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Securing Patent Law

Charles Duan

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A vigorous conversation about intellectual property rights and national security has largely focused on the defense role of those rights, as tools for responding to acts of foreign infringement. But intellectual property, and patents in particular, also play an arguably more important offense role. Foreign competitor nations can obtain and assert U.S. patents against U.S. firms and creators. Use of patents as an offense strategy can be strategically coordinated to stymie domestic innovation and technological progress. This Essay considers current and possible future practices of patent exploitation in this offense setting, with a particular focus on China given the nature of the current policy conversation.

To respond to this use of patents as an offense tool, the best approach takes a page from cybersecurity. Patent law cannot simply exclude foreign adversaries, and so the law must be rendered secure and resilient to all potential users, foreign or domestic. Procedures for patent examination and verification, leadership in adjudication fairness, importation of competition principles into patent doctrine, and a whole-of-government approach can help to ensure that patent law is secure from exploitative abuses.

* Assistant Professor, American University Washington College of Law. The views expressed in this testimony are my own and not those of any of my affiliated institutions or organizations. This Essay is based on my testimony of March 8, 2023, before the Subcommittee on Courts, Intellectual Property, and the Internet of the House Committee on the Judiciary. *See Intellectual Property and Strategic Competition with China, Part I: Hearing Before the Subcomm. on Cts., Intell. Prop., & the Internet of the H. Comm. on the Judiciary*, 118th Cong. (2023) https://judiciary.house.gov/sites/evo-subsites/republicans-judiciary.house.gov/files/evo-media-document/duan-testimony.pdf (testimony of Charles Duan). I would like to thank Michael Carrier, Bernard Chao, Jorge Contreras, Nikola Datzov, James Grimmelmann, Dave Jones, Josh Landau, Matt Lane, Alex Moss, Laura Sheridan, Daniel Takash, the Spring 2023 Intellectual Property Law class at AUWCL, and the members of the Subcommittee and their staff for their valuable questions, thoughts, and suggestions that contributed to the content of this Essay, as well as the editors of the *Belmont Law Review* for their excellent comments and suggestions.

INTRODUCTION

It is a story heard many times before: an American tech startup pitted against a Chinese electronics manufacturer; a patent on robotics against an allegedly infringing Amazon listing in direct competition with the patent holder's products.[1] This kind of story has driven a vociferous conversation about the need for stronger U.S. patents to fight Chinese intellectual property theft.[2] But while that ongoing conversation has

1. *See* Compl. for Declaratory Judgment at ¶¶ 12–19, Wyze Labs, Inc. v. Beijing Rockrobo Tech. Co., No. 2:21-cv-941 (W.D. Wash. July 15, 2021).

2. *See, e.g.*, COMM'N ON THE THEFT OF AM. INTELL. PROP., NAT'L BUREAU OF ASIAN RES., THE IP COMMISSION REPORT 34 (May 2013) ("A study by the U.S. International Trade Commission found that U.S. firms estimate losses to Chinese patent infringers to have topped $1.3 billion in 2009 alone.") (citing U.S. INT'L TRADE COMM'N, USITC PUB. 4226, CHINA: EFFECTS OF INTELLECTUAL PROPERTY INFRINGEMENT AND INDIGENOUS INNOVATION POLICIES ON THE U.S. ECONOMY 3–37 (2011)); Jeff Ferry, *Top Five Cases of Huawei IP Theft and Patent Infringement*, COAL. FOR A PROSPEROUS AM. (Dec. 13, 2018), https://prosperousamerica.org/top-five-cases-of-huawei-ip-theft-and-patent-infringement/ [https://perma.cc/HL6V-XNCU]; Lingling Wei & Bob Davis, *How China Systematically Pries Technology from U.S. Companies*, WALL ST. J. (Sept. 26, 2018), https://www.wsj.com/articles/how-china-systematically-pries-technology-from-u-s-companies-1537972066 [https://perma.cc/DZ8Q-GEL6] (describing infringement of DuPont patents in China); Milton Ezrati, *Does Biden Care About China's Theft of American Technology?*, NAT'L INT. (June 26, 2022), https://nationalinterest.org/blog/techland-when-great-power-competition-meets-digital-world/does-biden-care-about-china%E2%80%99s-theft [https://perma.cc/WRX6-A34A] ("Less licit is how Chinese firms buy high-tech American equipment and, despite patent protections, reproduce it for use in China . . . ."). Criticisms of the Biden Administration's negotiation position on COVID-19 vaccine patents have also connected patents with Chinese IP theft. *See, e.g.*, Walter G. Copan, *China's Ally in Stealing Western IP: The United States*, REALCLEARPOLICY (Oct. 12, 2022), https://www.realclearpolicy.com/articles/2022/10/13/chinas_ally_in_stealing_western_ip_the_united_states_858707.html [https://perma.cc/Y7T7-5BNT] (connecting patent policy with "Chinese government agenda to steal competitors' intellectual properties"); Grover Norquist, *Biden's*

