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Incentivizing the Ordinary User

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INCENTIVIZING THE ORDINARY USER

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Abstract

Disputes regarding the effectiveness of the patent system focus on the appropriate scope of patent rights. This Article departs from the traditional debate and looks instead at the players regulated by the patent system. This Article shows that the patent system fails to effectively encourage technological dissemination because it focuses on the patent owner and his competitors but largely ignores a crucial player: the ordinary user.

The user, in his everyday decisions of whether to adopt a technology, plays a critical role in determining whether a new technology will be disseminated. Yet patent law contains an overly simplistic view of the ordinary user. It views the ordinary user as motivated only by price and availability. This Article uncovers the intricacy of ordinary users' technological adoption decisions. It identifies two principle factors that influence user resistance to new technology: novelty and perceived consequences.

Many believe that the market rule should govern the adoption process of new technologies, that is, the market should decide which technologies society adopts. Yet this rule fails to recognize the variety of factors that influence the ordinary user. This Article proposes that while government action to encourage user adoption should not be the norm, government action that gently nudges the user could prove particularly effective in cases of market failures. In conclusion, this Article suggests two instances in which government action is particularly warranted: first, when market failure occurs because a technology is dependent on network effects and the accumulation of a critical mass of users; second, when there is a critical need to disseminate a technology quickly.

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INTRODUCTION

Critics of the patent system argue that it fails to achieve its goal of advancing progress. They argue that it fails to advance progress through the promotion of innovation and dissemination because Congress and the courts have overly expanded patent owners' rights.[1] This Article focuses

1. While most scholarship focuses on the effects of strong patent rights on innovation, some scholars argue that strong patent rights inhibit dissemination. For scholarship on the effect of strong

on the dissemination of new technologies—their social adoption process. It offers a novel outlook on patent law's failure to effectively encourage the dissemination of new technologies.[2] Instead of focusing on the strength of patent rights, it points to the patent system's neglect of an important class of players which has a critical influence on technological dissemination. The patent system focuses on the patent owner and his competitors while it largely fails to acknowledge the significant role of the ordinary user—even the couch potato—in his important everyday decisions to adopt or not adopt a new technology.[3]

User decisions determine the fate of many technologies. For example, electronic book readers, such as the Kindle and the Nook, currently flood our markets. Users of electronic readers can instantaneously purchase and carry with them a practically unlimited number of weightless books that users can easily read off the device's screen. Yet many potential users refuse to purchase electronic readers—they prefer the comfort of the old-fashioned paper book and lament a world of bare library walls no longer adorned by books.[4] Similarly, handwritten health records in hospitals and physicians' offices can now be replaced with electronic records that

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patent rights on innovation, see generally Michael A. Heller & Rebecca S. Eisenberg, *Can Patents Deter Innovation? The Anticommons in Biomedical Research*, 280 SCIENCE 698 (1998) (describing the detrimental effect of strong patent rights on downstream scientific discoveries); Arti K. Rai & Rebecca S. Eisenberg, *Bayh-Dole Reform and the Progress of Biomedicine*, 66 LAW & CONTEMP. PROBS. 289 (2003) (discussing the detrimental effects of university-owned patents on scientific research). For scholarship on the effect of strong patent rights on dissemination, see generally Gaia Bernstein, *In the Shadow of Innovation*, 31 CARDOZO L. REV. 2257, 2292–301 (2010) (discussing the effects of strong patent rights on the dissemination of genetic testing); Jeanne C. Fromer, *The Layers of Obviousness in Patent Law*, 22 HARV. J.L. & TECH. 75 (2008) (discussing the importance of looking beyond conception in the context of the nonobviousness analysis).

2. The goal of this Article is not to replace the traditional insights regarding the impact of the scope of patent rights on the effectiveness of the patent system. Instead, the objective of the Article is to shed additional light on the problems that underlie the effectiveness of the patent system and expand the existent discourse.

3. Few scholars address the importance of the social acceptance of a technology by the users. For exceptions, see generally Gaia Bernstein, *The Socio-Legal Acceptance of New Technologies: A Close Look at Artificial Insemination*, 77 WASH. L. REV. 1035 (2002) (discussing the historical acceptance process of the technology of artificial insemination); Erik Lillquist & Sarah E. Waldeck, *Government Action in Emerging Networked Technologies*, 87 OR. L. REV. 581 (2008) (discussing the social acceptance process of electronic payments).

4. *See* LEE RAINIE, PEW INTERNET AM. & LIFE PROJECT, TABLET AND E-BOOK READER OWNERSHIP NEARLY DOUBLE OVER THE HOLIDAY GIFT-GIVING PERIOD 2 (2012), *available at* http://libraries.pewinternet.org/files/legacy-pdf/Pew_Tablets%20and%20e-readers%20double%201.23.2012.pdf (showing that although the rate of e-reader ownership is rising steadily, as of 2012, the majority of the U.S. population still does not own e-readers); *see also* Shantella Y. Sherman & James Wright, *eBooks Come of Age*, WASH. INFORMER (Sept. 1, 2010), http://washingtoninformer.com/news/2010/sep/01/ebooks-come-of-age (discussing concerns regarding the demise of books and libraries).

centralize all available records about a patient and reduce errors caused by illegible handwriting and missing information. Yet some of the systems' users—medical professionals who are unfamiliar with the novel technology—resist. They claim that the entry of information into the system detracts from their ability to focus on their medical duties.[5] In both cases, it is neither the patent owner nor the competitors who are responsible for the extent of dissemination of the technologies. Instead, regular everyday users are the ones who play this vital role.

This Article begins by examining the patent system's tools that are designed to promote the dissemination of inventions once they enter the market. It examines two doctrines—compulsory licensing and patent misuse—and demonstrates that both doctrines focus on the patent owner and his competitors to indirectly nudge the user. Misconduct of the patent owner can trigger both doctrines, which then look to the patent owner's competitors to facilitate dissemination as they increase production and reduce prices. In essence, these doctrines treat competition as a proxy for dissemination; they assume that if price is reduced and availability increased, innovations will attain increased user adoption.[6]

Patent law focuses on the patent owner and his competitors because it contains a simplistic view of the user as motivated by only price and availability. This Article uncovers a more nuanced view of the ordinary user by providing a taxonomy of reasons for user resistance to adopting new technologies. It identifies two main sources of user resistance to new technology: novelty and perceived consequences of adopting the technology. Users who resist a technology due to its novelty may resist the novelty of the hardware, as in the case of electronic book readers, or they may resist the novelty of the technology's complexity. At the same time, users may resist a technology due to perceived economic consequences of the technology, such as employees' fears of being replaced by technology; owners' reluctance to lose investments in older technologies; and the unattractiveness of a technology that has yet to achieve a critical mass of users. Users may also fear noneconomic adverse effects, such as fear of genetically modified food because of potential effects on personal health or the environment. Finally, they may resist a technology because they view it as a threat to their moral or religious values, such as the fear that human cloning will impact the uniqueness of human identity.[7]

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5. *See* 42 U.S.C.A. § 300jj-11 (2012) (listing the goals of electronic health records); Milt Freudenheim, *Many Hospitals Resist Computerized Patient Care*, N.Y. TIMES, Apr. 6, 2004, at C1 (describing resistance among physicians to use electronic health records systems); Sharona Hoffman & Andy Podgurski, *Finding a Cure: The Case for Regulation and Oversight of Electronic Health Record Systems*, 22 HARV. J.L. & TECH. 103, 112–19 (2008) (describing the benefits of electronic health record systems).

6. *See infra* Part I.

7. *See infra* Part II.

While the law regulates the invention of new technologies through the patent system, the prevailing view is that the market efficiently determines which technologies society eventually adopts. Yet relying solely on market governance to control the adoption of new technologies is problematic. First of all, reliance on market governance can carry grave costs. History is replete with adoptions of important and eventually successful technologies that society resisted or delayed for decades and even centuries. Secondly, the belief that the market alone determines the fate of new technologies is, in fact, unfounded. The government, on all levels, regularly intervenes in many subtle and some unsubtle ways to encourage users to adopt new technologies.[8]

The technology-regulating regime is charged with the promotion of progress.[9] Yet patent law, which focuses on innovation and encouraging competition, executes only part of this mission through rules enforcing compulsory licensing and patent misuse remedies. This Article underscores the need for broader, systematic thinking and coordination of the technology-regulating regime to directly encourage user adoption of patented and unpatented technologies alike.[10] The goal of this Article is not to set a norm of government action. In fact, some technologies are unsuccessful inventions that users legitimately resist.[11] Yet governmental action to promote user adoption is already taking place on a broad scale through Congress, federal agencies, and state and local governments. Presently, though, these efforts are piecemeal, uncoordinated, and inconsistent.[12]

While it does not focus on institutional design, this Article builds on the important work done by Professors Stuart Benjamin and Arti Rai, who propose an "Office of Innovation Policy" to coordinate government

8. *See infra* Part III.

9. *See* U.S. CONST. art. I, § 8, cl. 8.

10. The assumption that underlies this project is that technological innovation is a primary contributor to long-term well-being. Specifically, this Article relies on writings that describe how biological and agricultural innovations decrease disease and hunger and contribute to health; how innovations in communications and information technologies contribute to educational, political, and social development; and how innovation generally propels economic growth, which contributes to increased and more egalitarian well-being. *See generally* Stuart Minor Benjamin & Arti K. Rai, *Fixing Innovation Policy: A Structural Perspective*, 77 GEO. WASH. L. REV. 1, 8 n.24 (2008) (reviewing literature on the topic). For literature that focuses on technological diffusion and adoption—as opposed to just invention—as means for the promotion of human progress, see THOMAS R. DEGREGORI, A THEORY OF TECHNOLOGY: CONTINUITY AND CHANGE IN HUMAN DEVELOPMENT xi–xiii (1985) and JOEL MOKYR, THE LEVER OF RICHES: TECHNOLOGICAL CREATIVITY AND ECONOMIC PROGRESS 10–11 (1990).

11. *See, e.g.*, Dan Tynan, *The 25 Worst Tech Products of All Time*, PCWORLD (May 26, 2006), http://www.pcworld.com/article/125772/the_25_worst_tech_products_of_all_time.html (describing the reasons for the failure of twenty-five technology products).

12. *See infra* Section III.B.

agencies' decision-making regarding innovation.[13] The articulation and enforcement of guidelines to promote user adoption through the type of agency proposed by Benjamin and Rai could improve the coherency and consistency of government policies. Such guidelines could identify when governmental action to encourage user adoption is particularly warranted or when it may be unnecessary, and could lay out effective action modes.

Opponents of government action to encourage user adoption point to the difficult process of selecting winning technologies. They caution that the government is likely to err and encourage the adoption of mediocre technologies, perhaps even at the expense of superior ones. To address this concern, this Article proposes that the government should limit its action to gentle nudges to encourage user adoption. Government should not be coercive and mandate the adoption of a particular new technology, making it the only viable option. Furthermore, this Article proposes that government action should be limited only to new classes of technology, which is where user resistance is most likely to occur, and should not advance one competing technology over another.[14]

Finally, this Article argues that although market forces can overcome some instances of user resistance, government action is particularly warranted in cases of market failure. This inquiry takes the first step to indicate the usefulness of systematic thought about government action to encourage user adoption. To do so, it identifies cases in which government action is particularly warranted, and through that it sheds light on where such action may not be necessary and the market may be better suited to overcome user resistance. This Article highlights two instances of market failure that could warrant government action. These scenarios are not meant to be an exhaustive list. The first scenario is where a technology is characterized by network effects and requires the attainment of critical mass to achieve widespread adoption. The second scenario involves cases of urgency—where time is of the essence.[15]

This Article proceeds as follows: Part I examines post-market-entry patent law doctrines to reveal patent law's overly simplistic view of the players who influence technological dissemination. Part II highlights the important role of the user's everyday technological adoption decisions and provides a taxonomy of causes for user resistance. Part III reveals the risks of sole reliance on market governance for the adoption of new technologies. Part IV highlights the need for an institutional actor to articulate and enforce systematic guidelines for identifying when

13. STUART MINOR BENJAMIN & ARTI K. RAI, THE INFO. TECH. & INNOVATION FOUND., STRUCTURING U.S. INNOVATION POLICY: CREATING A WHITE HOUSE OFFICE OF INNOVATION POLICY 2 (2009).

14. *See infra* Section IV.B.

15. *See infra* Part V.

encouragement of user adoption through gentle nudges is warranted. Part V highlights two instances of market failure in which action to encourage user adoption would be warranted.

I. THE PATENT SYSTEM'S ROLE POST-MARKET ENTRY

Scholars, judges, and litigants generally agree that patent law is charged with the promotion of progress through advancement of both innovation and dissemination.[16] Yet the parties disagree as to whether the patent system executes its mission effectively.[17]

Critics of the patent system focus on the effect of strong patent rights on innovation and argue that broad patent rights impede subsequent innovation.[18] It appears that the focus on innovation may have obstructed a careful examination of the patent system's treatment of dissemination. Far fewer critics focus on dissemination and those who do so generally extend the innovation prism to criticize the patent system's effect on dissemination. Specifically, they argue that strong patent owner rights enable patent owners to increase prices beyond the threshold intended for patent monopoly, and thereby unjustifiably restrict public access.[19]

This Part sheds light on the patent system's failure to effectively promote dissemination, and shows that patent law cannot execute its mission because it fails to adequately account for all the players who

16. For discussions of innovation and progress, see Bernstein, *supra* note 1, at 2264–68 (describing how academics, legislators, and courts celebrate innovation as the promoter of progress). For discussions of dissemination and progress, see generally Margaret Chon, *Intellectual Property and the Development Divide*, 27 CARDOZO L. REV. 2821 (2006); Thomas F. Cotter, *Memes and Copyright*, 80 TUL. L. REV. 331 (2005).

17. *See, e.g.*, James Langenfeld & Wenqing Li, *Intellectual Property and Agreements to Settle Patent Disputes: The Case of Settlement Agreements with Payments from Branded to Generic Drug Manufacturers*, 70 ANTITRUST L.J. 777, 778 (2003) (arguing that strong patent rights promote innovation in drug development); Arti K. Rai, *Fostering Cumulative Innovation in the Biopharmaceutical Industry: The Role of Patents and Antitrust*, 16 BERKELEY TECH. L.J. 813, 822–23 (2001) (discussing the role of patent law and antitrust law in encouraging innovation, focusing on upstream research products).

