* note 51, at 442–43 ("[I]t seems clear as a factual matter that . . . venture capitalists like the firm to hold patents."). *But see* Mann, *supra* note 224, at 977–78 (reporting varying views among software VCs about the importance of patents).

367. Graham et al., *supra* note 59, at 1280.

368. Simon, *supra* note 174, at 764.

369. Mann & Sager, *supra* note 50, at 194, 200–03, 206.

consider patents an effective appropriation mechanism" and believe "the average value of an issued patent is actually quite small."[370] Survey evidence further indicates that sophisticated actors downplay the importance of patents in protecting market space or warding off competition.[371]

The precise reason(s) sophisticated investors rely so heavily on patented status remains a mystery.[372] Sophisticated investors' perceptions of patented status is varied, complex, unclear, and even contradictory.[373] The information value of patented status to sophisticated actors seems to vary between industries,[374] development stage of the company,[375] and individual investor strategies.[376] But sophisticated actors in surveys and interviews commonly mention false patent signals to explain their reliance on patented status, including business prosperity and financial worth;[377] the promise of enhanced value from licensing reviews or selling the asset if the company fails;[378] and the innovativeness of the company or technology.[379] Even the weight sophisticated actors sometimes put on patented status to protect against competition suggests overreliance on the weak exclusivity signal, at least among those who do not also acknowledge its shortcomings.[380] Sophisticated actors also frequently mention patents as signaling management competence and sophistication,[381] relying on one of the incidental patent signals.

Logic and some evidence suggest misleading patent signals should have minimal impact on the most sophisticated patent audiences — corporations, venture capitalists and angel investors, experienced

370. Parchomovsky & Wagner, *supra* note 52, at 14.

371. *See* Silbey, *supra* note 72, at 461 ("[I]nterviewees spoke less about this particular promise of patents protecting a coveted market position . . . ."); Mann, *supra* note 224, at 978–80 (reporting that software VCs viewed patents as insufficient to prevent competition from closely related products).

372. Burk, *supra* note 51, at 442–43; *see also* Graham et al., *supra* note 59, at 1306 (describing why VCs "rely on patents in their investment decisions" as "unclear"); Parchomovsky & Wagner, *supra* note 52, at 18–19 (noting that the reasons are unclear why firms put such emphasis on patents).

373. *See* Silbey, *supra* note 72, at 476 (describing how interviewees "perceive patents as functioning in various and contradictory ways"); Mann, *supra* note 224, at 977 (recognizing software VCs had differing and conflicting views about importance of patents).

374. Graham & Sichelman, *supra* note 45, at 158–61.

375. *See* Simon, *supra* note 174, at 782 (noting differences between companies seeking early-stage financing and those in commercialization phase); *see also* Mann, *supra* note 224, at 997–98 (noting differences between early-stage and later-stage companies).

376. *See* Mann, *supra* note 224, at 978 (concluding that software VCs' varying views about patents reflected "different investment models based on their particular expertise").

377. Silbey, *supra* note 72, at 459; *see also* Mann, *supra* note 224, at 996 (noting software developers' view that patents' primary value is looking good to investors).

378. Simon, *supra* note 174, at 763; *see also* Silbey, *supra* note 72, at 468.

379. Simon, *supra* note 174, at 765.

380. *See supra* note 362 and accompanying text.

381. Simon, *supra* note 174, at 763; Silbey, *supra* note 72, at 461; Mann, *supra* note 224, at 993–94.

startup executives, etc. Yet, the weight of the evidence, though ambiguous, suggests that at least some sophisticated actors in some circumstances overvalue weak patent signals and/or are vulnerable to false patent signals.