assumed a contest between American patent holders and Chinese infringers, that is not this story: the accused infringer was a Washington State startup, and the patent holder here was Xiaomi Corporation, one of the largest electronics companies in both China and the world.[3]

Conversations in the United States about national competitiveness and national security, especially with respect to China, have increasingly focused on intellectual property.[4] The Trump Administration's "China Initiative" tied industrial espionage and trade secret theft to national security risks,[5] reports detail forced transfers of aerospace and electric vehicle technologies from American to Chinese firms,[6] and experts inside and outside the federal government have cited China's increasing proficiency in telecommunications and artificial intelligence as reasons for augmenting patent protection in the United States.[7]

Push to Undermine IP Rights Harms the US and Helps Communist China, THE HILL (June 8, 2022), https://thehill.com/opinion/finance/3515851-bidens-push-to-undermine-ip-rights-harms-the-us-and-helps-communist-china/ [https://perma.cc/9D9Q-2UZP]; Seton Motley, *Biden Admin Now Directly Handing China Our Intellectual Property*, HEARTLAND INST. (Sept. 22, 2022), https://heartland.org/opinion/biden-admin-now-directly-handing-china-our-intellectual-property/ [https://perma.cc/6Z2L-QRFT].

3. *See* Compl. for Declaratory Judgment at ¶¶ 3–6, *Wyze Labs*, No. 2:21-cv-941; Todd Bishop, *Wyze Sues Xiaomi and Roborock to Invalidate Robotic Vacuum Patent and Save Its Amazon Listing*, GEEKWIRE (July 20, 2021), https://www.geekwire.com/2021/wyze-sues-xiaomi-roborock-invalidate-robotic-vacuum-patent-save-amazon-listing/ [https://perma.cc/5NZC-2YXR].

4. *See* Compl. for Declaratory Judgment at ¶¶ 3–6, *Wyze Labs*, No. 2:21-cv-941; Bishop, *supra* note 3; *see, e.g.*, NAT'L SEC. COMM'N ON A.I., FINAL REPORT 206 (2021) ("America's IP laws and institutions must be considered as critical components for safeguarding U.S. national security interests, including advancing economic prosperity and technology competitiveness."); Christopher Wray, Dir., Fed. Bureau of Investigation, Remarks at the Hudson Institute Video Event: China's Attempt to Influence U.S. Institutions (July 7, 2020) (transcript available at https://www.fbi.gov/news/speeches/the-threat-posed-by-the-chinese-government-and-the-chinese-communist-party-to-the-economic-and-national-security-of-the-united-states); Paul R. Michel, *U.S. Patent System Weakens: Protect IP to Keep American Tech at the Top*, VENTUREBEAT (Mar. 17, 2022), https://venturebeat.com/enterprise/us-patent-system-weakens-protect-ip-to-keep-american-tech-at-the-top/ [https://perma.cc/ADT9-6526] (connecting patent policy to "not only our prosperity, but national security as well"); Riley Walters & Michael Maher, *Why China's Intellectual Property Theft Is a Concern for National Security*, HERITAGE FOUND. (Apr. 4, 2019), https://www.heritage.org/asia/commentary/why-chinas-intellectual-property-theft-concern-national-security [https://perma.cc/4X8L-C33L]; Yudhijit Bhattacharjee, *The Daring Ruse That Exposed China's Campaign to Steal American Secrets*, N.Y. TIMES (Mar. 7, 2023), https://www.nytimes.com/2023/03/07/magazine/china-spying-intellectual-property.html [https://perma.cc/KQY9-AH93].