18. *See generally* Yochai Benkler, *Coase's Penguin, or Linux and the Nature of the Firm*, 112 YALE L.J. 369 (2002) (describing successful peer production on the Internet in the absence of intellectual property rights); Heller & Eisenberg, *supra* note 1 (describing the detrimental effects of strong patent rights on downstream scientific discoveries); Rai & Eisenberg, *supra* note 1 (discussing the detrimental effects of university patenting on scientific research). *See also* Rochelle Cooper Dreyfuss, *Does IP Need IP? Accommodating Intellectual Production Outside the Intellectual Property Paradigm*, 31 CARDOZO L. REV. 1437 (2010) (discussing the limits to creative production outside the intellectual property paradigm).

19. *See, e.g.*, Cynthia M. Ho, *Current Controversies Concerning Patent Rights and Public Health in a World of International Norms*, *in* PATENT LAW AND THEORY: A HANDBOOK OF CONTEMPORARY RESEARCH 673, 673 (Toshiko Takenaka ed., 2008); Amy Kapczynski, *Harmonization and Its Discontents: A Case Study of TRIPS Implementation in India's Pharmaceutical Sector*, 97 CALIF. L. REV. 1571, 1580–81 (2009).

influence technological dissemination. Patent law doctrines focus on the patent owner and his competitors but largely ignore the crucial role of the ordinary user. In essence, patent law treats competition as a proxy for dissemination, assuming that once the price barrier is eliminated through competition, dissemination will be accomplished.

Many patent law doctrines are designed to achieve a balance between incentivizing the patent owner and promoting the general public welfare by encouraging the dissemination of new technologies.[20] Yet the doctrines that directly affect dissemination are those that regulate the invention after it enters the market. This Part examines two doctrines that apply to the invention after its market entry: compulsory licensing and patent misuse. It will show that both doctrines focus on the actions of the patent owner and his competitors, aiming only indirectly to nudge the ordinary user's decision-making through the reduction of price. Both doctrines treat competition as a proxy for dissemination and assume that once the price barrier is removed, then dissemination will occur.

A. *Compulsory Licensing*

Compulsory licensing is intended to encourage dissemination of inventions in the marketplace. Unlike most of patent law, which focuses on the earlier stages of the technological process, compulsory licensing focuses on the dissemination stage and seeks to enhance the use of the technology. Under this doctrine, the government issues a compulsory license that permits a party other than the patent owner to make, use, or sell a patented invention without the patent owner's consent.[21] Compulsory licenses usually, although not always, provide for royalty payments to the patent owner.[22]

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20. For example, the exclusivity period is limited to twenty years to ensure that after a limited period for profit-making, competitors can produce and disseminate the invention more broadly. *See* 35 U.S.C.A. § 154(a)(2) (2012) (stating that the term of the patent shall be for twenty years from application). Similarly, the goal of the disclosure requirement is to release information about the patented invention that competitors can use to disseminate the invention once the patent expires. *Id.* § 112(a) (requiring that a patent application contain a written description enabling any person skilled in the art to make the invention).

21. SUBCOMM. ON PATENTS, TRADEMARKS & COPYRIGHTS OF THE S. COMM. ON THE JUDICIARY, 85TH CONG., AN ECONOMIC REVIEW OF THE PATENT SYSTEM 13 (Comm. Print 1958); NUNO PIRES DE CARVALHO, THE TRIPS REGIME OF PATENT RIGHTS 315 (2d ed. 2005); Colleen Chien, *Cheap Drugs at What Price to Innovation: Does the Compulsory Licensing of Pharmaceuticals Hurt Innovation?*, 18 BERKELEY TECH. L.J. 853, 857–58 (2003); Gianna Julian-Arnold, *International Compulsory Licensing: The Rationales and the Reality*, 33 IDEA: J.L. & TECH. 349, 349 (1993).

22. Chien, *supra* note 21, at 868–69 (stating that the government more rarely issues royalty-free licenses, usually in cases of misconduct).

Generally, there are four cases in which governments issue compulsory licenses:[23] (1) where the patent owner engages in anticompetitive behavior, as in merger cases where otherwise the merged entity would control a large part of the market;[24] (2) when the patent owner does not use the patent;[25] (3) when the invention is needed to serve the public interest, for example, to supply drugs or for purposes of national defense;[26] and (4) when others wish to exploit a dependent patent that cannot be used without infringing another patent.[27]

U.S. law does not include a general provision for compulsory licensing.[28] Yet the United States is a signatory of several treaties that endorse compulsory licensing regimes. These treaties include the Paris Convention for the Protection of Industrial Property,[29] the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS),[30] and the

23. *See* Julian-Arnold, *supra* note 21, at 349–50.

24. Agreement on Trade-Related Aspects of Intellectual Property Rights art. 31(k), Apr. 15, 1994, 1869 U.N.T.S. 299 [hereinafter TRIPS] (providing fewer conditions for the issuance of compulsory licenses when the patent owner engaged in anticompetitive behavior); *see also* Jonathan M. Barnett, *Cultivating the Genetic Commons: Imperfect Patent Protection and the Network Model of Innovation*, 37 SAN DIEGO L. REV. 987, 1044–51 (2000) (describing the issuance of compulsory licenses in merger cases).

25. Paris Convention for the Protection of Industrial Property art. 5, Mar. 20, 1883, 21 U.S.T. 1583 [hereinafter Paris Convention] (authorizing compulsory licenses in cases of nonuse). For a discussion of the issuance of compulsory licenses and patent nonuse, see Kurt M. Saunders, *Patent Nonuse and the Role of Public Interest as a Deterrent to Technology Suppression*, 15 HARV. J.L. & TECH. 389, 434–49 (2002).

26. TRIPS, *supra* note 24, art. 31(b) (allowing the issue of compulsory licenses where the technology is necessary to serve the public interest under certain conditions); *see also* Amy Kapczynski et al., *Addressing Global Health Inequities: An Open Licensing Approach for University Innovations*, 20 BERKELEY TECH. L.J. 1031, 1061–62 (2005) (discussing difficulties faced by developing countries attempting to issue compulsory licenses under TRIPS).

27. TRIPS, *supra* note 24, art. 31(l).

28. Adi Gillat, *Compulsory Licensing to Regulated Licensing: Effects on the Conflict Between Innovation and Access in the Pharmaceutical Industry*, 58 FOOD & DRUG L.J. 711, 712 (2003); Saunders, *supra* note 25, at 439.

29. Paris Convention, *supra* note 25, § 5(a) (allowing the issuance of compulsory licenses); Saunders, *supra* note 25, at 436 (stating that the United States is a signatory of the Paris Convention); Andrew W. Torrance, *Patents to the Rescue - Disasters and Patent Law*, 10 DEPAUL J. HEALTH CARE L. 309, 329–30 (2007) (describing compulsory licensing under the Paris Convention).

30. TRIPS, *supra* note 24, art. 31 (providing the conditions for the issuance of compulsory licenses); Steven D. Anderman, *The Competition Law/IP 'Interface': An Introductory Note*, *in* THE INTERFACE BETWEEN INTELLECTUAL PROPERTY RIGHTS AND COMPETITION POLICY 1, 15 (Steven D. Anderman ed., 2007); *see also* Cynthia M. Ho, *Patent Breaking or Balancing?: Separating Strands of Fact from Fiction Under TRIPS*, 34 N.C. J. INT'L L. & COM. REG. 371, 396–411 (2009) (discussing the scope of compulsory licensing under TRIPS); Kevin Outterson, *Disease-Based Limitations on Compulsory Licenses Under Articles 31 and 31 BIS* 17–19 (Bos. Univ. Sch. of Law, Working Paper No. 09-26, 2009), *available at* http://www.bu.edu/law/faculty/scholarship/working

North American Free Trade Agreement (NAFTA).[31] Thus, while compulsory licenses are relatively rare in the United States,[32] through its treaty obligations and an amalgamation of statutory provisions, the United States may, and at times does, authorize some version of a compulsory license in three of the four above-mentioned categories.[33]

The ultimate goal of compulsory licensing is to increase availability and reduce the price of the technology in order to enhance dissemination and encourage user adoption. Yet compulsory licensing focuses on the actions of the patent owner and her competitors. Although the law's objective is to encourage user adoption, the law contains a simplistic view of the user as motivated by availability and price alone. Therefore, it concentrates on deciphering and influencing the conduct of the patent owner and her competitors. First, the patent owner's actions or failures to act instigate the issuance of a compulsory license in three of the four situations in which a government issues compulsory licenses: anticompetitive behavior, patent nonuse, and refusal to license to a dependent patent. As for the fourth public interest category, some causes, such as a sudden need for a drug, are not related to the patent owner's behavior. Yet other causes—which include refusal to increase manufacturing, refusal to license to additional manufacturers, or refusal to lower prices despite public need—stem from the patent owner's conduct. Hence, in most cases, governments issue compulsory licenses as an antidote to a patent owner's behavior that limits dissemination of an invention.

While the patent owner's conduct instigates the issuance of compulsory licenses, the law of compulsory licensing focuses on the patent owner's competitors to resolve the dissemination problem. By compelling the

papers/documents/OuttersonK052009.pdf (discussing the U.S. position that compulsory licenses under TRIPS should be limited to certain diseases).

31. North American Free Trade Agreement (NAFTA) art. 1709(10), Dec. 8, 1993, 32 I.L.M. 289; Torrance, *supra* note 29, at 334 (discussing the impact of NAFTA's compulsory licensing provisions on U.S. patent policy options).

32. Torrance, *supra* note 29, at 336.

33. For an example of the anticompetitive behavior category, see *In re* Ciba-Geigy Ltd., 123 F.T.C. 842, 897–98 (1997) (requiring the merged company to license some of its gene therapy patent rights to a competitor). For an example of the nonuse category, see 35 U.S.C. § 203 (2012) (granting the U.S. federal agency that funded the invention march-in rights to issue licenses if the patent owner refuses to do so). For examples of the public interest category, see 28 U.S.C. § 1498 (2012); Chien, *supra* note 21, at 862–63 (explaining that the federal government may use inventions without a patent owner's consent for just compensation, but a patent owner may not receive injunctive relief, which prevents the patent owner from refusing to license); Kenneth J. Nunnenkamp, *Compulsory Licensing of Critical Patents Under CERCLA?*, 9 J. NAT. RESOURCES & ENVTL. L. 397, 404–05 (1994) (explaining that the Clean Air Act permits states to issue compulsory licenses for air pollution reduction technologies if their use is necessary to meet federal air quality standards). There are no examples in U.S. law of the issuance of compulsory licenses to allow exploitation of a dependent patent.

patent owner to license to competitors, the law seeks increased production of the invention to promote increased dissemination. While the debate surrounding compulsory licensing mostly focuses on the effect of compulsory licenses on innovation,[34] the underlying assumption is that the issuance of compulsory licensing would improve access directly or indirectly by reducing price.[35] Hence, the law of compulsory licensing uses competition as a proxy for dissemination and focuses on increasing availability and eliminating the price barrier.

B. *Patent Misuse*

Patent misuse originally developed as a common law equitable affirmative defense to an infringement claim similar to the traditional Unclean Hands Doctrine in tort law. Defendants sued for patent infringement may claim as a defense that the patent owner misused her patent grant.[36] If the defense is successful, the patent is effectively unenforceable. Courts will refuse to grant the patent owner an injunction or damages until the patent owner stops any misuse and until the effects of the misuse dissipate.[37]

The patent misuse defense applies when the patent owner takes unfair advantage of his patent rights in the market.[38] Examples of actions courts consider patent misuse include: discriminatory licensing, in which the patent owner charges some licensees more than others;[39] restrictions on the

34. For the debate on the effects of compulsory licensing on innovation, see generally Richard A. Epstein & F. Scott Kieff, *Questioning the Frequency and Wisdom of Compulsory Licensing for Pharmaceutical Patents*, 78 U. CHI. L. REV. 71 (2011) (discussing effects of compulsory licensing on innovation in drug development) and Daniel Benoliel & Bruno Salama, *Towards an Intellectual Property Bargaining Theory: The Post-WTO Era*, 32 U. PA. J. INT'L L. 265 (2010) (using compulsory licensing as a working example for a proposed positive bargaining theory for intellectual property rights).

35. *See* F.M. SCHERER, THE ECONOMIC EFFECTS OF COMPULSORY PATENT LICENSING 13–14, 66, 78 (1977).

36. R. CARL MOY, MOY'S WALKER ON PATENTS §18.1 (4th ed. 2010); *see also* Mark A. Lemley, *The Economic Irrationality of the Patent Misuse Doctrine*, 78 CALIF. L. REV. 1599, 1618–19 (1990) (criticizing the lack of an injury requirement).

37. HERBERT HOVENKAMP ET AL., IP AND ANTITRUST: AN ANALYSIS OF ANTITRUST PRINCIPLES APPLIED TO INTELLECTUAL PROPERTY LAW § 3.6 (2d ed. 2010); Lemley, *supra* note 36, at 1613.

38. MOY, *supra* note 36, § 18.1. Although courts and the legislature greatly constricted the patent misuse defense through the years, certain actions by patent owners are still considered misuse. *See* HOVENKAMP ET AL., *supra* note 37, § 3.2 (describing the historical demise of patent misuse).