2. Costs

The patent signals literature focuses on the benefits of patent signaling to sophisticated parties, contending that it creates private value for the patent owner distinct from exclusivity and reduces information asymmetries in capital markets.[382] If sophisticated audiences properly understand patented status and properly discount for the shortcomings in the patent system, then the benefits of patent signaling — value for patent owners and reduction of information asymmetries — are overstated since patented status should convey only limited information and do even that weakly.[383]

Conversely, to the extent sophisticated actors are misled by weak and false patent signals, the signaling effect undoubtedly creates private value for the patent owner but is socially problematic because the value comes from a misunderstanding or overvaluing of patented status, not the patent owner's contributions to technological progress. The result is an unwarranted wealth transfer from the investor to the patent owner, similar to that potentially suffered by consumers, retail investors, and other ordinary individuals. Even for those unbothered by losses to sophisticated investors, misleading patent signals could cause sophisticated investors to redirect capital to the patent owner that would have gone to alternative companies or ventures (whether competitors or completely separate endeavors). This misdirection of capital not only harms the other companies and ventures but could harm innovation and social welfare if those alternative firms had more innovative research or higher quality products stifled by capital shortages.

As with ordinary individuals, the unwarranted private value created when patented status misleads sophisticated actors could lead to overpatenting.[384] Anecdotal and qualitative evidence suggests that companies do sometimes obtain patents just to have something to show investors or because technology companies are expected to do so, which could reflect an effort to capitalize on misleading patent signals.[385] Beyond the harms already discussed, overpatenting in this context imposes costs on startups themselves, which feel obligated to

382. *See supra* Section II.A.
383. *See supra* Sections III.A–B.
384. *See supra* Section V.A.2.
385. *See* Silbey, *supra* note 72, at 459–60; Burk, *supra* note 51, at 442.

obtain patents they would otherwise not pursue to appease investors.[386] This redirects firm resources from other, more productive uses and creates a costly barrier entrepreneurs must overcome to be successful.[387]

3. Causes

The key reasons why ordinary individuals are misled by patented status — lack of knowledge and experience and patent mythologizing — seem less relevant to sophisticated investors and executives. Repeated interactions with the patent system give these audiences knowledge and experience with the realities of patent protection.[388] Additionally, their access to lawyers, technological advisors, economists, etc., necessitates less reliance on proxies such as quality, innovativeness, and likely market success.[389] These advisors can also correct misapprehensions about what patented status does and does not signify.[390]

Yet, at least some sophisticated investors and executives seem vulnerable to at least some misleading patent signals in at least some circumstances. Though business savvy, perhaps these investors and executives do not have the level of patent sophistication, even with expert advice, to be completely immune from the pervasive misunderstandings of patented status. For example, only in the last twenty years have patent scholars fully appreciated the structural and practical shortcomings in patent examination.[391] Perhaps there is a lag before even sophisticated audiences have this same level of recognition. Similarly, the mythologizing of patenting is strong, and it could affect sophisticated actors despite their experience, knowledge, and advisors.[392] The pervasiveness of false patent signals of quality, superiority, innovativeness, value, or likely financial success may have caused them to

386. *See* Long, *supra* note 46, at 635 (explaining that inventors may seek patents not warranted by exclusivity because of signaling value).

387. *See* Mann, *supra* note 224, at 982 (noting that patenting diverts time, focus, and resources for software startups).

388. *See* Graham et al., *supra* note 59, at 1304–05 (recounting VC explanation that they do not just rely on patented status but fully scrutinize and "dig very deeply into the validity of that IP").

389. *See* Anderson, *supra* note 56, at 1596 (noting that VCs can "have the patents outsourced to a third party who can advise them on the technology"); Mann, *supra* note 224, at 984 (noting that VCs have qualified lawyers to evaluate technical merits and potential market power of patents); *see also* Burk, *supra* note 51, at 427 (noting "evidence that investors look to more immediate signals of firm competence" than patents).

390. *See* Simon, *supra* note 174, at 764–65 (describing medical device investors carefully reviewing patent prosecution, giving weight to issuances and office actions, discounting provisional applications, and evaluating whether claims will survive prior art challenges).

391. *See* Stephen Yelderman, *Improving Patent Quality with Applicant Incentives*, 28 HARV. J.L. & TECH. 77, 78 (2014) (describing how "[o]ver the last decade, legal scholars from every corner have come forward to decry" the deficiencies in patent examination).

392. *See* Burk, *supra* note 51, at 427–29 (suggesting that sophisticated corporate and other institutions are not immune from patent myths).

become part of the ethos of the patent system in a way that misleads even sophisticated actors.