5. *See Information About the Department of Justice's China Initiative and a Compilation of China-Related Prosecutions Since 2018*, U.S. DEP'T OF JUST. (July 31, 2020), https://www.justice.gov/archives/nsd/information-about-department-justice-s-china-initiative-and-compilation-china-related [https://perma.cc/E7BD-ZXWS].

6. *See* OFF. OF THE U.S. TRADE REP., SPECIAL 301 REPORT 24–26 (2022).

7. *See* NAT'L SEC. COMM'N ON A.I, *supra* note 4, at 207. *See generally* Charles Duan, *Of Monopolies and Monocultures: The Intersection of Patents and National Security*, 36

As these examples show, the bulk of the national security conversation has been about IP in a *defense* role: protecting American innovators from theft of their technologies and information.[8] But as the example of Xiaomi and Wyze shows, IP rights can also play an *offense* role,[9] in which foreign firms obtain U.S. protections and assert them against U.S. firms. The United States ignores this offense role at its peril. A coordinated effort by China or another competitor nation to obtain and assert U.S. patents on strategically important technologies could tie up American innovators, undermining U.S. technological progress and leadership.

This Essay explores ways in which a foreign competitor nation could exploit U.S. patent law in an offense capacity. These possibilities are based on observations of current patent activities by China and other countries.

First, the competitor nation could file or otherwise obtain U.S. patents in critical technological areas. China is doing this already, making it poised to be the top foreign filer of U.S. patent applications in the next few years.[10] In prioritizing quantity, the foreign filing nation potentially sacrifices quality, resulting in patents that may be statutorily invalid and are issued only due to unavoidable errors in patent examination.[11] Nevertheless, history suggests that these low-quality patents can impose tremendous costs on innovators, making them ideal tools for an offense strategy.[12]

These foreign-filed patents can then be asserted against U.S. firms.[13] Indeed, foreign governments often sponsor and coordinate the assertion of patents around the world.[14] If litigation rigorously scrutinized the asserted patents and weeded out low-quality ones, then that might put an end to this international strategic behavior. But the competitor nation could further take advantage of the ongoing race to the bottom among

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SANTA CLARA HIGH TECH. L.J. 369, 374–87 (2020) [hereinafter Of Monopolies and Monocultures].

8. *See, e.g.*, Debora Halbert, *Intellectual Property Theft and National Security: Agendas and Assumptions*, 32 INFO. SOC'Y 256, 264 (2016) (raising "concerns about appropriating the concept of IP as a national security issue and using it to justify the protection of cyberspace"); Jorge L. Contreras, *Patents on 5G Standards Are Not Matters of National Security*, 53 INT'L REV. INTELL. PROP. & COMPETITION L. 849, 850 (July 1, 2022) ("The notion that [patent and antitrust] doctrines could also compromise national security is misplaced."); Helen Nissenbaum, *Where Computer Security Meets National Security*, 7 ETHICS & INFO. TECH. 61, 68 (2005).

9. The word "offense" is intended here in its strategic or athletics sense of taking initiative to win points or resources, as opposed to defensive strategy intended to protect against losses. *See, e.g.*, DEPT. OF THE ARMY, ADRP 3-0, OPERATIONS 3-2 tbl.3-1 (2016) (distinguishing purposes of offense and defense). The term is not intended in its sense of "distastefulness" or "vulgarity."

10. *See infra* notes 59–60 and accompanying text.

11. *See infra* notes 76–78 and accompanying text.

12. *See infra* notes 80–85 and accompanying text.

13. *See infra* Section II.B.

14. *See infra* notes 89–92 and accompanying text.

patent litigation forums.[15] Both Chinese and U.S. courts have adopted procedures that tilt the playing field in favor of patent holders, in an effort to attract lucrative patent cases.[16] In particular, the U.S. International Trade Commission, intended as a forum for American patent holders to obtain relief against foreigners,[17] has rewritten its jurisdiction so broadly that now it is frequently an agency where foreign patent holders obtain relief against American firms.[18] Even if the targets of such assertion activity ultimately prevail on the merits, the costs of prolonged litigation could set American technological progress on a slower track.