39. *See, e.g.*, Laitram Corp. v. King Crab, Inc., 244 F. Supp. 9, 16–17 (D. Alaska 1965) (finding discriminatory licensing rates of shrimp peeling machinery to constitute patent misuse); MOY, *supra* note 36, § 18.31.

licensee's ability to resell units of the patented invention;[40] requirements that the licensee pay royalties beyond the patented invention (e.g., royalties based on the licensee's total sales or continued payment of royalties after the patent expires);[41] and tying arrangements that require the licensee to purchase other things from the patent owner in addition to the subject matter claimed in the patent (e.g., agreements that require the licensee to purchase unpatented supplies).[42]

Protection of competition appears to be a core concern of the patent misuse defense.[43] Similar to compulsory licensing, patent misuse attempts to encourage dissemination by encouraging competition. The goal is for competitors to raise patent misuse as a defense in order to increase availability and reduce price for the end user. Yet while the law carefully considers the conduct and motivation of the patent owner and his competitors, it addresses the user only indirectly. In all patent misuse cases, the law focuses on the acts of the patent owner who has taken unfair advantage of the patent and solves the problem by absolving the owner's

40. *See, e.g.*, Ansul Co. v. Uniroyal, Inc., 306 F. Supp. 541, 559 (S.D.N.Y. 1969) (holding that the patent owner's setting of a resale price for a product that inhibits plant growth constitutes patent misuse), *rev'd in part on other grounds*, 448 F.2d 872 (2d Cir. 1971).

41. MOY, *supra* note 36, §§ 18.38, 18.40; *see, e.g.*, Brulotte v. Thys Co., 379 U.S. 29, 33–34 (1964) (holding that requiring a licensee to pay a royalty past the expiration of the patent constitutes patent misuse); Scheiber v. Dolby Labs., Inc., 293 F.3d 1014, 1017–18 (7th Cir. 2002) (holding that requiring a licensee to pay a royalty past the expiration of the patent constitutes patent misuse).

42. *See* 35 U.S.C.A. § 271(d) (2012) (limiting liability for patent misuse for tying to cases where the patent owner has a market monopoly). For examples of tying arrangements, see Morton Salt Co. v. G. S. Suppiger Co., 314 U.S. 488, 489–90 (1942) (where the patent owner agreed to lease his patented machine that automatically deposited salt tablets only if customers agreed to buy all their salt tablets from the patent owner); Carbice Corp. of Am. v. Am. Patents Dev. Corp., 283 U.S. 27, 30–31, 33–34 (1931) (where the patent owner tied the sale of his patented invention to the sale of unpatented carbon dioxide).

43. Many scholars point to the language of the Federal Circuit in *Windsurfing v. AMF*, which reframed the test with antitrust competition terminology and stated that "the alleged infringer [must] show that the patentee has impermissibly broadened the 'physical or temporal scope' of the grant with anticompetitive effect." Windsurfing Int'l v. AMF, Inc., 782 F.2d 995, 1001 (Fed. Cir. 1986); *see also* Thomas F. Cotter, *Misuse*, 44 HOUS. L. REV. 901, 913 (2007) (citing *Windsurfing* and stating that the "Federal Circuit itself has come to define patent misuse as 'impermissibly broaden[ing] the "physical or temporal scope"' of the patent grant with anticompetitive effects" (alteration in original)). Some commentators note that patent misuse law goes beyond the traditional competition objectives of antitrust law because for some patent licensing arrangements, courts apply the per se rule, which does not investigate whether the arrangement, in fact, affects competition. *See, e.g.*, Robin C. Feldman, *The Insufficiency of Antitrust Analysis for Patent Misuse*, 55 HASTINGS L.J. 399, 401, 436–38, 449 (2003). Yet although courts that evaluate licensing investigations under the per se rule do not look at the effects on competition in the specific case, they assume that the restriction is so onerous that the restrictions must affect competition. *See* J. Dianne Brinson, *Patent Misuse: Time for a Change*, 16 RUTGERS COMPUTER & TECH. L.J. 357, 359, 394 (1990) (stating that under patent misuse's per se rule, certain licensing practices are, without inquiry into circumstances of use or economic consequences, presumed to seriously threaten competition).

competitors from liability for patent infringement. For example, courts that hold that a tie-in constitutes patent misuse prevent the patent owner's unjustifiable inhibition of competition in technologies that are related to the patented invention. By defining the act as patent misuse and preventing the patent owner from enforcing his patent, courts strengthen the patent owner's competitors under the assumption that competition will lower prices, increase availability, and thereby enhance dissemination of these related technologies.[44] Hence, the law of patent misuse, like the law of compulsory licensing, focuses primarily on the patent owner and his competitors and embodies a simplistic view of the user as motivated by availability and price alone.

II. THE USER AND THE DISSEMINATION OF NEW TECHNOLOGIES

Patent law doctrines focus on the actions of the patent owner and his competitors. The goal of the doctrines is to ensure a low price and increased availability of the technology. The assumption underlying these laws is that technological dissemination is dependent on availability and price alone. The market narrative presumes that once the price is lowered and the technology is widely available, then the market will determine which technology is worthy of adoption. Yet the market narrative is lacking.[45]

This Part will uncover the important role of the ordinary user in determining the fate of new technologies. It will also present a more nuanced view of the user. It will show that the market narrative is lacking because the ordinary user is not motivated by price and availability alone. This Part reveals that there are many sources of motivation for the ordinary user to resist a new technology. Specifically, this Part will categorize these reasons into two broad categories: resistance due to novelty and resistance due to the perceived consequences of the technology.

A. *The Impact of the User's Adoption Decision*

Scholars recently looked beyond the inventor or creator to the role of the user in influencing technological design. These scholars emphasize that the user's values and preferences shape the technology he uses. However, these scholars do not focus on the ordinary user, but rather focus on the

44. *See, e.g.*, *Carbice Corp. of Am.*, 283 U.S. at 33–34 ("The Dry Ice Corporation has no right to be free from competition in the sale of solid carbon dioxide. Control over the supply of such unpatented material is beyond the scope of the patentee's monopoly; . . . . The present attempt is analogous to the use of a patent as an instrument for restraining commerce.").

45. *See* Joel Mokyr, *The Political Economy of Technological Change: Resistance and Innovation in Economic History*, *in* TECHNOLOGICAL REVOLUTIONS IN EUROPE: HISTORICAL PERSPECTIVES 39, 39 (Maxine Berg & Kristine Bruland eds., 1998) (arguing that the market test is often insufficient).

creative user. They emphasize the role of the user as an innovator and his influence on technological design.[46]

Indeed, the focus on the user as an innovator is an important step toward illuminating the process of technological adoption. History is replete with examples of users operating technologies differently than their designers expected them to be used. Individuals may use a technology for a different function than the inventors' intended uses. For example, phone companies originally promoted the telephone for use only as a business tool. It was the users who transformed the telephone into a social tool.[47] Yet the focus on the user as an innovator highlights only part of the crucial role of the user in the dissemination process of new technologies. The user can play a role as an innovator, but her role as a consumer determines the fate of new technologies on a much more crucial and broader scale. The user in her role as a potential consumer—even the couch potato—regularly determines the fate of technological artifacts.[48]

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46. *See* ERIC VON HIPPEL, DEMOCRATIZING INNOVATION 70–72 (2005) (describing the innovative user); Dan Hunter & F. Gregory Lastowka, *Amateur-to-Amateur*, 46 WM. & MARY L. REV. 951, 954 (2004) (showing that "copyright's former consumers are now the creators, producers, and disseminators of content"). *See generally* Benkler, *supra* note 18 (describing peer production projects through which many individuals cooperate together to create); William W. Fisher III, *The Implications for Law of User Innovation*, 94 MINN. L. REV. 1417 (2010) (discussing legal conflicts between user innovators and producers); Katherine J. Strandburg, *Users as Innovators*: *Implications for Patent Doctrine*, 79 U. COLO. L. REV. 467 (2008) (distinguishing the user–innovator from the prevailing conception of the seller–innovator in patent law and focusing on research tools inventions). *But see generally* Julie Cohen, *The Place of the User in Copyright Law*, 74 FORDHAM L. REV. 347 (2005) (providing a broader conception of the user that she defines as "the situated user").

47. *See* Claude S. Fischer, *"Touch Someone": The Telephone Industry Discovers Sociability*, *in* TECHNOLOGY AND CHOICE: READINGS FROM TECHNOLOGY AND CULTURE 87, 88 (Marcel C. Lafollette & Jeffrey K. Stine eds., 1991); Roger Silverstone, Eric Hirsch & David Morley, *Information and Communication Technologies and the Moral Economy of the Household*, *in* CONSUMING TECHNOLOGIES: MEDIA AND INFORMATION IN DOMESTIC SPACES 15, 19, 21–26 (Roger Silverstone & Eric Hirsch eds., 1994). Users' choices can also constrict the functions of a new technology and those functions may disappear or change altogether. *Id.*

48. Consumption is important because it can also define identities and human relations. Even in the most mundane process of integrating new technologies into the household, both artifacts and people change and meanings are produced. The purchase of certain technologies could be central to an individual's or household's efforts at self-creation and could affect the relationship between members of the household and the outside world. For example, teenagers use their consumption of music as a ticket into a peer group. *See* Merete Lie & Knut H. Sorensen, *Making Technology Our Own? Domesticating Technology into Everyday Life, in* MAKING TECHNOLOGY OUR OWN? DOMESTICATING TECHNOLOGY INTO EVERYDAY LIFE 1, 8–9 (Merete Lie & Knut H. Sorensen, eds., 1996); Nelly Oudshoorn & Trevor Pinch, *How Users and Non-Users Matter*, *in* HOW USERS MATTER: THE CO-CONSTRUCTION OF USERS AND TECHNOLOGIES 1, 12, 14 (Nelly Oudshoorn & Trevor Pinch eds., 2003); Silverstone, Hirsch & Morley, *supra* note 47, at 15, 19, 21–26. For a discussion of domestication, see generally Anne Sofie Laegran, *Escape Vehicles? The Internet and*

The user, who influences the fate of a new technology in her basic decision of whether to adopt it, may be a consumer, an employee within an organization, the management of an organization, or a member of the public whose actions affect the decisions of direct adopters. All these share in common their crucial effect on the fate of a new technology. Hence, this Article defines "user" broadly as a user or potential user who may choose to adopt or reject a technology.

The user plays an important role in the adoption or rejection of a new technology. Resistance to the adoption of new technologies takes many forms. Behaviors constituting resistance to new technology include both consciously motivated behavior and avoidance behavior. They include both overt opposition and passive reluctance to use a technology.[49] Individuals who demonstrate against nuclear power are overt rejecters of a technology, whereas passive rejecters include the woman who refuses to buy genetically modified food in the supermarket and the aging writer who refuses to substitute his typewriter for a computer and word processor. All these forms of conduct affect the fate of a new technology.

User resistance to the adoption of new technologies may result in the complete rejection of a new technology.[50] For example, our computer keyboard—QWERTY—is considered inferior to an alternative keyboard—DVORAK—which users rejected.[51] User resistance may also significantly delay the adoption of a new technology. For example, artificial insemination in humans was invented at the end of the eighteenth century, but it reached mainstream adoption much later during the 1940s and

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the Automobile in a Local-Global Intersection, *in* HOW USERS MATTER: THE CO-CONSTRUCTION OF USERS AND TECHNOLOGIES, *supra*, at 81.

49. Some writers use narrower definitions of resistance. *See* Martin Bauer, *Resistance to New Technology and Its Effects on Nuclear Power, Information Technology and Biotechnology*, *in* RESISTANCE TO NEW TECHNOLOGY: NUCLEAR POWER, INFORMATION TECHNOLOGY AND BIOTECHNOLOGY 1, 14–15 (Martin Bauer ed., 1995) (defining resistance to include only behavior motivated by a purpose and not avoidance behavior); Dorothy Nelkin, *Forms of Intrusion: Comparing Resistance to Information Technology and Biotechnology in the USA*, *in* RESISTANCE TO NEW TECHNOLOGY: NUCLEAR POWER, INFORMATION TECHNOLOGY AND BIOTECHNOLOGY, *supra*, at 379, 379 (focusing on overt opposition and excluding passive reluctance).

50. While this Article focuses on complete rejection of specific technologies, resistance could take subtler forms, such as reluctance to learn about sophisticated uses of a video recorder, despite still using its basic functions, or refraining from using a technology in certain ways, such as not using personal data on a computer. *See* Ian Miles & Graham Thomas, *User Resistance to New Interactive Media: Participants, Processes and Paradigms*, *in* RESISTANCE TO NEW TECHNOLOGY: NUCLEAR POWER, INFORMATION TECHNOLOGY AND BIOTECHNOLOGY, *supra* note 49, at 255, 256.

51. *See* Paul A. David, *Clio and the Economics of QWERTY*, 75 AM. ECON. REV. 332, 332 (1985); Clayton P. Gillette, *Lock-In Effects in Law and Norms*, 78 B.U. L. REV. 813, 817 (1998). *But see generally* S.J. Liebowitz & Stephen E. Margolis, *The Fable of the Keys*, 33 J.L. & ECON. 1 (1990) (arguing that use of the QWERTY keyboard is efficient and that users justifiably rejected the DVORAK keyboard).

1950s.[52] Finally, certain population groups may refuse to adopt a technology and thereby restrict dissemination. For example, some parents reject childhood inoculation technology when they refuse to vaccinate their children against childhood diseases due to fear that these inoculations may cause autism.[53]

B. *Factors Influencing the User's Adoption Decision*

Doubtless, price and availability of a technology are significant factors in when or whether users adopt a technology. Price is also closely related to the technology's perceived relative advantage—the ratio of the expected benefits and the costs of adoption in the eyes of the user. The technology's relative advantage is affected by: low price, economic profitability, decrease in discomfort, social prestige, and savings of time and effort.[54] Yet many additional factors influence the user's willingness to adopt a technology. The ordinary user is a multifaceted creature whose motivations and complexities should be carefully examined because of his crucial importance to the fate of new technologies. This section focuses on the main reasons that lead to user resistance to the adoption of a new technology.[55] The dissemination process of a new technology may be inhibited by one or a combination of these factors. Diverse groups of users may resist the same technology for a different set of reasons. These reasons can be divided into two categories: the novel nature of the technology and the perceived consequences.