Alternatively, even sophisticated actors who should know enough, have enough experience, and/or have access to advisors to avoid being misled may still choose to rely on patents as a proxy for things like quality, innovativeness, and likely financial success. Observers have noted how venture capitalists overly rely on proxies, rather than their own thorough due diligence, due to the costs of due diligence, lack of expertise to evaluate specific businesses, and the fear that excessive probing will cost them the investment opportunity.[393] Patented status may be such a proxy. Or reliance on patented status may simply result from the herd mentality seen as pervading the venture capital sector.[394] Sophisticated actors may use patented status as an unwarranted proxy simply because — due to the pervasiveness of false signals, the mythologizing of patenting, etc. — everyone else does.

Relatedly, Dan Burk's invocation of new institutionalist theory suggests organizations obtain patents to comply with social norms and prevalent narratives of what innovation, competition, and success look like — to show "that the firm is behaving as it ought" for a firm that is "technologically progressive and innovative, worthy of the trust that investment or employment entails."[395] Under this theory, investors "look for patents as a marker of innovation because patents are what innovative firms are supposed to have" since "patents embody a social trope of innovation that is pervasive throughout the field."[396] Thus, sophisticated actors might treat patented status as correlating with innovation, technological specialness, or financial promise because that is the socially accepted meaning of patents.[397] Indeed, some survey evidence indicates that even investors do not know why patented status is so important to them other than being a tangible manifestation of a more general hope or promise[398] and that companies obtain patent protection even in the absence of value just because that is what is expected of them by venture capitalists.[399]

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393. *Why Venture Capital Due Diligence Fails*, VC FACTORY, https://thevcfactory.com/why-venture-capital-due-diligence-fails-video/ [https://perma.cc/UYT4-GLEQ].

394. *See* Julian Teicke, *Lessons Learned From Studying The Herd Mentality Of Venture Capitalists*, FORBES (Aug. 19, 2023), https://www.forbes.com/sites/julianteicke/2023/08/19/lessons-learned-from-studying-the-herd-mentality-of-venture-capitalists/ [https://perma.cc/A8SQ-235B].

395. Burk, *supra* note 51, at 442.

396. *Id.* at 443.

397. *See id.* at 442 (describing patents as a token signaling compliance with "the pervasive narrative of innovation, of competence, of competitiveness.").

398. Silbey, *supra* note 72, at 460–61.

399. Mann, *supra* note 224, at 996.

C. The Varied Middle

Between the poles of regular people and sophisticated actors lies a varied middle of people who interact with the patent system. Some consumers, inventors, or employees might have more patent knowledge and experience and therefore might be more sophisticated than average. Many businesses or executives — smaller businesses, non-repeat entrepreneurs, executives from less traditionally patent-focused fields, etc. — likely have less patent knowledge and experience than the most sophisticated audiences.

Significantly, the class of investors in technology companies is more diverse than traditional depictions focusing on sophisticated venture capitalists and angel investors.[400] Startups are often funded by loans from commercial banks or by family and friends, who are less knowledgeable and experienced with the patent system.[401] One-third of survey respondents reported that patents were important to friends and family investors, and a quarter to a half reported that they were important to commercial bank financers.[402] Patents also are seen as important in later stage financing through public markets to show "that the company's technology is valuable" because these investors are less likely to carefully evaluate the technology and the market and therefore "tend to rely (less thoughtfully) on the mere existence of patents in the company's portfolio."[403] And the rise of crowdfunding has eroded the distinction between investors and regular people. Though similar to consumers, crowdfunders often are more technologically-savvy than average and view themselves as investors.[404]

This varied middle is likely impacted by misleading patent signals. Even some sophisticated investors are misled, so presumably the middle of the patent audience spectrum is even more vulnerable. This aligns with the limited direct evidence. Mann's software industry interviewees believed that later-stage investors in public markets used patented status as a proxy for the value of the technology, as well as the likelihood of a financial payoff if the company failed.[405] Cotropia's study of crowdfunding found that campaigns highlighting patented or patent-pending status were more likely to meet funding goals, though only the latter was statistically significant.[406]