How should the United States defend against patents used in this offense capacity? Perhaps it could block foreigners from asserting U.S. patents or retaliate by using patents in a counter-offense against foreign citizens.[19] Both approaches face difficulties for two reasons. First, international treaties require the U.S. patent system to treat other nations equally, and to change that would trigger destructive tit-for-tat actions around the world.[20] Second, because a patent is territorially limited to the country granting it, the retaliatory approach requires U.S. firms to avail themselves of foreign courts and foreign patents, and thus is beyond the scope of domestic policy.[21]

The better approach is to secure U.S. patent law.[22] The patent system can be understood as a form of infrastructure:[23] an operational institution that accepts inputs in the form of patent applications from around the world and produces outputs like granted patents and infringement determinations. Computers or banking systems are secured to prevent malicious inputs from executing harmful procedures.[24] Patent law, too, needs checks, redundancies, and validation measures that prevent misuse in ways that undermine the system's objectives of encouraging innovation.

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15. *See infra* Section II.C.

16. *See infra* notes 112–118 and accompanying text.

17. U.S. INT'L TRADE COMM'N, A CENTENNIAL HISTORY OF THE USITC 129 (2017), https://www.usitc.gov/documents/final_centennial_history_508_compliant_v2.pdf [https://perma.cc/EE2T-C7SZ].

18. *See infra* Section II.D.

19. *See infra* note 141 and accompanying text.

20. *See* Bernard Chao, *Patent Imperialism*, 109 NW. U. L. REV. ONLINE 77, 86 (2014).

21. WesternGeco LLC v. ION Geophysical Corp., 138 S. Ct. 2129, 2137 (2018) ("Courts presume that federal statutes apply only within the territorial jurisdiction of the United States.") (quoting Foley Bros., Inc. v. Filardo, 336 U.S. 281, 285 (1949)) (internal quotations omitted).

22. Chao, *supra* note 20, at 86–90.

23. *Cf.* Peter Lee, *The Evolution of Intellectual Infrastructure*, 83 WASH. L. REV. 39, 43 (2008) (describing how other forms of intellectual property, namely trademarks and copyrights, "can quickly evolve into general infrastructure").

24. *See, e.g.*, Andrew P. Scott & Paul Tierno, Cong. Res. Serv., R47434, Banking, Data Privacy, and Cybersecurity Regulation (2023).

To that end, this Essay outlines four approaches:

> **Trustworthiness in patents.**[25] Processes for ensuring that patents are correctly issued will separate hard-earned innovation from low-quality patent chaff that, left untouched, could entangle American innovators in costly litigation. Greater transparency in patent ownership and litigation would also help detect, identify, and respond to any abuse.
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> **Championing forum fairness.**[26] The United States should lead in putting a stop to the ongoing, destructive race to the bottom[27] on patent litigation practices. It should stand against "forum selling" practices, in China and elsewhere, of courts attracting lucrative patent lawsuits by tilting the playing field.
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> **Focusing on competition.**[28] A robustly competitive landscape promotes national security. Policymakers should work to ensure that the IP laws enhance competition and cannot be turned into tools for suppressing competition.
>
> **The whole of government.**[29] To ensure American leadership in technology and innovation, IP rights are an important component but not the only component. Especially for dynamic fields like artificial intelligence, patents can have complex and counterintuitive effects, and policy tools such as STEM education, high-skilled immigration, research funding, and diversity initiatives can have tremendous impact.

This Essay proceeds as follows. Part I reviews the operation of patents and focuses in particular on their territorial nature. Part II considers ways in which U.S. patents can be used in offense, such that a foreign competitor could impair domestic interests. Part III describes legal and policy approaches to mitigate the offense potential of U.S. patents.

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25. *See infra* Section III.A.

26. *See infra* Section III.B.

27. This phrase generally refers to the practice of jurisdictions adopting increasingly lax regulatory schemes to attract business interests. *See, e.g.*, Gibbs v. Babbit, 214 F.3d 483, 501 (4th Cir. 2000).

28. *See infra* Section III.C.

29. *See infra* Section III.D.