1. Novelty and User Resistance

Users resist technology because of its "newness." Yet, their resistance to "newness" is comprised of different reasons. First, some individuals may resist the newness of the hardware or the process of the new technology.[56] For example, despite the advantages of electronic book

52. Bernstein, *supra* note 3, at 1049, 1060–83.

53. *See* Katherine Seligman, *Vaccination Backlash: There's a Small but Stubborn Faction of Parents Who Don't Vaccinate Their Children. Are There Risks?*, S.F. CHRON. (May 25, 2003, 4:00 AM), http://www.sfgate.com/health/article/Vaccination-Backlash-There-s-a-small-but-2645779.php (describing a growing movement of parents who refuse to vaccinate their children); Sue Bennett, *The Shot Felt Round the World: Did an Immunization Trigger Your Child's Autism?*, AUTISM COACH (Oct. 14, 2004), http://www.autismcoach.com/Articles.asp?ID=269 (reporting on a poll surveying parents' beliefs that vaccinations caused their children's autism).

54. *See* EVERETT M. ROGERS, DISSEMINATION OF INNOVATIONS 229–30, 233 (5th ed. 2003).

55. There are many factors that affect the adoption of new technologies. Additional factors not discussed in detail are the triability of the invention (can it be tried on a limited basis?), its observability (whether one sees others using it), users' socioeconomic status, and users' personality traits. *Id.* at 258–59, 288–90.

56. *See* Bauer, *supra* note 49, at 19.

readers such as the Kindle, the idea that paper books will become obsolete deters many.[57]

Second, newness often entails complexity, and users may reject a technology if they perceive it as relatively difficult to use. This is particularly the case when a technology is incompatible with a preceding idea. Old ideas are the main tools that people use to assess new ideas and give them meaning.[58] A historical example from the 1980s involves the adoption process of home computers. Users went through periods of frustration while they learned how to connect the computers and how to run software. Although personal computers eventually became commonplace in the American household, their perceived complexity was an important negative force in their adoption rate in the 1980s. Eventually, as home computers became more user friendly, their adoption rate increased.[59]

A technology's perceived complexity also inhibits adoption within organizations. Bureaucracies function on routine and standard operating procedures that resist change.[60] For example, hospital personnel impeded the transition from handwritten records to computerized electronic records. The adoption of electronic records[61] provides many advantages, which include reductions in prescription errors due to illegible handwriting and the ability for authorized physicians to access relevant information about their patients no matter where the patients received previous treatment.[62]

Despite these advantages, training personnel to adjust to complex systems is cumbersome. Medical providers and personnel need to adjust to

57. Sherman & Wright, *supra* note 4, at 28–29 (discussing concerns regarding the demise of books and libraries). As of January 2014, 28% of adults in the United States reported reading an e-book in the previous year while 70% reported reading a book in print. The majority of the population still prefers reading printed books despite a rise in use of e-readers. Katherine Zickuhr & Lee Rainie, *E-Reading Rises as Device Ownership Jumps*, PEW RES. INTERNET PROJECT (Jan. 16, 2014), http://www.pewinternet.org/2014/01/16/e-reading-rises-as-device-ownership-jumps.

58. ROGERS, *supra* note 54, at 243–46.

59. *Id.* at 257–58.

60. *See* Joel Mokyr, *Progress and Inertia in Technological Change*, *in* CAPITALISM IN CONTEXT: ESSAYS ON ECONOMIC DEVELOPMENT AND CULTURAL CHANGE IN HONOR OF R.M. HARTWELL 230, 236 (John A. James & Mark Thomas eds., 1994). The rate of adoption and nature of adoption in organizations is different. *See* ROGERS, *supra* note 54, at 221, 402–35.

61. Electronic health records generally have the following functionalities: display of health information and data (including medical diagnoses, allergies, and medications a patient is taking); result management (including laboratory test results and other treatment results); order entry and management (including computerized medication orders, such as prescription orders that are not handwritten); decisions support (including computer reminders that improve preventive care and disease management); and electronic communication and connectivity (including integrating medical records across treatment settings). Hoffman & Podgurski, *supra* note 5, 108–09.

62. 42 U.S.C.A. § 300jj-11(b) (2012) (listing the goals of electronic health records); Hoffman & Podgurski, *supra* note 5, at 112–19 (describing the benefits of electronic health record systems).

entering all the required data in the system's preferred format and abandon their own methods of keeping charts; they need to become proficient at using the systems; and both patients and providers need to accommodate to the central place that the computer takes during the physician–patient interaction.[63] Consequently, some physicians rebelled against the newly installed systems and complained that the time required to use the electronic systems distracts them from their medical duties.[64]

2. Perceived Consequences and User Resistance

Users may refrain from adopting a new technology because they are concerned that the use of a technology will adversely affect either their everyday well-being or will be incompatible with deeply held beliefs. User resistance to the adoption of a new technology due to its perceived consequences can be broken into two categories. First, users may resist technological adoption due to perceived practical consequences, which include both economic and noneconomic effects. Second, users may resist technological adoption because of perceived consequences of the impact on moral and religious values.

a. Practical Consequences

User resistance may stem from economic reasons. A primary economic reason for resistance to new technology is a fear of loss of jobs. Workers may fear that a new technology will render their skills obsolete.[65] The

63. *See* Sharona Hoffman, *Employing E-Health: The Impact of Electronic Health Records on the Workplace*, 19 KAN. J.L. & PUB. POL'Y 409, 427–28 (2010) (discussing employers' challenges in implementing electronic health record systems in the workplace). *See generally* Richard J. Baron & Elizabeth L. Fabens et al., *Electronic Health Records: Just Around the Corner? Or Over the Cliff?*, 143 ANNALS INTERNAL MED. 222 (2005) (describing one practice's difficulties in adjusting to an electronic health records system).

64. Ceci Connolly, *Cedars-Sinai Doctors Cling to Pen and Paper*, WASH. POST, Mar. 21, 2005, at A01 (describing staff rebellion at the Cedars-Sinai Medical Center that forced the Center to shelve its new electronic record system after three months of use); Freudenheim, *supra* note 5 (describing resistance among physicians to the use of electronic health records systems). Resistance to the adoption of electronic health record systems is not motivated by its complexity alone. Users also resist these systems because of concerns over errors, the costs of purchase and implementation, as well as privacy and security concerns. *See* David Blumenthal, *Stimulating the Adoption of Health Information Technology*, 360 NEW ENG. J. MED. 1477, 1477 (2009); Hoffman & Podgurski, *supra* note 5, at 119–24.

65. *See* Joel Mokyr, *Technological Inertia in Economic History*, 52 J. ECON. HIST. 325, 330 (1992) [hereinafter Mokyr, *Technological Inertia*] (explaining that the more precise and valuable the skill or equipment being replaced, the greater the owner's incentive to resist the technology that reduces its value); Joel Mokyr, *The Political Economy of Technological Change: Resistance and Innovation in Economic History*, DEP'T OF ECON., NW. UNIV., 23–24 (Mar. 1997), http://www.fsalazar.bizland.com/PYMES/Berg.pdf [hereinafter Mokyr, *Political Economy of Technological Change*] (describing fears that machinery will displace labor and cause

classic historical example involves the Luddites' resistance to the Industrial Revolution in England, which produced protests that culminated in the breaking of machines. Workers feared that the machinery would displace them.[66] These concerns are not confined to the past. Today's electronic technology takes over many functions previously performed by individuals. For example, lawyers fear that technology could render some of their skills obsolete as new discovery software quickly scans for the necessary information and rapidly achieves results that previously required thousands of billable hours of work.[67]

Users and organizations may also hesitate before they adopt a new technology due to sunk costs. Where investments and infrastructure already accommodate a previous technology or an existing way of doing things, it may prove more efficient to resist change.[68] Particularly compelling is the effect sunk costs have on current computer keyboard design. The computer keyboard design used by most computer users is called QWERTY. Many, in fact, believe that QWERTY is a suboptimal keyboard design.[69] Its arrangement of keys was selected to deal with an ancient technological problem—the clashing of type bars on the typewriter—that was solved by the nineteenth century.[70] The DVORAK keyboard—designed to enable more effective typing—was invented in 1932, but users reluctant to adjust to a new typing method declined to adopt the new design. Existing users' preferences repeatedly outweighed those of new users for whom it would have been more efficient to adopt the DVORAK design.[71]

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unemployment). Technological change may also threaten nonpecuniary characteristics of labor by changing a physical work environment or transforming labor hierarchies. Laborers also resist these changes. *See* Mokyr, *supra* note 60, at 236.

66. For literature on the Luddite resistance, see generally BRIAN BAILEY, THE LUDDITE REBELLION (1998); Adrian Randall, *Reinterpreting 'Luddism': Resistance to New Technology in the British Industrial Revolution, in* RESISTANCE TO NEW TECHNOLOGY: NUCLEAR POWER, INFORMATION TECHNOLOGY AND BIOTECHNOLOGY, *supra* note 49, at 57; Mokyr, *supra* note 65, at 329–30. *See also* ADRIAN RANDALL, BEFORE THE LUDDITES: CUSTOM, COMMUNITY AND MACHINERY IN THE ENGLISH WOOLEN INDUSTRY, 1776–1809, at 4, 41–68 (1991) (examining the pre-Luddite period and showing that the woolen cloth industry in England between the 1770s and 1809 resisted machinery when it threatened employment or relocated workers into a new factory based system).

67. John Markoff, *Armies of Expensive Lawyers, Replaced by Cheaper Software*, N.Y. TIMES (Mar. 4, 2011), http://www.nytimes.com/2011/03/05/science/05legal.html; *see also* KIRKPATRICK SALE, REBELS AGAINST THE FUTURE 223–28 (1995) (discussing post-World War II concerns of labor displacements).

68. *See* Lucian Arye Bebchuk & Mark J. Roe, *A Theory of Path Dependence in Corporate Ownership and Governance*, 52 STAN. L. REV. 127, 139 (1999).

69. For an explanation and history of the DVORAK keyboard, see *The DVORAK Keyboard*, MIT, http://www.mit.edu/~jcb/Dvorak/ (last visited June 11, 2014).

70. *Id.*

71. *See* David, *supra* note 51, at 332, 335–36; Gillette, *supra* note 51, at 817. *But see generally* Liebowitz & Margolis, *supra* note 51 (arguing that use of the QWERTY keyboard is efficient and that users justifiably rejected the DVORAK keyboard).

Finally, users may believe a technology confers a reduced advantage due to its failure to attain critical mass. Interactive technologies can be prone to market failure because they are often characterized by "network effects."[72] Network effects exist in markets where the value an individual places on a good increases as others use the good. Once a critical mass of people use a particular technology, its rate of adoption accelerates.[73] Thus, reaching a critical mass is imperative for the adoption of many interactive technologies.[74] A classic example of a technology dependent on network effects is the Internet. The value of the Internet is a function of the number of people who connect to it.[75] The Internet reached its critical mass point in 1990 with four million users worldwide.[76] Vendors and information providers found the Internet more lucrative as more people were online. At a certain point most offline businesses realized they had to offer an online service because a large percentage of their clientele transferred their purchasing activity online. In addition, when a technology reaches its critical mass, then people are less likely to abandon use of the technology because they become dependent on it.[77] For example, in 2014, it is more costly for an individual to stop using Facebook unilaterally than it was for a Facebook user seven years earlier.[78]

Individuals may resist new technologies due to other noneconomic practical consequences. Throughout history, individuals have resisted many new technologies that they believed threatened community health and common resources. Examples of resistance include protests against

72. *See* Gillette, *supra* note 51, at 818.

73. *See id.* at 817–18.

74. Goods that do not have network effects have demand curves that slope downwards, that is, as price decreases consumer demand increases. However, goods that have network effects feature a different demand curve. The willingness of individuals to pay for the good increases as the number of goods expected to be sold grows and, therefore, price may increase instead of decreasing. *See generally* Nicholas Economides & Charles Himmelberg, *Critical Mass and Network Size with Application to the US Fax Market* 4–6 (N.Y. Univ. Stern Sch. of Bus., Research Paper Ser. No. EC-95-11), *available at* http://www.stern.nyu.edu/networks/95-11.pdf. It should be noted, however, that the presumed increasing returns might not be the only effects at work because eventually other preferences may also affect choices. *See* ROGERS, *supra* note 54, at 343–45; Mark Lemley & William McGowan, *Legal Implications of Network Economic Effects*, 86 CALIF. L. REV. 479, 497 (1998).

75. *See* Mark A. Lemley, *The Law and Economics of Internet Norms*, 73 CHI.-KENT L. REV. 1257, 1281 (1998).

76. *See* ROGERS, *supra* note 54, at 343–44, 346–47.

77. *See id.* at 343–44; M. Lynne Markus, *Toward a "Critical Mass" Theory of Interactive Media*, *in* ORGANIZATIONS AND COMMUNICATION TECHNOLOGY 194, 194, 197 (Janet Fulk & Charles Steinfield eds., 1990).

78. *See* Randall Stross, *Getting Older Without Getting Old*, N.Y. TIMES, Mar. 6, 2010, at BU4; *Facebook Users in the World: Facebook Usage and Facebook Growth Statistics*, INTERNET WORLD STATS, http://www.internetworldstats.com/facebook.htm (last visited June 1, 2014) (noting the increased growth of Facebook users, reaching 835 million users in March of 2012).

nuclear power plants, nuclear waste disposal, and chemicals.[79] Feared risks to personal or family health also played an important role in persuading individuals to refuse using new technologies. For example, consumers' refusal to purchase genetically modified food also stems from concerns of risks to personal or family health and harmful effects to the environment.[80] Similarly, a vocal movement of parents refuses to vaccinate their children due to concerns that autism is linked to certain childhood vaccinations.[81]

Other concerns that relate neither to health nor community well-being affect users' willingness to adopt a new technology. Fear of discrimination can play a role in the rejection of a new technology. For example, despite the growing availability of genetic testing, studies show that many individuals decide not to undergo testing due to fear of insurance and employment discrimination.[82]

b. Impact on Moral and Religious Values

Potential users may reject a technology due to cultural, moral, social, or religious reasons.[83] Historical and current examples are plentiful. The

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79. *See generally* Nancy Kraus et al., *Intuitive Toxicology: Expert and Lay Judgments of Chemical Risks*, *in* THE PERCEPTION OF RISK 285 (Paul Slovic ed., 2000) (discussing and comparing public and expert perceptions of risks in chemicals); Allan Mazur, *Opposition to Technological Innovation*, 13 MINERVA 58, 60–61 (1975) (showing that a perception of danger provoked popular opposition to both nuclear plants and the fluoridation of water supplies); Paul Slovic et al., *Perceived Risk, Trust and the Politics of Nuclear Waste*, *in* THE PERCEPTION OF RISK, *supra*, at 275 (describing public opposition to nuclear waste disposal). On perceptions of risk of technology, see generally MARY DOUGLAS & AARON WILDAVSKY, RISK AND CULTURE: AN ESSAY ON THE SELECTION OF TECHNICAL AND ENVIRONMENTAL DANGERS (1982); Judith A. Bradbury, *The Policy Implications of Differing Concepts of Risk*, 14 SCI. TECH. & HUM. VALUES 380 (1989).