The costs of misleading patent signals are similar for the middle of the spectrum as for the poles — unwarranted premiums, ill-advised

400. Graham et al., *supra* note 59, at 1304.
401. *Id.* at 1304.
402. *Id.* at 1307.
403. Mann, *supra* note 224, at 995.
404. *See* Cotropia, *supra* note 50, at 195, 214.
405. *See* Mann, *supra* note 224, at 995.
406. Cotropia, *supra* note 50, at 210–14.

expenditures, misdirected investments, and overpatenting. And the causes are similar too — limited patent knowledge and understanding, the mythologizing of patenting, and social norms about patenting. Moreover, the disconnect between the lingo of patent law (known as "patentese") and ordinary English might contribute to the problem for all audiences but especially for this middle audience that knows something about patent law but not enough. Rantanen and Jack suggest that patented status conveys useful information because patent law's "basic criteria are mostly easy to understand and convey."[407] According to Rantanen and Jack, the requirements that "an invention must be novel, it must be useful, and it must be nonobvious . . . are so simple, they can be conveyed in a children's book."[408] But the patent terms "novel," "useful," and "nonobvious" only *seem* simple because those terms also have ordinary meanings in English. The patent law meanings, however, differ from their ordinary meanings. The words "novel" and "useful" ordinarily suggest a degree of accomplishment and importance not reflective of patent law's comparatively low requirements of mere technological distinctness and real-world use.[409] Calling something "nonobvious" in ordinary English also would seem to suggest a degree of importance or genius beyond that required by patent law.

Similarly, ninety percent of Cotropia's survey respondents correctly recognized that a patent is obtained by "fil[ing] for approval from a government agency" and "obtain[ing] approval from a government agency."[410] Once again, ordinary understanding of government examination and approval may suggest a level of rigor, comprehensiveness, and cost-benefit weighing that does not occur. And the ultimate goal of the patent system — technological progress — is well-known but might be conflated with the requirements for individual patents, leading to a misunderstanding that patented status necessarily equates with technological improvement.

VI. ADDRESSING MISLEADING PATENT SIGNALS

This Part addresses the consequences of misleading patent signals. Section VI.A explores the insights for patent law theory, arguing that weak and false signals (and even inadvertent signals) complicate the patent signals theory and raise doubts about patent law's traditional deference to the market. Though the Article's contributions are primarily

407. Rantanen & Jack, *supra* note 57, at 353.

408. *Id.*

409. *See Novel*, DICTIONARY.COM, https://www.dictionary.com/browse/novel [https://perma.cc/DA3F-WULF] (defining novel as including "unusual" and "different from anything seen or known before"); *Useful*, DICTIONARY.COM, https://www.dictionary.com/browse/useful [https://perma.cc/6RJH-98YZ] (defining useful as including "advantageous, helpful, or of good effect").

410. Cotropia, *supra* note 50, at 208.

theoretical, Section VI.B explores practical ways of addressing misleading patent signals. Uncertainty about the scope of the problem counsels against fundamental changes to the patent system on this basis alone. However, two targeted reforms can address the clearest ways in which patent signals mislead audiences: restricting the use of the patent-pending designation and eliminating the Patent Office's contributions to the misleading signals problem.

A. Addressing Misleading Patent Signals in Patent Law Theory

This Article's analysis of patent signals complicates the existing patent signals literature, offering ambiguous support for its descriptive account but questioning the social value of patent signals. More broadly, it raises questions about patent law's well-established reliance on market forces to evaluate the quality, worth, etc. of the invention since market participants, to some extent, rely on patented status for these very same things.

1. Complicating the Signal Theory of Patent Law

The patent signals theory is a straight-forward, descriptive account. Patents serve as signals for investors and others, reducing information asymmetries, creating value for patent owners, and explaining why some firms patent when it would be irrational based on exclusivity alone.[411] Two shortcomings exist in the literature: confusion as to what exactly patents signal and inadequate attention to the theoretical and practical accuracy of the patent signal.[412] In addressing these shortcomings, this Article complicates the patent signals theory, supporting it in some regards and challenging it in others.