I. PATENTS AND THEIR TERRITORIAL NATURE

Patents are often described as a key driver of innovation, but how they do so is not straightforward. Patents are government-granted legal instruments given to inventors of new technologies. To obtain a patent, the inventor must describe the invention in a patent application.[30] A patent examiner reviews the application to determine whether the technology purported to be patentable is, in fact, a new and nonobvious advance.[31] If the examiner finds that it is, then the U.S. Patent and Trademark Office ("USPTO") issues a patent, granting the holder a right for about two decades to prevent others from making, using, selling, or importing the invention.[32] The inventor can sue and obtain damages or injunctive relief from those who infringe the patent.[33]

The reward of temporary market exclusivity over the technology is intended to encourage inventors not simply to invent in the first place, but to reveal their inventions to the world and to turn their inventions into commercial products and services.[34] The patent system is a *quid pro quo* arrangement: the public gives inventors the economic benefit of a temporary monopoly in exchange for the inventor's efforts and disclosure.[35] The public benefit of that bargain, of course, depends on whether the patent was granted correctly, as a patent granted on old or obvious technology only imposes monopoly control without the benefit of a technological advance.[36]

With respect to international technological competition, patent law's key feature is its asymmetry toward those outside the United States.[37] U.S. patents generally cannot stop foreign activity.[38] There are limited avenues for asserting patents against importers of infringing products,[39] but they still require a domestic act of importation.[40] An American patent has no effect on a foreign company operating entirely outside the United States, even if that foreign company is exploiting technology squarely within the

30. *See* 35 U.S.C. § 112.
31. *See* 35 U.S.C. §§ 102–03, 131.
32. *See* 35 U.S.C. §§ 154(a)(2), 271.
33. 35 U.S.C. §§ 283–284.
34. *See, e.g.*, Graham v. John Deere Co. of Kan. City, 383 U.S. 1, 5–6 (1966).
35. *See, e.g.*, Kewanee Oil Co. v. Bicron Corp., 416 U.S. 470, 484 (1974).
36. *See* Bonito Boats, Inc. v. Thunder Craft Boats, Inc., 489 U.S. 141, 148–49 (1989).
37. *See generally* Chao, *supra* note 20, at 78–79.
38. *See id.*; WesternGeco LLC v. ION Geophysical Corp., 138 S. Ct. 2129, 2137 (2018) ("Courts presume that federal statutes apply only within the territorial jurisdiction of the United States.") (quoting Foley Bros., Inc. v. Filardo, 336 U.S. 281, 285 (1949)) (internal quotations omitted).
39. *See* 35 U.S.C. § 271(g) (providing for patent infringement when one "imports into the United States . . . a product which is made by a process patented in the United States").
40. *See* Chao, *supra* note 20, at 78 ("Although there are exceptions to patent law's territorial limitation, these exceptions are narrow.").

scope of the patent.[41] That foreign company, however, can apply for and obtain as many U.S. patents as it wants.[42] Patents are available equally to foreign and domestic applicants, and in compliance with international treaties, the patent laws give no preference to domestic patent holders.[43] Indeed, in 2020, 56% of U.S. patent applications were filed by foreign residents, and 53% of patents were issued to foreign inventors.[44]

The result of this asymmetry is that a foreign firm can obtain a patent and charge an American company with infringement, but an American company cannot reciprocate.[45] For the American company to charge the foreign company with infringement, it must obtain a patent in the local jurisdiction and avail itself of that jurisdiction's intellectual property laws and procedures to obtain relief.[46]

This asymmetric situation is well-established in law, and it would be bad policy to change it for the following reasons.[47] Patents cannot be given extraterritorial effect to reach foreign conduct, as U.S. courts lack jurisdiction over foreign defendants and cannot enforce judgements in foreign countries.[48] Nondiscrimination among patent applicant nationalities avoids a destructive race to the bottom, in which countries vie to attract companies to relocate based on increasingly discriminatory patent laws; it also avoids tit-for-tat retaliation against countries' respective innovators.[49] The end result of policies favoring U.S. patent holders could ultimately be to disfavor them more greatly worldwide.[50] Furthermore, determined foreign adversaries could probably game such policies easily through shell companies and obfuscatory corporate transactions.[51] Thus, attempting to disfavor foreign patent applications legislatively would likely be futile.

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41. *See id.*

42. *See, e.g.*, Contreras, *supra* note 8, at 852.

43. *See* Agreement on Trade-Related Aspects of Intell. Prop. Rights Annex 1C, art. 3, para. 1, Apr. 15, 1994, 1869 U.N.T.S. 299; Jonathan Stroud & Levi Lall, *Paper of Record: Modernizing Ownership Disclosures for U.S. Patents*, 124 W. VA. L. REV. 449, 454 (2022).