80. *See* ALLAN MCHUGHEN, PANDORA'S PICNIC BASKET: THE POTENTIAL AND HAZARDS OF GENETICALLY MODIFIED FOODS 104–28 (2000) (discussing and addressing Europeans' health and environmental concerns regarding genetically modified foods); Marsha A. Echols, *Food Safety Regulation in the European Union and the United States: Different Cultures, Different Laws*, 4 COLUM. J. EUR. L. 525, 527–29 (1998) (describing Europeans' opposition to genetically modified foods); Gregory N. Mandel, *The Future of Biotechnology Litigation and Adjudication*, 23 PACE ENVTL. L. REV. 83, 89–92 (2006) (discussing health and environmental concerns regarding genetically modified food).

81. *See* Steve P. Calandrillo, *Vanishing Vaccinations: Why Are So Many Americans Opting Out of Vaccinating Their Children?*, 37 U. MICH. J.L. REFORM 353, 388–90 (2004) (pointing to fear of autism as one of the motivators of the antivaccination movement); Jane E. Brody, *Vaccines and Autism, Beyond the Fear Factors*, N.Y. TIMES, Mar. 25, 2003, at F7 (reporting on concerns that mercury in vaccines causes autism); Gardiner Harris, *Measles Cases Grow in Number, and Officials Blame Parents' Fear of Autism*, N.Y. TIMES, Aug. 22, 2008, at A16 (reporting on an increase in measles cases due to parents' concerns of a link between the measles vaccine and autism, despite evidence to the contrary).

82. Gaia Bernstein, *The Paradoxes of Technological Diffusion: Genetic Discrimination and Internet Privacy*, 39 CONN. L. REV. 241, 255–64 (2006).

83. *See* DEGREGORI, *supra* note 10, at xi (explaining that some people will not use technologies because their belief systems forbid it); DAVID ELLIOTT & RUTH ELLIOTT, THE CONTROL

Amish community is best known for its religious opposition to technology. The Amish are a Christian religious sect that objects to the use of many technologies. To this day, they travel with horses and carriages and refuse to use electricity and common household appliances.[84] Other religious groups oppose the use of reproductive technologies. For example, in 2008, the Vatican affirmed the Catholic Church's opposition to use of different forms of reproductive technologies, including in vitro fertilization, based on the belief that every human life, including that of an embryo, is sacred.[85]

Other possible users may resist certain technologies due to fear that they destabilize important moral and social values. For example, the desire to preserve the uniqueness of human identity and to preserve human dignity motivates opposition to diverse technologies. During the 1970s and 1980s as computers became prevalent, studies revealed that some individuals resisted computer usage because they feared the idea of an autonomous entity's ability to perform the functions of human thought, and thereby downgrade man's previously unique significance in the order of things.[86] Similar fears inspire resistance to robots that can replace human functions.[87]

More recently, a different version of the argument was made to oppose human cloning. Objectors to human cloning argued that the replication of

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OF TECHNOLOGY vii, 10 (1976) (arguing that the choice of one technology over another is based on a society's scheme of values and priorities, which include cultural and religious beliefs); ROGERS, *supra* note 54, at 241–42, 249 (describing studies finding that incompatibility with values and beliefs is an obstacle to technological adoption); MOKYR, *supra* note 10, at 173–76 (tying societies' technological progress to their value systems); Joel Mokyr, *Technological Inertia*, *supra* note 65, at 327 (stating that historically, cultural and religious elements may have a big influence on technological decision-making). *But see generally* Jacques Ellul, *The Technological Order*, *in* PHILOSOPHY AND TECHNOLOGY: READINGS IN THE PHILOSOPHICAL PROBLEMS OF TECHNOLOGY 86, 86 (Carl Mitcham & Robert Mackey eds., 1972) (arguing that technology is determinative and autonomous of social values).

84. *See generally* Lee J. Zook, *Slow-Moving Vehicles*, *in* THE AMISH AND THE STATE 145 (Donald B. Kraybill ed., 1993) (describing reasons for the Amish's use of horses and carriages in lieu of modern vehicles); Jameson M. Wetmore, *Amish Technology: Reinforcing Values and Building Community*, IEEE TECH. & SOC'Y MAG. Summer 2007, at 10, *available at* http://archive.cspo.org/documents/Wetmore-AmishTechnology-v2.pdf (describing Amish decision-making regarding technological adoption).

85. *See* CONGREGATION FOR THE DOCTRINE OF THE FAITH, INSTRUCTION DIGNITAS PERSONAE ON CERTAIN BIOETHICAL QUESTIONS (2008), *available at* http://www.vatican.va/roman_curia/congregations/cfaith/documents/rc_con_cfaith_doc_20081208_dignitas-personae_en.html.

86. Robert S. Lee, *Social Attitudes and the Computer Revolution*, 34 PUB. OPINION Q. 53, 53, 56–57 (1970).

87. *See* SHERRY TURKLE, ALONE TOGETHER: WHY WE EXPECT MORE FROM TECHNOLOGY AND LESS FROM EACH OTHER 23–147 (2011) (underscoring concerns regarding robots fulfilling human functions).

humans will undermine the uniqueness of individual identity, pose psychological problems for the cloned individuals, and generally erode human dignity.[88]

The desire to preserve the uniqueness of human identity is only one social value that often stands in the way of the adoption of new technologies. Another example is the traditional social value of the family as a nuclear unit, which consists of a mother, father, and child who are genetically related. The technology of artificial insemination introduced the ability to produce a child with donor sperm. For over 150 years, society resisted this technology because, since children who were not genetically related to their fathers could now be born, it destabilized the traditional concept of the nuclear, genetically related family.[89]

III. THE MARKET GOVERNANCE RULE

While the law regulates the invention of new technologies through the patent system, the prevailing wisdom is that the market should determine which technologies society eventually adopts.[90] Advocates of market

88. *See, e.g.*, George J. Annas, *Human Cloning: A Choice or an Echo?*, 23 U. DAYTON L. REV. 247, 256 (1998) (stating that "[p]ersonal identity is at the heart of objections to human cloning"); Dan W. Brock, *Cloning Human Beings: An Assessment of the Ethical Issues Pro and Con*, *in* CLONES AND CLONES: FACTS AND FANTASIES ABOUT HUMAN CLONING 141, 150–55 (Martha C. Nussbaum & Cass R. Sunstein eds., 1998) (discussing the argument that human cloning violates the right to a unique identity); John A. Robertson, *Liberty, Identity, and Human Cloning*, 76 TEX. L. REV. 1371, 1410 (1998) (discussing opposition to human cloning because it violates human dignity and identity); THE PRESIDENT'S COUNCIL ON BIOETHICS, HUMAN CLONING AND HUMAN DIGNITY: AN ETHICAL INQUIRY (2002), *available at* http://bioethics.georgetown.edu/pcbe/reports/cloningreport/children.html (discussing problems of identity and individuality for the cloned child); Gina Kolata, *Ethics Panel Recommends a Ban on Human Cloning*, N.Y. TIMES (June 8, 1997), http://www.nytimes.com/1997/06/08/us/ethics-panel-recommends-a-ban-on-human-cloning.html (reporting that the National Bioethics Advisory Commission recommended that President Clinton continue the moratorium on the use of federal funding to support human cloning).

89. *See generally* Bernstein, *supra* note 3 (describing the social adoption process of the technology of artificial insemination).

90. *See* Helge Godo, *Technological Evolution, Innovation and Human Agency*, *in* DIVERSITY IN THE KNOWLEDGE ECONOMY AND SOCIETY: HETEROGENEITY, INNOVATION AND ENTREPRENEURSHIP 18, 31–32 (Elias G. Carayannis & Aris Kaloudis eds., 2008); Maggie Mahar, *Irrational Exuberance over Electronic Medical Records?*, HEALTH BEAT BLOG (Dec. 17, 2008), http://www.healthbeatblog.org/2008/12/irrational-exuberance-over-electronic-medical-records-.html (quoting Dr. Rick Peters, founder and former CEO of Oceania, an early enterprise of electronic health records, who stated, "[T]he organizations set up by industry and the government to mandate standards . . . stifle innovation and . . . keep health care IT completely out of step with the general computer industry"); Tom Stricker, Comment to *Sizing Up Obama's Fuel Economy Standards*, NAT'L J. EXPERT BLOG (Aug. 1, 2011, 5:42 PM), http://web.archive.org/web/20110928005836/http://energy.nationaljournal.com/2011/08/sizing-up-obamas-fuel-economy.php#2038012 ("Any company relying on favorable regulatory structure to succeed is missing the bigger picture, namely, that long-term success will ultimately shine on companies that meet customer demands at an affordable price.").

governance believe that would-be adopters, whether individuals or corporations, will select the superior technology. As long as technologies are available on the free market, they maintain that the market will determine the optimal result for technological progress.[91] Proponents of market governance point to the hazards of government action. Particularly, they underscore the difficulty of distinguishing between user resistance that protects society from costly duds and resistance that hinders progress.[92] Given some time, they argue, technologies that are advantageous to the consumer are likely to flourish and government action will be unnecessary.[93]

This Part highlights the problems of relying solely on market governance. First, some very beneficial technologies incur significant delays before their eventual adoption. Second, market governance is, in fact, an illusion. The government at all levels—federal, state, and local—already acts to encourage user adoption. Yet, it does so in an inconsistent and piecemeal manner.

A. *The Costs of Delay and Nonintervention*

The appeal of allowing the market to determine the adoption of new technologies lies, at least partly, in its deceptive appearance of neutrality. Market choice may seem the natural state of events, but the decision to let the market control and to refrain from government action is itself an active choice, not necessarily a natural result.[94] Moreover, this choice carries with it a cost. Superior technologies that are available for use at times undergo lengthy social adoption processes or are resisted altogether.[95] A lengthy delay or complete rejection of an important technology undermines the overall goal of the intellectual property system—the promotion of progress. This is especially disconcerting because often it is the more radical inventions to which markets are particularly hostile.[96]

Of course, not every rejected technology reduces human welfare and inhibits progress. Nuclear weapons are a paramount example of a

91. *See generally* JOSEPH A. SCHUMPETER, CAPITALISM, SOCIALISM, AND DEMOCRACY 81–86 (Harper & Brothers 2d ed. 1947) (describing the process of creative destruction).

92. *See* Mokyr, *Technological Inertia*, *supra* note 65, at 328 (stating that this problem is not easily resolved).

93. Lillquist & Waldeck, *supra* note 3, at 623–35.

94. RICHARD H. THALER & CASS R. SUNSTEIN, NUDGE: IMPROVING DECISIONS ABOUT HEALTH, WEALTH, AND HAPPINESS 10 (2008) (stating that it is a misconception "that it is possible to avoid influencing people's choices").

95. *See generally* Ted Sichelman, *Commercializing Patents*, 62 STAN. L. REV. 341, 362–65 (2010) (arguing that at least half of patented inventions in the United States are never commercially exploited).

96. *See* Godo, *supra* note 90, at 18, 32 (stating that while certain technologies, particularly incremental technologies, may be more effectively governed by the markets, markets are particularly hostile to radical innovations warranting government action).

technology without which many believe our world would be better off without. And some rejected technologies are, doubtless, unneeded innovations.[97] Yet there are still plenty of examples of technologies that initially met social rejection only to be socially endorsed decades and even centuries later. Again, artificial insemination in humans serves as an example. Although many believe that the reproductive technology of artificial insemination in humans is a product of late twentieth century science, evidence of its existence was first recorded as early as the late eighteenth century.[98] Artificial insemination technology can overcome infertility by using a syringe-type instrument to insert the sperm of the husband or donor into the woman.[99] Yet despite the procedure's simplicity and its need by many childless couples, the first reports of significant social use emerged only in the 1930s and 1940s.[100] The costs of market governance are particularly evident when a new technology eventually becomes widespread, as was artificial insemination by the 1960s and 1970s,[101] but fails to benefit generations of potential users. In the case of artificial insemination, the cost was many infertile individuals who remained childless in the more than 150 years it took the procedure to become socially accepted.

B. *The Illusion of Market Control*

Although many believe that the current system is one of market control, the government actually intervenes to encourage user adoption in multiple ways, many of them subtle and unnoticed by the casual observer.[102] A current example involves the adoption of electronic health records by hospitals and private physician clinics. The government, in an effort to encourage adoption, undertook a variety of measures to encourage the process.[103]

First, the government offered financial incentives to doctors and hospitals in the form of extra Medicare payments for the "meaningful use" of electronic health record systems. The government offered the highest payments for 2011 adopters and will gradually reduce payments until they're phased out in 2016. The government's goal was to incentivize rapid adoption by offering the highest incentives to the earliest adopters.[104]

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97. *See, e.g.*, Tynan, *supra* note 11 (describing the reasons for the failure of twenty-five technology products).

98. Bernstein, *supra* note 3, at 1048–49.

99. *Id.* at 1037, 1049–50.

100. *Id.* at 1060.

101. *Id.* at 1083–84.

102. Lillquist & Waldeck, *supra* note 3, at 582 (stating that "[f]or our country's entire history, government action—both direct and indirect—has affected what technologies will be adopted").

103. Blumenthal, *supra* note 64, at 1478 (describing the government's measures to encourage adoption of electronic health records).

104. 42 U.S.C.A. § 1395W-4(o) (2012).