Parts III and IV detailed the wide swath of information that patented status can convey — e.g., technological distinctness, exclusivity, quality, superiority, efficacy, safety, innovativeness, financial promise, government endorsement, management sophistication, deterrence, and belonging. Parts IV and V recognized variation in different audiences for patent signals — sophisticated investors, businesspeople, consumers, inventors, peers of the inventor, etc. By comprehensively collecting and cataloging the various types of patent signals and audiences, this Article confirms and deepens the basic descriptive claim that patented status conveys information to observers.

On first glance, Parts III–V confirm the additional descriptive claim that the signaling effect creates private value for patent owners, thereby explaining patenting behavior. Those parts demonstrate that at

411. *See supra* Section II.A.
412. *See supra* Sections II.B–C.

least some audiences in at least some circumstances rely on the various signals identified in Parts III and IV. These signals — whether true, weak, false, or incidental — are positive traits for the patent owner[413] and can create private value for the firm in the form of consumer premiums, additional investments, etc.[414] And some firms seem to obtain patents exactly for the private value created by signaling, not for exclusivity.[415]

Yet, in two distinct ways, this Article creates ambiguity as to the private value of patent signaling. First, the evidence is unclear about the extent to which patent signals impact actual purchase and investment decisions in ways that would create private value.[416] Second, patents are only designed to give a limited amount of information and only do so weakly, while the incidental signals that they are not designed to give but do give in practice only provide a few additional pieces of information.[417] Many of the other patent signals mentioned in the existing literature (quality, superiority, efficacy, safety, innovativeness, R&D success, likely market success, and financial value) are false.

Audiences that recognize the limits, weaknesses, and inaccuracies of patent signals should discount them, undermining the private value that they are supposed to create. Perhaps even properly discounted signals of, for example, technological distinctness and exclusivity are useful in reducing information asymmetries and therefore valuable to patent owners. But the substantial unreliability of these signals seriously undermines their value.[418] In practice, incidental signals of management competence, deterrence, and belonging may constitute most of the informational value of patented status. Perhaps these signals alone are significant enough to conclude that patent signaling creates value for the patent owner. But the strength and scope of such incidental signals is ambiguous.[419] On the other hand, if audiences do *not* recognize or underestimate the weakness or inaccuracy in the patent signals, as some evidence suggests even for sophisticated investors, the private value to patent owners is *greater* than recognized by the existing literature because it includes the additional, unwarranted value generated by weak and false patent signals. Because patent signals should be limited and weak, the greater private value patent owners realize from patent signaling, the more likely patent signals are misleading audiences.

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413. *See* Long, *supra* note 46, at 654.
414. *See supra* Sections V.A.2, IV.B.2.
415. *See supra* Sections V.A.1, IV.B.1.
416. *See supra* Sections V.A.1, IV.B.1.
417. *See supra* Sections III, IV.B.
418. *See supra* Sections III.B–C.
419. *See supra* Sections IV.B.1–2.

The latter possibility — that patent owners obtain unwarranted value from misleading signals — demonstrates the potential negative social costs of patent signals, something that the existing literature either overlooks or downplays by emphasizing how patent signals reduce information asymmetries.[420] True and incidental signals may reduce information asymmetries but only if audiences recognize the limits and weaknesses of the signals and properly discount them. Once discounted, however, it is unclear how significant these signals are for reducing information asymmetries. Patents can instead exacerbate information asymmetries if the relevant audience (consumers, investors, etc.) is misled because of a failure to properly discount limited and weak signals or to recognize false signals. In such cases, the patent owner realizes greater private value but value that is socially problematic because it reflects the complexity and nuance of the patent system and the public's lack of understanding of its limits, not the patent owner's contribution to technological progress.

Ultimately, it is an uncertain empirical question as to what extent patents reduce information asymmetries and to what extent they exacerbate them, one that likely varies across industries, audiences, and investment strategies.[421] Some audiences are likely to be misled by weak and false signals, creating value for the patent owner but at a social cost. Other audiences that properly discount patent signals will glean only limited information from patented status, undermining the supposed benefits of the signaling effect. At best, patent signals have questionable social benefits with definite social costs of unclear scope.