44. *See* U.S. PAT. & TRADEMARK OFF., PERFORMANCE AND ACCOUNTABILITY REPORT 201, 205, 209, 215 (2021) [hereinafter USPTO PAR].

45. *See* Duan, *supra* note 7, at 387 n.105.

46. Derek Dessler, *China's Protection of Intellectual Property*, 19.1 FORDHAM INT'L L.J. 181, 190–91, 194–96 (1995).

47. *See* Chao, *supra* note 20, at 86–90.

48. *See* Goodyear Dunlop Tires Operations, SA v. Brown, 564 U.S. 915, 928–29 (2011) (discussing Helicopteros Nacionales de Colom., SA v. Hall, 466 U.S. 408, 416–18 (1984)); Yuliya Zeynalova, *The Law on Recognition and Enforcement of Foreign Judgments: Is It Broken and How Do We Fix It*, 31 BERKELEY J. INT'L L. 150, 151, 162–68 (2013) ("Enforcing U.S. court judgments abroad can prove especially difficult in light of divergent rules on jurisdiction, requirements for special service of process, reciprocity, and some foreign countries' public policy concerns over enforcing American jury awards carrying hefty punitive damages.").

49. *See, e.g.*, Alfredo C. Robles Jr., *History of the Paris Convention*, 15 WORLD BULL. 1, 15–16 (1999).

50. *See id.*

51. Cf. Tom Ewing, *Indirect Exploitation of Intellectual Property Rights By Corporations and Investors: IP Privateering and Modern Letters of Marque and Reprisal*, 4

Among other things, the territorial nature of patents explains why current concerns about IP theft in China are largely unrelated to U.S. patent law.[52] By both statute[53] and the Constitution,[54] the text of a patent is required to reveal the inner workings of a new technology with sufficient detail such that others are able to make and use the same technology.[55] That text is published such that anyone around the world can read the patent, and it makes little sense to say that anyone can "steal" publicly available information outside the ambit of U.S. patent law.[56] The odd juxtaposition of theft-based language with published, publicly accessible documents like patents has led to puzzling reports of Chinese "open-source intelligence" efforts to collect patents, academic articles, books, and other materials.[57] Despite being characterized as part of "China's Economic Aggression," open-source intelligence is nothing more than legally permissible academic research on published literature.[58]

Instead, IP theft typically refers to misappropriation of trade secrets and other proprietary information, through industrial espionage or forced disclosures through compelled joint ventures.[59] The implication is that U.S.

HASTINGS SCI. & TECH. L.J. 1, 50–51 (2012) (describing levels of "discretion" to conceal the sponsor of IP assertion and enforcement activities).

52. *See* KEVIN J. HICKEY ET AL., CONG. RSCH. SERV., R46532, INTELLECTUAL PROPERTY VIOLATIONS AND CHINA: LEGAL REMEDIES 15 (2020) ("A patent, for example, is a publicly available legal document granting the patent holder certain exclusive rights; . . . infringers do not 'steal' the patent."); Charles Duan, *U.S. Patents and Competitiveness with China*, R ST. SHORTS, Feb. 2019, at 2.

53. *See* 35 U.S.C. § 112(a).

54. The Supreme Court has connected the constitutional provision for patents with the requirement of public disclosure of the invention. *See* Kendall v. Winsor, 62 U.S. (21 How.) 322, 328 (1859) (reasoning that "[T]he inventor who . . . withholds his invention from the public, comes not within the policy or objects of the Constitution or acts of Congress."); Kewanee Oil Co. v. Bicron Corp., 416 U.S. 470, 480–81 (1974).

55. *See* Ariad Pharms., Inc. v. Eli Lilly & Co., 598 F.3d 1336, 1345 (Fed. Cir. 2010) (reasoning that "[A] separate requirement to describe one's invention is basic to patent law."); Jeanne C. Fromer, *Patent Disclosure*, 94 IOWA L. REV. 539, 548 (2009) (describing theory of the disclosure requirement).

56. *See* HICKEY ET AL., *supra* note 52, at 15; 35 U.S.C. § 10(a)(1).