Second, the government instituted a set of penalties for physicians and hospitals that do not use electronic health records systems meaningfully by 2015. Physicians will lose 1% of their Medicare fees in 2015 and the penalties escalate for each additional year of nonuse. Hospitals also face cuts in Medicare fees for failure to adopt these systems.[105] Third, the government instituted a support structure for the installation of electronic health records systems. The law provides funds to create regional technology extension centers to help providers install the systems[106] and train their workforces to use them.[107] It also provides support for educational programs for health care professional training through curriculum development and student recruitment.[108] Finally, the government acted to alleviate security and privacy fears. It required health care professionals and associated parties to promptly notify patients of a breach in the security of their electronic personal information.[109] Further, it extended Health Insurance Portability and Accounting Act (HIPAA) protections to health care providers and associated parties who deal with electronic health records.[110]

Similarly, the government engaged in a variety of methods to encourage adoption of new payment systems. Professors Erik Lillquist and Sarah Waldeck provide a rich study of government action to encourage adoption of novel payment systems.[111] First, the government provided the public with information to convince it to use new payment systems. For example, to promote public recognition and acceptance of electronic copies of checks, the government required that the electronic copies bear the legend: "This is a legal copy of your check. You can use it the same way you would use the original check."[112] The government also addressed public concerns over new payment systems. For instance, as the public began to use credit cards in the 1960s, concerns about theft and unauthorized charges accompanied the introduction of the cards. The government alleviated these fears by limiting cardholder responsibility to no more than fifty dollars of fraudulent charges and enacting criminal penalties for fraudulent credit card use.[113] Further, the government granted incentives and imposed sanctions to support new payment systems. For example, the Transit Authority in New York City encouraged use of the Metro card by

105. *Id.* § 1395W-4(a)(7)(A)(i).
106. *Id.* § 300jj-32(c).
107. *Id.* § 300jj-34(e)(3).
108. *Id.* §§ 300jj-35–36.
109. *Id.* §§ 17932, 17937.
110. *Id.* §§ 300jj-19, 17934, 17938.
111. *See generally* Lillquist & Waldeck, *supra* note 3.
112. 12 U.S.C. § 5003(b)(2) (2012); Lillquist & Waldeck, *supra* note 3, at 608.
113. 15 U.S.C. §§ 1643–1644 (2012); Lillquist & Waldeck, *supra* note 3, at 612–13.

offering free bus transfers to Metro card users.[114] Finally, the government ensured the adoption of new payment technologies by eliminating or severely curtailing the competition. For example, in 1863 the United States issued national bank notes, which faced stiff competition from state bank notes. Congress placed a 10% tax on state banknotes, thus making them prohibitively expensive and resulting in their elimination.[115]

IV. GOVERNMENT ACTION TO ENCOURAGE USER ADOPTION

This Part highlights the importance of an institutional actor that will articulate and implement systematic guidelines to encourage user adoption. It relies on Professors Stuart Benjamin and Arti Rai's work, which underscores the need to create an Office of Innovation Policy. This type of institutional actor could supervise the implementation of user adoption guidelines by different government agencies. This Article proposes that the guidelines should identify when government action is warranted and when it is not. The guidelines should incorporate action through gentle nudges and refrain from coercive action to encourage user adoption. Moreover, the government should limit its action to encouragement of a class of technologies and should not differentiate between competing technologies. Finally, this Part addresses the tension between this proposal and patent law's rejection of the Moral Utility Doctrine.

A. *An Institutional Coordinator*

The goal of our technology-regulating regime is to promote progress, and this objective is strongly tied to the dissemination of new technologies.[116] User adoption is vital to achieve technological dissemination. Yet policymakers give little systematic thought to the issue of user adoption. Admittedly, patent law incorporates some provisions that attempt to encourage user adoption by encouraging competition. However, patent law addresses only a small part of the spectrum of user resistance. And, again, while government action targeted at other aspects of user

114. Lillquist & Waldeck, *supra* note 3, at 614.

115. *Id.* at 620–21.

116. U.S. CONST. art. I, § 8, cl. 8. *See generally* David S. Olson, *A Legitimate Interest in Promoting the Progress of Science: Constitutional Constraints on Copyright Laws*, 64 VAND. L. REV. EN BANC 185, 187–92 (2011) (arguing that the framers intended the progress clause to promote the creation and dissemination of knowledge); Malla Pollack, *What Is Congress Supposed to Promote? Defining "Progress" in Article 1, Section 8, Clause 8 of the United States Constitution, or Introducing the Progress Clause*, 80 NEB. L. REV. 754 (2001) (arguing that progress under the constitutional provision incorporates dissemination). On the interpretation of the term "progress" in the intellectual property clause, see generally Dotan Oliar, *Making Sense of the Intellectual Property Clause: Promotion of Progress as a Limitation on Congress's Intellectual Property Power*, 94 GEO. L.J. 1771 (2006).

resistance occurs on a broad scale on all government levels—federal, state, and local[117]—it occurs in a piecemeal and inconsistent way.[118]

An institutional actor charged with promulgating and implementing guidelines to encourage user adoption could provide a systematic and consistent way to address user adoption issues for patented and unpatented technologies alike. The goal of guidelines developed to target user adoption is not to set a norm of government intervention. In fact, some technologies are unsuccessful and users legitimately resist them.[119] Instead, the objective of these guidelines should be to identify when a technology warrants government action and when it does not as well as the best ways to achieve user adoption. These principles would improve coherency and consistency in an important area that has thus far received little attention.

Under the current regime, government action to encourage user adoption is highly decentralized. A shift toward more centralization requires institutional change. Detailed institutional design is beyond the scope of this Article, but the following discussion relies on the important work done by Professors Benjamin and Rai on this topic. Benjamin and Rai make a compelling case for the creation of an Office of Innovation Policy.[120] Although they do not address the issue of user adoption, they define innovation broadly to include dissemination through putting the invention into productive use.[121]

Benjamin and Rai suggest that the creation of a new Office of Innovation Policy can address the problem of different governmental agencies pursuing innovation strategies that are in tension, if not even

117. *See supra* text accompanying notes 106–17.

118. *See supra* Part III.

119. *See, e.g.*, Tynan, *supra* note 11.

120. BENJAMIN & RAI, *supra* note 13, at 2. Another potential candidate is the U.S. Patent and Trademark Office (PTO), but the PTO currently lacks substantive rulemaking authority on patentability issues, such as subject matter or nonobviousness, which it decides on a daily basis. *See* Arti Rai, *Growing Pains in the Administrative State: The Patent Office's Troubled Quest for Managerial Control*, 157 U. PA. L. REV. 2051, 2053 (2009). Although recent proposals emphasize the need to expand the PTO's authority, it is unlikely that the government will expand its authority beyond the grant of patents to formulate and enforce rules to regulate user adoption. For proposals to expand the PTO's authority, see generally Sichelman, *supra* note 95, at 400–10 (proposing that the PTO should issue a commercialization patent in exchange for a commitment to commercialize a product not available in the marketplace); Michael J. Burstein, *Rules for Patents*, 52 WM. & MARY L. REV. 1747 (2011) (arguing for the need to grant the PTO substantive rulemaking authority); John Golden, *Patentable Subject Matter and Institutional Choice*, 89 TEX. L. REV. 1041 (2011) (arguing for the need to grant the PTO substantive rulemaking authority for issues of patentable subject matter); Jonathan Masur, *Regulating Patents*, 2010 SUP. CT. REV. 275 (arguing for the need to grant the PTO substantive rulemaking authority).

121. BENJAMIN & RAI, *supra* note 13, at 2. (defining innovation policy as focusing on promoting "the creation and diffusion of technology").

contradictory to each other.[122] They propose an executive entity that would have some authority to push agencies in a way that will promote innovation.[123]

Benjamin and Rai's proposal strikes an important balance between centralization and decentralization. They emphasize that centralization allows for efficiency, coordination, clarity, and interorganizational learning, but at the possible cost of bad decision-making.[124]

Since government agencies such as the Federal Drug Administration and the Federal Communications Commission have specialized knowledge, which is valuable for informed decision-making, Benjamin and Rai do not advocate an Office of Innovation Policy with the power to block.[125] Instead, they suggest a "Hard Look Review" regime under which agencies are obliged to consider all arguments, even those that do not correspond with their position, and respond publicly to the Office of Innovation Policy's position. At the same time, the specialized government agencies are not obligated to implement the Office of Innovation Policy's position.[126]

Although not specifically envisioned under Benjamin and Rai's scheme, an Office of Innovation Policy-type agency could also promulgate user adoption guidelines and enforce them under the mechanisms those authors propose. This could improve systematic thought and resolve coordination and inconsistencies regarding action intended to encourage user adoption. Furthermore, it could also alleviate the problem of capture. Currently, decisions regarding government action to encourage user adoption are often made by specialized agencies, state or local governments. Benjamin and Rai explain that capture is more likely to occur when an agency covers one or two industries and less likely when it has a broader scope.[127] Hence, overview by an Office of Innovation Policy-type agency is likely to reduce capture concerns as well.

B. *Gentle Nudges*

Advocates of market governance argue that while the market will select successful technologies that offer a significant advantage, the government

122. *Id.* at 4 ("Even when U.S. government entities like federal agencies and courts actually focus on innovation, they generally act without having much awareness of what other institutions faced with similar problems have done—much less coordinating with those institutions. Improving the awareness and coordination of innovation-related activities among federal agencies and courts could be tremendously helpful.").

123. Benjamin & Rai, *supra* note 10, at 6.

124. BENJAMIN & RAI, *supra* note 13, at 8.

125. Benjamin & Rai, *supra* note 10, at 58, 63.

126. BENJAMIN & RAI, *supra* note 13, at 11–12.

127. Benjamin & Rai, *supra* note 10, at 58, 78–79.

may force upon society technological failures. Technological failures may be technologies that do not offer a significant advantage or technologies that are inferior to other technologies. Particularly, the government may be quick to adopt the first prototype of a new class of technologies and make it less likely that individuals will invent or users will adopt more sophisticated embodiments later on. To address these concerns, this Article proposes that the government act through gentle nudges to encourage user adoption and refrain from coercive action that prevents society from choosing to adopt a specific technology.[128] In addition, the proposal is to limit government action to encourage the adoption of new categories of technology. It does not suggest that the government should intervene to encourage one version of a particular technology over another.

Law and social norms scholars distinguish between gentle nudges and harsh shoves.[129] Harsh shoves force change by eliminating or curtailing the older technology or mandating the adoption of a new technology to perform a previously non-technological function. The adoption of digital television is an example of a harsh shove. The government required all full-power television stations to broadcast exclusively in digital format as of June 12, 2009.[130] Consequently, the public had to either purchase a digital television set or connect their television to an analog-to-digital converter. In essence, the government eliminated the option of analog broadcasting to promote digital broadcasting.[131] The public did not have the option to decide whether they believed digital broadcasting was, in fact, superior and worthy of adoption.

To compare, there are many different forms of gentle nudges. The goal of this Article is not to provide a full survey of potential gentle nudges but to illustrate some significant examples. Patent law already incorporates some gentle nudges through compulsory licensing and patent misuse laws. This proposal seeks to expand the range of gentle nudges the technology-regulating regime offers to address the complexities of user resistance.

First, the government may offer information about a new technology[132] by, for example, facilitating or funding training, as it is currently doing to

128. *But cf.* Lillquist & Waldeck, *supra* note 3, at 623–35 (arguing that government action, whether through gentle nudges or hard shoves, is generally inadvisable).

129. *See* THALER & SUNSTEIN, *supra* note 94, at 5–6 (explaining that gentle nudges influence people's choices while still letting them opt out); Dan M. Kahan, *Gentle Nudges vs. Hard Shoves: Solving the Sticky Norms Problem*, 67 U. CHI. L. REV. 607, 619–20 (2000) (defining gentle nudges as less condemnatory norms than harsh shoves).

130. *The Switch to Digital Television (DTV) is Coming*, DTVANSWERS.COM, http://www.dtvanswers.com/toolkit/DTVQ&Aj.pdf (last visited Feb. 2, 2014).

131. *Id.*

132. Lillquist & Waldeck, *supra* note 3, at 608–12; *see also* THALER & SUNSTEIN, *supra* note 94, at 190–91.

encourage the adoption of electronic health information systems.[133] The government could also offer information through an advertisement campaign. Second, the government may take action to alleviate concerns about a particular technology. The government can reduce fears that surround a technology through legislation, as the government did when it enacted the Genetic Information Nondiscrimination Act of 2008 partly to alleviate fears of genetic discrimination.[134] The government can also ease concerns through an advertisement campaign. For example, when the government wanted to convince the public to take the swine flu vaccine, it used a massive advertising campaign to emphasize that the vaccine does not carry any hazardous side effects.[135] Third, the government may provide incentives to induce individuals to adopt a new technology and also enforce sanctions against those who refuse to adopt the technology. As illustrated previously, physicians and hospitals that timely adopt electronic health records systems will receive incentives in the form of additional Medicare payments, while those that resist adoption will eventually lose part of their Medicare compensation.[136]

Gentle nudges, as opposed to harsh shoves, facilitate user adoption only; they do not coerce social acceptance. Even a collection of gentle nudges, like in the case of electronic health records, does not amount to a harsh shove. A nudge is not a shove as long as a user may still choose not to adopt a technology. The government is less likely to lock society into use of an inferior technology through gentle nudges that do not coerce adoption. Regardless of incentives, sanctions, advertising, training, information, and reduction of concerns, the public is unlikely to adopt a technology that does not confer a significant relative advantage.[137] In a sense, government action through gentle nudges to encourage user adoption is similar to the government's role in the encouragement of innovation through the grant of patents. The hope of getting a patent encourages innovative activity. In addition, the grant of a patent can

133. 42 U.S.C.A. §§ 300jj-35–36 (2012).

134. *See* Genetic Information Nondiscrimination Act of 2008, Pub. L. No. 110-233, 122 Stat. 881; Jessica L. Roberts, *Preempting Discrimination: Lessons from the Genetic Information Nondiscrimination Act*, 63 VAND. L. REV. 439, 471–74 (2010).

135. Paul Joseph Watson, *Government Appoints Task Force to Handle H1N1 Vaccine Propaganda*, PRISONPLANET.COM (Nov. 2, 2009, 11:45 AM), http://www.prisonplanet.com/government-appoints-task-force-to-handle-h1n1-vaccine-propaganda.html.