The patent signal theory's major contribution was to broaden the conception of the benefits of patent rights beyond merely exclusivity and monopoly pricing. This Article's major contribution is to broaden the conception of the costs of patent rights beyond merely restricting competition and follow-on innovation to include the ways in which patent audiences can be misled by patented status. Thus, the patent signaling effect does not provide a solid normative basis to justify patent rights.

2. Complicating Patent Law's Deference to the Market

Market deference is a fundamental pillar of the American patent system. The Patent Office merely decides technological distinctness, de minimis utility, and adequate disclosure.[422] The patent system leaves it to the market to evaluate the quality, superiority, specialness, innovativeness, financial worth, etc. of the technologically distinct invention

420. *See supra* Section II.C.
421. *See supra* Part V.
422. *See supra* Section III.A.

disclosed in the patent.[423] But Part IV's identification and cataloging of false patent signals demonstrates that at least some segments of the market rely, to some extent, on patented status to determine quality, superiority, specialness, innovativeness, financial worth, etc. Thus, the patent system defers to the market on the same questions to which the market (somewhat) defers to the patent system, as depicted below:

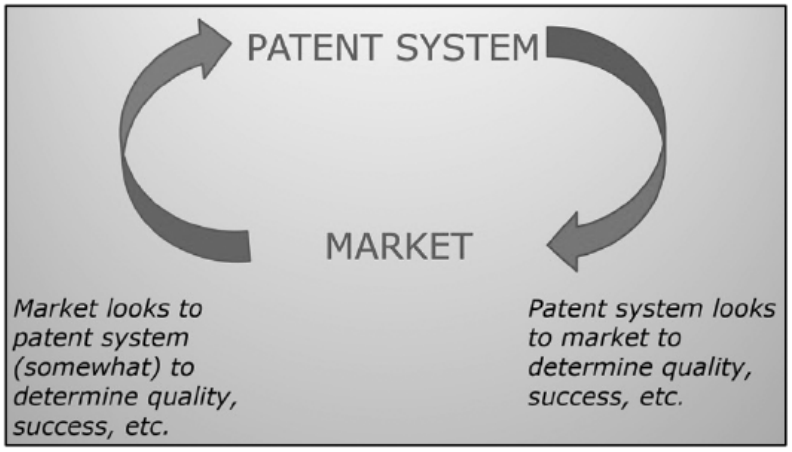

Figure 1: Patent System-Market Feedback Loop

Recognizing that the market, in practice, actually looks to patent protection as an indicator of the same information to which the patent system defers to the market raises questions for patent debates where market deference is central. For example, in debates over whether patents are superior to other forms of innovation incentives, like prizes or direct subsidies,[424] a commonly identified benefit of patents is they allow the market to determine the inventor's financial reward based on the market's determination of usefulness and consumer preferences.[425] This benefit depends on the premise that "consumers do not pay more for innovations than their value to them."[426] However, this Article shows that consumers may be relying, to some extent, on patented status itself, and the perceived government endorsement it conveys, to determine value and usefulness, rather than making their own independent judgments. If so, the supposed market-based benefits of the patent incentive are less compelling. Relatedly, a supposed downside of prizes and subsidies is that they require a difficult, and likely

423. *See* Roin, *supra* note 235, at 1027–29; *see also* Price, *supra* note 44, at 772, 826.

424. *See generally* Daniel J. Hemel & Lisa Larrimore Ouellette, *Beyond the Patents-Prizes Debate*, 92 TEX. L. REV. 303 (2013) (providing overview of debate).

425. Roin, *supra* note 235, at 1027–29.

426. *Id.* at 1028.

inaccurate, government evaluation of social value and likely consumer demand.[427] But a direct governmental evaluation of these questions, however complicated and imprecise, seems more reliable than the false signals of quality and value already conveyed by patented status.

Furthermore, the government takes a laissez-faire approach to patent rights, with the Patent Office granting patents based just on technological requirements, without any discretion or policy-based considerations, and the government not regulating (for the most part) use of patent rights after issuance.[428] The laissez-faire approach is longstanding and seen as fundamental to the patent system, with departures sparking significant opposition.[429] Perhaps for this reason, the government rarely uses the limited powers it has to directly regulate patent rights.[430] But if patent rights, in practice, indicate quality, importance, or government endorsement, perhaps the Patent Office (or another government agency) should evaluate these issues pre-issuance to enhance the accuracy of the signals conveyed. Or perhaps the government should better regulate post-issuance use of patent rights, given that the public relies, to some extent, on the false signal of government endorsement.