57. WILLIAM C. HANNAS ET AL., CHINESE INDUSTRIAL ESPIONAGE: TECHNOLOGY ACQUISITION AND MILITARY MODERNISATION 26 (2013), *cited in* MICHAEL BROWN & PAVNEET SINGH, DEF. INNOVATION UNIT EXPERIMENTAL, CHINA'S TECHNOLOGY TRANSFER STRATEGY: HOW CHINESE INVESTMENTS IN EMERGING TECHNOLOGY ENABLE A STRATEGIC COMPETITOR TO ACCESS THE CROWN JEWELS OF U.S. INNOVATION 19 (Jan. 2018), *cited in* WHITE HOUSE OFF. OF TRADE & MFG. POL'Y, HOW CHINA'S ECONOMIC AGGRESSION THREATENS THE TECHNOLOGIES AND INTELLECTUAL PROPERTY OF THE UNITED STATES AND THE WORLD 13–14 (June 2018).

58. *See* WHITE HOUSE OFF. OF TRADE & MFG. POL'Y, *supra* note 57, at 13 (noting that "many other countries and the citizens of countries leverage open sources to advance technology"); BROWN & SINGH, *supra* note 57, at 16 fig. (characterizing "Open Source tracking of foreign innovation" as legal).

59. *See* OFF. OF THE U.S. TRADE REPRESENTATIVE, FINDINGS OF THE INVESTIGATION INTO CHINA'S ACTS, POLICIES, AND PRACTICES RELATED TO TECHNOLOGY TRANSFER, INTELLECTUAL PROPERTY, AND INNOVATION UNDER SECTION 301 OF THE TRADE ACT OF 1974

patent law has only limited capabilities when employed as a defensive measure, and the offense role of patents ought to be the stronger consideration with respect to how patents interact with national security and competitiveness.

II. U.S. PATENTS AS OFFENSE STRATEGY

The asymmetry between who can obtain U.S. patents and who can be sued under them helps to explain the offense role of patents. Foreign firms, perhaps with support or direction from their government, can obtain U.S. patents and assert them against American businesses.[60] This Essay uses China as a primary example because recent research and commentary has focused on Chinese IP practices.[61] However, any nation could avail itself of the tactics described below.[62]

A. Flooding the United States with Low-Quality Patents

First, Chinese entities apply for U.S. patents at a staggering rate.[63] In 2020, the USPTO received 47,712 patent applications from China, the second highest filing volume from a foreign country.[64] That represents a nearly 50% increase in application volume since 2017, a rapid acceleration compared to the top foreign filing country, Japan, where applications have dropped by almost 25% over the same period,[65] and compared to an overall increase in U.S. patent application filings of about 7% between those years.[66] China appears on track to be the top foreign filer of U.S. patent applications within just a few years.[67]

This meteoric rise in patent applications from China is the result of state-sponsored policy.[68] China uses a variety of tools to induce patent filings: tax incentives, target metrics for institutional patenting, and (until

19–23 (2018) (describing China's use of joint venture requirements to compel technology transfers "behind closed doors").

60. *See, e.g.*, Contreras, *supra* note 8, at 852.

61. *See, e.g.*, OFF. OF THE U.S. TRADE REP., *supra* note 59.

62. *See generally* Alden Abbot et al., ALIGNING INTELLECTUAL PROPERTY, ANTITRUST, AND NATIONAL SECURITY POLICY (2021), https://rtp.fedsoc.org/wp-content/uploads/Paper-Aligning-Intellectual-Property-Antitrust-and-National-Security-Policy.pdf [https://perma.cc/2UB7-DSMN].

63. USPTO PAR, *supra* note 44, at 210.

64. *Id.*

65. *See id.* at 211.

66. *See id.* at 201.

67. *See id*. at 211.