136. *See* 42 U.S.C.A. § 1395W-4(a)(7), (o).

137. Professors Thaler and Sunstein describe gentle nudges as a form of "libertarian paternalism." Gentle nudges influence people's choices though gentle nudges still leave them the option to opt out. A nudge alters people's behavior in a predictable way but does not forbid any options. *See* THALER & SUNSTEIN, *supra* note 94, at 4–6.

facilitate innovation because it signals the worth of the invention.[138] Yet the patent system does not guarantee that a specific innovation will succeed. It merely provides a gentle nudge.

Admittedly, although a gentle nudge is less likely to lead to the adoption of an inferior technology, there is still some risk that this may occur. This risk is inevitable, though, and it accompanies technological adoption processes dominated by the market as well. For example, users did not adopt the superior DVORAK keyboard over QWERTY because of sunk costs. Users were unwilling to invest the time and training required to adjust to a new typing system.[139]

Finally, this Article suggests that the government should act through gentle nudges only where it seeks to encourage the adoption of a new class of technology. An example of intervention to encourage use of a class of technology is the government's use of feed-in tariffs to subsidize use of solar energy. Users who install solar panels connected to the electrical grid receive subsidized payments for the electricity the panels generate.[140] The government's goal through this program is to encourage use of solar energy generally and not to advocate the use of a specific type of solar panel.[141] This is distinguished from government action to encourage the adoption of one of several competing technologies, as in the encouragement of the use of one drug over another where both operate in a similar fashion and achieve a similar result.[142]

For two reasons, this Article proposes to limit government action to the encouragement of a class of technology rather than the promotion of one competing technology over another. First, government action is justified as a means to overcome user resistance. User resistance, for the variety of reasons discussed—novelty of hardware or process; novelty due to complexity; concerns about practical consequences such as loss of jobs, sunk costs, effects on personal health and the environment; and pressures on moral and religious values—generally does not rise when users select between competing technologies. User resistance usually occurs when

138. For a discussion on the expressive function of the patent system, see generally Timothy R. Holbrook, *The Expressive Impact of Patents*, 84 WASH. U. L. REV. 573, 575–77, 594–97 (2006).

139. *See generally* David, *supra* note 51; Gillette, *supra* note 51, at 817. *But see* Liebowitz & Margolis, *supra* note 51 (arguing that use of the QWERTY keyboard is efficient and that users justifiably rejected the DVORAK keyboard).

140. David Grinlinton & LeRoy Paddock, *The Role of Feed-In Tariffs in Supporting the Expansion of Solar Energy Production*, 41 U. TOL. L. REV. 943, 969–72 (2010) (describing states' initiatives using the feed-in-tariff mechanism).

141. *See id.* at 944–46.

142. Admittedly, at times it may be hard to determine when a technology constitutes a separate class and when it is merely a competitor to another technology, but often the distinction is clear. For example, the Internet is clearly a separate class of technology, while Google+ and Facebook are without doubt competitor social network technologies.

users face a truly transformative technology—a new category of technology. Conversely, when users adopt one technology, they are unlikely to resist its competitors due to fear of novelty or consequences. Therefore, government action is particularly justified to encourage the adoption of a new category of technology where lack of adoption is more likely to result from user resistance.

At the same time, user resistance does come up between competing technologies in one instance. This is where a technology requires critical mass. For example, Google+ currently struggles to lure users from Facebook in order to create a critical mass of users. Government action to select between competitors in such a case remains inappropriate in light of the general goals of the technology-regulating regime, which seeks to encourage dissemination in order to promote progress. Thus, dissemination of a new class of technology serves its overall goal, but distinguishing between competitors who offer different versions of the same technology does not impact the progress goal.[143]

C. *The Moral Utility Objection*

An important objection to the incorporation of user adoption guidelines into our technology-regulating regime is that it contradicts the rejection of the Moral Utility Doctrine. Patent owners must satisfy the utility requirement in order to attain a patent—they must show that their patent is useful.[144] In the past, moral utility was part of the general utility decision. The law considered whether an invention was "frivolous or injurious to the well-being, good policy, or sound morals of society."[145] Thus, the U.S. Patent and Trademark Office (PTO) and the courts evaluated the potential detrimental effects of an invention on society when they determined whether they should grant a patent for an invention. However, in recent years, patent law has rejected the Moral Utility Doctrine and refused to consider whether an invention is immoral or illegal.[146]

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143. One could argue that one version of the technology is so superior to another that its promotion over competitors does, in fact, promote progress. Yet it may be that in this case the technologies are not actually competing technologies, but the superior technology is in essence a new category of technology, even if it accomplishes similar functions as other technologies on the market. For example, most would agree that while both the VCR and the DVD accomplish the same function—enabling entertainment consumption at one's own leisure—they are not competing technologies, but different categories of technologies.

144. 35 U.S.C. § 101 (2012) ("Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor . . . .").

145. Lowell v. Lewis, 15 F. Cas. 1018, 1019 (C.C.D. Mass. 1817) (No. 8568).

146. Juicy Whip, Inc. v. Orange Bang, Inc., 185 F.3d 1364, 1366–67 (Fed. Cir. 1999). *But see* Margo A. Bagley, *The New Invention Creation Activity Boundary in Patent Law*, 51 WM. & MARY

The incorporation of principles to encourage user adoption into the technology-regulating regime will bring back the "social effects" question that was reflected in the moral utility analysis. Government agencies will need to determine whether the social effects of an invention require government action. It may, therefore, appear at first blush to contradict the rejection of the Moral Utility Doctrine. However, the differences between user adoption and moral utility decisions underscore that charging the government with user adoption decisions is not necessarily inconsistent with the rejection of the Moral Utility Doctrine.

First, the moral utility decision is relevant to the early stages in the life of a technology. The PTO decides whether to encourage the invention and application to practice of a technology that may be immoral and injurious, or a court may later invalidate a patent because the PTO should not have granted the patent in the first place. Where a technology is at its invention or application to practice stage, its potential effects on society are less clear. An early decision that an invention is immoral and should not receive a patent because it does not meet the utility requirement may close unknown opportunities and preclude other potential uses for the technology.[147] Conversely, user adoption decisions are usually made when the patented invention is already in the market and its potential uses are better known. Thus, it decreases the risk of an erroneous decision.

Second, objectors to the Moral Utility Doctrine warn that the doctrine would deter inventors with controversial inventions from filing patents, which would have negative economic effects.[148] This argument is irrelevant to user adoption decisions because these decisions take place later in the process—after the technology is invented and patented. Furthermore, while the Moral Utility Doctrine penalizes a technology when it denies patent protection, user adoption encouragement singles out a technology for a positive reward. The Moral Utility Doctrine will not affect competitors because government action should apply to a category of technology, not to a specific competitor. Thus, government action to encourage user adoption is unlikely to deter inventors. The opposite may in fact be true; inventors may be induced to increase their efforts if they believe their invention is truly revolutionary and could gain governmental support.

L. REV. 577, 591–97 (2009) (describing an international trend toward consideration of morality in invention creation activity).

147. Although a court may invalidate the patent later when more information is available, the basis for its decision is that the PTO should not have granted a patent in the first place because at the time of the invention there was no known utility.

148. Benjamin D. Enerson, Note, *Protecting Society from Patently Offensive Inventions: The Risk of Reviving the Moral Utility Doctrine*, 89 CORNELL L. REV. 685, 715 (2004).

Finally, objectors to the Moral Utility Doctrine argue that the PTO is ill-equipped to make determinations regarding the social effects of diverse technologies.[149] Again, this argument does not apply to the incorporation of user adoption principles into the law. These principles would help to create a systemized and consistent law to encourage user adoption, but the PTO would not implement them. The implementation would remain under the auspices of specialized agencies, Congress, and state and local governments.

V. INSTIGATORS FOR GOVERNMENT ACTION

Government action is not the only way to overcome user resistance, nor is it always warranted. Promoters of new technologies will often try to overcome resistance in order to be successful in the marketplace. Particularly, they often work to overcome resistance due to novel complexity. Their efforts may include design changes to simplify the technology and advertisement campaigns that emphasize the ease of use.[150] In other instances, society may require a considerable adjustment time that precludes a hasty adoption. This is often the case where resistance is a result of pressures on moral or social values. Finally, some inventions may be unsuccessful technologies, without which society is better off.

The goal of this Part is to take a preliminary step to identify situations in which government action is particularly justified. These are cases of market failure. In these cases, neither the actions of the patent owner nor her competitors are likely to overcome user resistance. This inquiry is a first step that seeks to indicate how systematic thought about government action to encourage user adoption can be useful. The goal of this preliminary inquiry is twofold: to identify situations that warrant government action and, through this investigation, to shed light on situations in which government action may not be necessary. If we do not embark on a systematic exploration of situations that are suitable for government action, we will be unable to identify situations in which the government action may be inappropriate. This section identifies two situations where government action is justified because of market failure. The two situations underscored are not an exhaustive list. These are cases where technologies are characterized by network effects that require critical mass for widespread adoption, and cases in which dissemination is urgent.

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149. *See id.* at 711.

150. For example, the Mac is known for its ease of use and Apple emphasizes this factor in its advertising. *See, e.g.*, *Compare Mac Models*, APPLE, http://www.apple.com/mac/compare (last visited June 11, 2014) ("No matter which Mac you choose, you're getting a computer that features the latest technology and is ready to help you do amazing things right out of the box.").

A. *Network Effects: Attaining Critical Mass*

Government action is particularly important where a technology that is characterized by network effects requires support to acquire critical mass. Technologies characterized by network effects become desirable as more people use them. Once a technology reaches critical mass, its rate of adoption accelerates. For example, interactive technologies are often characterized by network effects—the more people who use them, the more functional they become. Consequently, it is often vital for interactive technologies to attain critical mass in order to achieve widespread dissemination.[151] While some technologies characterized by network effects may be successfully adopted without government action, in other cases, government action could prevent a market failure.[152]

The adoption of the Minitel—a videotext system that gave the French population many of the advantages of the Internet a decade earlier than the rest of the world—illustrates the significance of government action to attain critical mass and the ways in which a technology can attain a critical mass. While consumers gladly endorsed the convenience of online plane and train ticket purchase, grocery shopping, and abundant sources of information and opportunities for social interaction, few realized that many of these conveniences were available to large segments of the French population since the 1980s. Minitel[153] offered French phone customers a multitude of online services including online banking; travel and ticketing reservations; specialized information services (finance, health, travel and

151. *See* ROGERS, *supra* note 54, at 343–44; Economides & Himmelberg, *supra* note 74, at 4–6; Nicholas Economides, *The Economics of Networks*, 14 INT'L J. INDUS. ORG. 673, 694–95 (1996); Markus, *supra* note 77, at 194–95.

152. Government action to create critical mass may also be warranted in some cases where the encouragement of standard-setting would promote interoperability. There are three options for standardization: industry players can coordinate to select a single standard; the market may tip to favor a certain standard; or the government may mandate a standard. Mark A. Lemley, *Standardizing Government Standard-Setting Policy for Electronic Commerce*, 14 BERKELEY TECH. L.J. 745, 747 (1999). In certain cases, where the market or industry players are unlikely to achieve standard-setting, the situation may warrant government action to prevent market failure. For discussions of government action compared to other methods of standardization, see generally Daniel Benoliel, *Cyberspace Technological Standardization: An Institutional Theory Retrospective*, 18 BERKELEY TECH. L.J. 1259 (2003); Joseph Forrell & Garth Solaner, *Competition, Compatibility and Standards: The Economics of Horses, Penguins and Lemmings* (Univ. of Cal. Berkeley Dep't of Econ., Working Paper No. 8610, 1986); Mark A. Lemley, *Antitrust and the Internet Standardization Problem*, 28 CONN. L. REV. 1041 (1996); Kevin Werbach, *Higher Standards Regulation in the Network Age*, 23 HARV. J.L. & TECH. 179 (2009). *But see* Michael L. Katz & Carl Shapiro, *Systems Competition and Network Effects*, 8 J. ECON. PERSP. 93, 112–13 (1994) (cautioning against government action in cases of network effects).

153. The system was officially known as the French national videotex system. William L. Cats-Baril & Tawfik Jelassi, *The French Videotex System Minitel: A Successful Implementation of a National Information Technology Infrastructure*, 18 MIS Q. 1, 1 (1994).

entertainment); online ordering of goods such as groceries; messaging services (the anonymous sex forums were particularly successful); jobs and classified ads; and interactive games.[154]

Minitel comprised a small monitor and a keyboard. It used the phone connection to transmit text to and from the user.[155] Minitel reached mainstream adoption in France by the mid-1980s, soon after its introduction in 1982. Many households and businesses used Minitel on an everyday basis.[156] Interestingly, in 1982, companies launched similar services that used the same technology in many other countries, including the United States, sixteen Western European countries, and Japan. Yet these systems failed to achieve the widespread dissemination enjoyed by the French Minitel. Consequently, residents of these countries waited until the mid-1990s to benefit from the advantages of an online system—the Internet.[157]

Commentators raise different theories to explain the success of the French Minitel in comparison to the failure of similar online services in other countries. Particularly, they point to the rapid creation of a critical mass of Minitel users. Minitel is an interactive communication system. It requires a significant number of users to draw in service providers, who in turn bring in additional users. Thus, analysts explain that the French government's monopoly on Minitel services and the initial free distribution of the system to all phone consumers rapidly brought in the necessary critical mass of users.[158] Conversely, promoters of similar systems in other

154. *See* Eric Brousseau, *E-Commerce in France: Did Early Adoption Prevent Its Development?*, 19 INFO. SOC'Y 45, 46 (2003); Cats-Baril & Jelassi, *supra* note 153, at 12. An email service was added in 1991. *Id.* at 8.

155. *See* H.L. Moulaison, *The Minitel and France's Legacy of Democratic Information Access*, 21 GOV. INFO. Q. 99, 101 (2004).