This is not to take any position about patents versus prizes or the laissez-faire approach to patent rights. This Article's more limited intervention is to flag that false patent signals require reconsideration of the unthinking adherence to the market deference narrative in patent discourse.

B. Addressing Misleading Patent Signals in Patent Law Practice

This Article's primary contribution is to patent law theory. The ambiguity as to the scope of the problem counsels caution regarding practical reforms. However, this Article's identification and analysis of misleading patent signals offers three important practical insights.

First, a lively debate exists regarding the proper rigor of patent examination. Twenty years ago, Mark Lemley influentially argued that the Patent Office's relatively cursory initial examination was rationally ignorant because it was more efficient to save more rigorous evaluation for ex post litigation or Patent Office cancellation procedures, given the small number of patents that are ever litigated or licensed in a way that

427. *Id.* at 1034–35.

428. *See* Reilly, *supra* note 108, at 222. *But see* Laura E. Dolbow, *Public Patent Powers*, 123 MICH. L. REV. (forthcoming 2024) (manuscript at 5, 48–49) (on file with author) (identifying numerous statutory provisions by which the government could control "who can access patented technology and how patent holders can exercise their rights to exclude" but also noting limited use of the most direct forms of regulation).

429. *See* Reilly, *supra* note 108, at 222–31.

430. *See* Dolbow, *supra* note 428, at 48–49.

makes their validity relevant.[431] More recently, Melissa Wasserman and Michael Frakes used sophisticated empirical evidence and analysis in place of some of Lemley's assumptions to show that the benefits of improving the rigor of examination (in terms of examiner time) outweigh its costs, making the Patent Office irrationally ignorant.[432]

The patent signal problem points in opposite directions regarding examination. The weak signal problem seems to support Wasserman and Frakes. An additional cost of the Patent Office's cursory examination not raised by Wasserman and Frakes is that it weakens the signals patents should convey, potentially misleading audiences. On the other hand, more rigorous examination will not help with false patent signals, since they relate to issues (quality, innovativeness, safety, etc.) not covered by examination. If anything, more rigorous examination could strengthen false signals of government endorsement, quality, innovativeness, etc. if the public understands these to be subject to more rigorous examination. Thus, misleading patent signals do not support any strong conclusions about the rigor of patent examination, given these conflicting lessons and the ambiguous scope of misleading patent signals.

Second, presumably inadvertently, the Patent Office explicitly or implicitly reinforces several of the false patent signals. For example, the Patent Office's website identifies a benefit of provisional patent applications as "allowing the term 'Patent Pending' to be applied in connection with the description of the invention."[433] Yet, the patent-pending status, especially due to a provisional application, provides virtually no useful information and primarily serves to mislead.[434] The Patent Office also frequently endorses the false signal that patented status leads to market success and financial reward. Targeted at inventors, its "Patent essentials" page contends that "[t]hrough the protection provided by patents, American industry has prospered."[435] The Patent Office similarly advertised its "Invention-Con" event by emphasizing "us[ing] intellectual property (IP) to achieve success."[436] Finally, the Patent Office frequently reinforces the false signal that equates patents with importance, superiority, and innovativeness. Its "Patent essentials" page contends that "[t]he continued demand for patents shows the

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431. Lemley, *supra* note 184, at 1497.

432. Frakes & Wasserman, *supra* note 116, at 980–81.

433. *Provisional*, *supra* note 262. Another page does correctly explain that patent-pending has "no legal effect, but only inform[s] the public that a patent application has been filed." *Managing a Patent,* USPTO, https://www.uspto.gov/patents/basics/manage#rights [https://perma.cc/H24Y-DWKJ].

434. *See supra* Section IV.A.6.

435. *Patent Essentials*, USPTO, https://www.uspto.gov/patents/basics/essentials [https://perma.cc/7DEJ-ELZ5] [hereinafter *Patent Essentials*].

436. *Invention-Con 2023: Building Tomorrow's Innovation*, USPTO, https://www.uspto.gov/about-us/events/invention-con-2023-building-tomorrows-innovation [https://perma.cc/Y9FU-Y8MD].

ingenious spirit of you and fellow inventors."[437] The National Inventors Hall of Fame, of which the Patent Office is the principal partner/sponsor and physical home, describes itself as telling "stories of *ingenuity* and *intellectual property*."[438]

These Patent Office marketing efforts are not harmless puffery. At a specific level, they reinforce and encourage some of the false patent signals. At a more general level, they serve to mythologize patenting, a partial cause of misleading patent signals.[439] Careful Patent Office review and editing of its materials to avoid misleading audiences as to the significance of patented status is a low cost, easily implemented practical reform to help protect, at least a little, patent audiences from being misled.

Third, misleading patent signals seem most problematic for consumers and other less sophisticated audiences.[440] This suggests a general need for greater education and protection of consumers and regular people within the patent system. Consumer advertising that relies on patented status is particularly problematic since any persuasiveness it has is based on false patent signals.[441] To be sure, marking a product "patented" is a statutorily-endorsed means of providing the notice to competitors necessary for them to avoid infringement, notice which is a prerequisite to recovering infringement damages.[442] And the First Amendment protects advertising that truthfully states that a product is patented.[443] However, Michael Mattioli recently proposed ways to make it easier to restrict advertisements that go beyond mere marking or truthful statements about patenting and instead falsely suggest government endorsement of safety and efficacy.[444] This Article provides support for Mattioli's proposal and suggests it should be broadened in two ways. First, Mattioli's proposal should be expanded to include advertising that relies on false signals other than government endorsement, like quality, superiority, and financial value. Second, Mattioli's proposal should be broadened to include the use of the term "patent-pending," which is just as misleading to consumers, and perhaps more so, as "patented."[445]

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437. *Patent Essentials*, *supra* note 435.

438. *Annual Report*, NATIONAL INVENTORS HALL OF FAME (2022), https://www.invent.org/sites/default/files/2023-05/2022-Annual-Report.pdf [https://perma.cc/N43N-X52K] (first emphasis in original; second emphasis added).

439. *See supra* Section V.A.3.

440. *See supra* Section V.A.

441. *See supra* Section II.C.

442. 35 U.S.C. § 287; *see* Winston, *supra* note 242, at 119–20.

443. *See* Mattioli, *supra* note 177, at 719–721.

444. *Id.* at 744–751.

445. *See* Cotropia, *supra* note 50, at 195, 225–26.

VII. CONCLUSION

The patent signals literature introduced to patent debates the important insight that patent rights do not just provide exclusivity and the ability to charge supercompetitive prices but also convey information to the audiences that engage with patent rights. But that literature has remained underdeveloped, narrowly focusing on some information signals and audiences and providing descriptive accounts that ignore or downplay normative implications. By collecting, cataloging, and evaluating the theoretical and practical accuracy of the various types of information conveyed by patented status to various audiences, this Article deepens and complicates the patent signals theory. Although patents should only convey limited information, and do so only weakly in practice, at least some audiences overestimate the reliability of patent signals and, more problematically, treat patents as false signals of information to which they do not correlate.

The exact scope and impact of these misleading patent signals is unclear, both in the types of audiences affected and the degree of impact on actual decision making. This ambiguity prevents recommending major changes to the patent system. Yet, misleading patent signals are important to theoretical debates in patent law, both regarding the patent signal theory itself and the broader deference to markets that permeates the patent system. Most importantly, the problem of weak and false patent signals undermines the normative desirability of the patent signaling effect, suggesting that signaling does not provide an independent social justification for the patent system. That justification must instead rest on its traditional basis — exclusivity and the resulting innovation incentives. Recognition of misleading patent signals also requires the Patent Office to exercise caution in marketing the patent system, lest it reinforce misleading signals. Finally, it counsels greater education and protection of consumers and other ordinary individuals who interact with patents, including restricting misleading use of patented and patent-pending status in advertising.