156. In 1985, 39% of French businesses used Minitel. By 1990, 84% of French businesses used Minitel and a third of the population had access to it, whether at home or at work. Finally, by 1992, about half the French population had access to Minitel. Brousseau, *supra* note 154, at 46; Cats-Baril & Jelassi, *supra* note 153, at 16.

157. *See* Cats-Baril & Jelassi, *supra* note 153, at 9; Ya-Ching Lee, Newspaper Online Services: A Successful Business? Lessons Learned from Videotext Failure 5– 6, 11–13 (July 1999) (Ph. D dissertation, Indiana University), *available at* http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.42.9681&rep=rep1&type=pdf (discussing the failure of newspaper videotext systems in the United States); Miles & Thomas, *supra* note 50, at 255 (discussing the failure of the British videotext system).

158. Brousseau, *supra* note 154, at 46. Specifically, the government initially distributed Minitel for free as the only effective source of directory assistance. Cats-Baril & Jelassi, *supra* note 153, at 4–5, 10, 15; Moulaison, *supra* note 155, at 101. Commentators identified additional factors that contributed to Minitel's success. These factors included the easy-to-use design and the use of the French telephone system solely as a transmission gateway and not as an information provider. *See* Cats-Baril & Jelassi, *supra* note 153, at 9, 10–11, 15; Miles & Thomas, *supra* note 50, at 262–66.

countries failed to meet the critical mass challenge.[159] With the benefit of hindsight, based on the success of the Internet and Minitel, parallel online systems had the potential for mass adoption outside France during the early 1980s. Yet, most of the world's residents received the benefits of an online system over a decade later, when the Internet reached popular use.[160]

B. *Urgency*

Market processes take time as different groups of users with different levels of risk aversion and technological sophistication decide whether to adopt a new technology.[161] Some technological adoption processes take a year or less, while others may take decades or even centuries. Yet in times of national emergencies, particularly those involving health threats, governments may need to intervene to expedite the market process. Intervention in these cases is necessary because of the dire implications of a market failure to achieve widespread dissemination of the technology in a timely manner.[162] The U.S. government's intervention in the dissemination

159. *See, e.g.*, Ya-Ching Lee, *supra* note 157, at 5–6, 11–13 (discussing the failure of newspaper videotext systems in the United States); Miles & Thomas, *supra* note 50 (discussing the failure of the British videotext system).

160. Some believe that Minitel was not necessarily a success story because it delayed the adoption of the Internet in France. *See, e.g.*, Hugh Dauncey, *A Cultural Battle: French Minitel, the Internet and the Superhighway*, 3 CONVERGENCE 72, 77–78 (1997) (pointing out that the French attachment to Minitel is one of the factors that delayed Internet adoption in the country); Amy Harmon, *Why the French Hate the Internet*, L.A. TIMES (Jan. 27, 2007), http://articles.latimes.com/print/1997-01-27/news/mn-22569_1_french-culture (reporting that the French devotion to Minitel is part of the reason for their antagonism to the Internet). And, doubtless, Minitel did play a role in France's delayed Internet adoption. Yet the picture is more complex. First, e-commerce fared differently than individual user adoption. Although in 1997 only 22% of French businesses were online (compared to 58% in the United States), businesses could take advantage of the infrastructure and experience they gained in Minitel, and they closed the gap quickly. By 2001, 80% of all French businesses were online (compared to 88% in the United States). Brousseau, *supra* note 154, at 51. Second, adoption by individual users did lag behind. Between 1997–2007, the French individual user adoption lagged 25% behind the United States; the gap only began shrinking in 2007, and then closed in 2010. *Internet Users (per 100 People)*, U.N. DATA (2012), http://data.un.org/Data.aspx?q=internet+users&d=WDI&f=Indicator_Code%3aIT.NET.USER.P2. Although Minitel played a role in the user adoption delay, additional factors contributed, including a low rate of homeownership of personal computers and an underdeveloped cable network. *See generally* Brousseau, *supra* note 154. Third, even acknowledging that Minitel did contribute to the delayed individual user adoption between 1997–2007, critics should balance the costs of this delay against the fact that from 1982–1995 the French exclusively possessed many of the advantages of the Internet. Furthermore, despite the slow rate of adoption from 1997, many French residents did enjoy both the Internet and Minitel throughout this period.

161. For a description of adopter types, including innovators, early adopters, early majority, late majority, and laggards, see ROGERS, *supra* note 54, at 282–85.

162. Sometimes market failure occurs when the window of opportunity is broader (beyond a few weeks or months or even a year) but time is still of the essence, as when the market delays adoption of environmental technologies designed to reduce pollution. Yet, the discussion of

of the swine flu vaccine illustrates the importance of expediting market processes in these situations.

The swine flu epidemic broke out in the spring of 2009.[163] In June of that year, the World Health Organization (WHO) declared the swine flu to be the first pandemic in forty-two years.[164] Deaths from the swine flu during the spring raised fears of a massive epidemic that would kill many once the flu season began in the fall of 2009.[165] A flu vaccine was ready by the early fall of 2009.[166] Yet, the government's challenge was to vaccinate the population at large, beginning with the groups that were particularly at risk.[167] Public health experts warned that health care providers should vaccinate the whole, or at least most, of the U.S. population within a couple of weeks to prevent massive outbreaks of the swine flu that could culminate in a large death toll.[168] Under these circumstances, the government could not wait for market forces to take their course. The government faced a double task—to ensure not only an adequate supply of vaccine, but also to create demand for the vaccine by the population at large.

The U.S. government acted quickly. First, it eliminated the price obstacle by providing the vaccine for free.[169] However, it had to do much more to overcome resistance. The government vaccinated school children in public schools and opened centers in many communities during the weekends to facilitate the process of vaccination.[170] In addition, the

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whether these situations should also be included within the category of urgency is beyond the scope of this Article.

163. *See* Donald G. McNeil, Jr., *U.S. Declares Public Health Emergency Over Swine Flu*, N.Y. TIMES, Apr. 26, 2009, at A1, *available at* http://www.nytimes.com/2009/04/27/world/27flu.html?_r=0.

164. Niko Kyrakou, *Swine Flu Didn't Fly*, DEEP J. (Jan. 27, 2010), http://www.deepjournal.com/p/43/a/en/2527.html.

165. JoNel Aleccia, *Swine Flu Fears Subside, but Second Wave Looms*, NBC NEWS (May 4, 2009, 9:41 PM), http://www.nbcnews.com/id/30563707.

166. *See* Donald G. McNeil, *Swine Flu Vaccinations Start as Officials Attack Myths*, N.Y. TIMES, Oct. 6, 2009, at A19, *available at* http://www.nytimes.com/2009/10/07/us/07flu.html.

167. *See* Elizabeth Weise, *Swine Flu Vaccine Arrives, and the Scramble Begins*, USA TODAY, Oct. 2, 2009, at 1A, *available at* http://usatoday30.usatoday.com/news/health/2009-10-01-swine-flu-vaccine_N.htm#.

168. *See 2009 H1N1 Vaccination Recommendations*, CTRS. FOR DISEASE CONTROL AND PREVENTION, http://www.cdc.gov/h1n1flu/vaccination/acip.htm (last updated Oct. 15, 2009); *WHO Recommendations on Pandemic (H1N1) 2009 Vaccines*, WORLD HEALTH ORG. (July 13, 2009), http://www.who.int/csr/disease/swineflu/notes/h1n1_vaccine_20090713/en/index.html.

169. *See* Julie Bosman, *Long Lines to Get Free Swine Flu Shot in New York City*, N.Y. TIMES (Nov. 15, 2009), http://www.nytimes.com/2009/11/15/nyregion/15clinic.html.

170. *See* Erin Allday, *Thousands Swamp S.F. Clinics to Get Vaccines*, S.F. CHRON. (Oct. 30, 2009, 4:00 AM), http://www.sfgate.com/health/article/Thousands-swamp-S-F-clinics-to-get-vaccine-3282492.php; Michael Laris, *D.C. Swine Flu Plan Includes Vaccination Hubs, Network of*

government engaged in a massive advertisement campaign. It not only had to advertise the availability of the vaccine for free, but also had to overcome fears of the consequences of taking the vaccine.[171] Many individuals were afraid to take the vaccine due to concerns about dangerous side effects. Specifically, they feared that the vaccine was new and different from previous flu vaccines, and therefore, entailed additional risks.[172]

The feared swine flu epidemic did not break out during the flu season of 2009–2010.[173] Some critics argued that the swine flu vaccines were unnecessary and that the swine flu was never destined to become an epidemic. No consensus has yet been reached on this point.[174] Yet, the criticism was targeted at the decision-making process and the conclusions of the medical agencies (the WHO and the Center for Disease Control (CDC)), not the government's adoption of these conclusions and its implementation process.[175] Given the recommendations of the medical

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Health-Care Providers, WASH. POST (Sept. 5, 2009), http://articles.washingtonpost.com/2009-09-05/news/36857385_1_swine-flu-vaccinations-clinic-doctors.

171. *HHS Secretary Sebelius Unveils New H1N1 Advertisement That Will Air During New Year's College Football Bowl Games*, U.S. DEP'T OF HEALTH & HUMAN SERVS. (Dec. 31, 2009), http://www.hhs.gov/news/press/2009pres/12/20091231a.html; Rich Thomaselli, *Government PSA Urges Americans to Get Swine-Flu Vaccine*, ADAGE.COM (Dec. 7, 2009), http://adage.com/article/news/advertising-psa-urges-americans-swine-flu-vaccine/140923/.

172. *See* Michael Specter, *The Fear Factor*, NEW YORKER (Oct. 12, 2009), http://www.newyorker.com/talk/comment/2009/10/12/091012taco_talk_specter; *Poll: One-Third of U.S. Parents Oppose H1N1 Vaccines*, USA TODAY (Oct. 7, 2009, 4:34 PM), http://www.usatoday.com/news/health/2009-10-07-swine-flu-poll_N.htm.

173. *See* CTRS. FOR DISEASE CONTROL AND PREVENTION, UPDATED CDC ESTIMATES OF 2009 H1N1 INFLUENZA CASES, HOSPITALIZATIONS AND DEATHS IN THE UNITED STATES, APRIL 2009 –APRIL 10, 2010 (May 14, 2010), http://www.cdc.gov/h1n1flu/estimates_2009_h1n1.htm.

174. *See, e.g.*, Philip Bethge et al., *The Great Swine Flu Boosterism of 2009*, S.F. SENTINEL (Mar. 18, 2010), http://www.sanfranciscosentinel.com/?p=65052 (quoting Wolfgang Wodarg, a member of the German parliament, telling the European Council that "millions of people worldwide were vaccinated for no good reason"); Donald G. McNeil, Jr., *U.S. Reaction to Swine Flu: Apt and Lucky*, N.Y. TIMES, Jan. 1, 2010, at A1, *available at* http://www.nytimes.com/2010/01/02/health/02flu.html?_r=0 (quoting leading medical professionals praising the government's response); Editorial, *H1N1dsight is a Wonderful Thing*, 28 NATURE BIOTECH. 182, 182 (2010) ("Although the nature of the threat may have been overstated, the WHO, CDC and other authorities had little scientific evidence at the beginning of the H1N1 pandemic to discount the most dire predictions of fatalities."); *Billions Wasted Over Swine Flu, Says Paul Flynn MP*, BBC NEWS (June 24, 2010), http://www.bbc.co.uk/news/10396382 (quoting disparate views regarding whether mass vaccination was a mistake).

175. Kyrakou, *supra* note 164 (reporting on criticisms of the WHO's definition of pandemic and the allegations that the WHO created panic to boost vaccine sales); WORLD HEALTH ORG., DRAFT REPORT OF THE REVIEW COMMITTEE ON THE FUNCTIONING OF THE INTERNATIONAL HEALTH REGULATIONS (2005) AND ON PANDEMIC INFLUENZA A (H1N1) 2009, at 14–15, 18–19 (2011), http://www.who.int/ihr/preview_report_review_committee_mar2011_en.pdf (criticizing the WHO's definition of pandemic but finding no evidence of motivation to create panic to enrich vaccine

authorities at the time, vaccination of the population was imperative.[176] And it is clear that at that time, absent these steps, health care workers would have vaccinated a far smaller segment of the U.S. population.

CONCLUSION

While traditional critique of the patent system's failure to encourage dissemination focuses on the increasing strength of patent rights, this Article showed that dissemination often fails because patent law largely ignores the ordinary user. The ordinary user is a critical player who determines the fate of new technologies through his mundane everyday decisions of whether to adopt a new technology. Yet, patent law treats competition as a proxy for dissemination and focuses on the patent owner and his competitors, but addresses the ordinary user only indirectly as it views him as motivated by availability and price alone.

This Article explored the reasons for user resistance and showed that these can be categorized into two main sources of resistance: resistance to the novelty of the technology and resistance to the perceived consequences of using the technology. It argued that the technology-regulating regime should incorporate gentle nudges that address the complexities of the ordinary user. This Article revealed that although patent law contains some gentle nudges to indirectly encourage user adoption, the law addresses only a limited part of the reasons for user resistance. And while different government agencies currently attempt to encourage user adoption, they do so in a piecemeal and inconsistent manner.

This Article underscored the need to incorporate a systematic framework of gentle nudges to address the full spectrum of reasons for user resistance. Specifically, this Article argued that government action, through gentle nudges to encourage user adoption, is particularly warranted in two instances of market failure: where a technology is characterized by network effects and needs to acquire critical mass, and where dissemination is urgent and time is of the essence.

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manufacturers); Mike Adams, *Flu Vaccines, Pharma Fraud, Quack Science, the CDC and WHO – All Exposed by Richard Gale and Gary Null*, NATURAL NEWS (July 2, 2010), http://www.naturalnews.com/029124_flu_vaccines_quackery.html (stating that the CDC's support for vaccination "raises an alarm about our federal government's scientific integrity, and calls into question its true allegiance and purpose: to protect the health of American citizens or increase Big Pharma profits").

176. *H1N1dsight is a Wonderful Thing*, *supra* note 174, at 182 ("Faced with the certainty of a new influenza virus to which a large proportion of the world's population was immunologically naïve, and the uncertainty of the predictive epidemiological models, governments had little political choice but to act, anticipating something close to the worst case scenario.").