68. *See* U.S. PAT. & TRADEMARK OFF., TRADEMARKS AND PATENTS IN CHINA: THE IMPACT OF NON-MARKET FACTORS ON FILING TRENDS AND IP SYSTEMS 7 (2021); s*ee also* DAN PRUD'HOMME & TAOLUE ZHANG, CHINA'S INTELLECTUAL PROPERTY REGIME FOR INNOVATION: RISKS TO BUSINESS AND NATIONAL DEVELOPMENT 62 (2019); Cheryl Xiaoning Long & Jun Wang, *China's Patent Promotion Policies and Its Quality Implications*, 46 SCI. & PUB. POL'Y 91 (2019).

recently[69]) even monetary subsidies.[70] The USPTO concludes that these inducements are a "major contributor" to China's high worldwide volume of patent filings.[71]

China is not only applying for patents; it is buying them.[72] A 2020 study found that many Chinese mergers and acquisitions are driven by an interest to obtain patents.[73] Key manufacturers such as Huawei and Xiaomi are obtaining patent portfolios, often in coordination with the Chinese government.[74] Even the American patent broker Intellectual Ventures has been gladly dealing with China, with one co-founder saying, "the Chinese government is the only one we meet with on anything like a regular basis . . . Our expansion into China has gone really well."[75]

Multiple analyses suggest that those patents are also often of low innovative quality.[76] A *Bloomberg* report found that the majority of Chinese patents are abandoned shortly after grant, suggesting their minimal asset value.[77] The USPTO also concludes that China's use of subsidies and incentives "may in part explain why the commercial value of China's patents is low."[78] It further finds that China's IP licensing receipts are comparatively low, "an additional indicator of the relatively low value of China's patents and other IP."[79] Although these studies focused on worldwide patenting by Chinese entities, there does not appear to be reason to believe that Chinese-filed U.S. patents are substantially different.[80]

This glut of low-quality patents cannot simply be ignored. It strains the USPTO's limited examination resources, potentially delaying the

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69. *See* Stephen Yang, *Ending Patent Subsidies in China*, LANDSLIDE, Jan. 2021, at 10.

70. *See* U.S. PAT. & TRADEMARK OFF., *supra* note 68; *see also* PRUD'HOMME & ZHANG, *supra* note 68.

71. *See* U.S. PAT. & TRADEMARK OFF., *supra* note 68, at 7.

72. *See* Anton Malkin, *Beyond "Forced" Technology Transfers: Analysis of and Recommendations on Intangible Economy Governance in China* 4–12 (Ctr. for Int'l Governance Innovation, Paper No. 239, 2020), https://www.cigionline.org/sites/default/files/documents/no239_1.pdf [https://perma.cc/VS2U-STB4].

73. *See id.*

74. *See id.* at 9–10.

75. *See id.* at 10 (quoting Intellectual Ventures co-founder Edward Jung).

76. *See* Lulu Yilun Chen, *China Claims More Patents than Any Country—Most Are Worthless*, BLOOMBERG (Sept. 26, 2018), https://www.bloomberg.com/news/articles/2018-09-26/china-claims-more-patents-than-any-country-most-are-worthless [https://perma.cc/8GKY-XNJD]; U.S. PAT. & TRADEMARK OFF., *supra* note 68, at 7; PRUD'HOMME & ZHANG, *supra* note 68, at 62–63.

77. *See* Chen, *supra* note 76.

78. *See* U.S. PAT. & TRADEMARK OFF., *supra* note 68, at 7; PRUD'HOMME & ZHANG, *supra* note 68, at 62–63.

79. *See* U.S. PAT. & TRADEMARK OFF., *supra* note 68, at 9.

80. *See* Chen, *supra* note 76; U.S. PAT. & TRADEMARK OFF., *supra* note 68, at 7; PRUD'HOMME & ZHANG, *supra* note 68, at 62–63.

issuance of valuable patents representing commercializable innovation.[81] More importantly, it increases potential liability for American innovators and businesses.[82] A company entering a market often conducts a "freedom to operate" analysis, assessing what patents cover a certain technological area.[83] In performing that analysis, the company must wade through all the patents in the relevant area, high-quality or not.[84] A mass of low-quality patents multiplies this search cost many times over.[85] Indeed, these filings may impede American firms from protecting their IP rights, as they facially constitute prior art that could lengthen the patent examination process.[86]

B. Asserting Patents Against American Firms

The most significant concern arising out of a mass of foreign-held U.S. patents is that these patents could be asserted against American companies.[87] The telecommunications giant Huawei, for example, is reportedly the fourth most prolific patentee in the United States, obtaining 2,836 U.S. patents in 2022 alone.[88] In 2020, Huawei sued Verizon for patent infringement; that lawsuit followed a 2016 suit against T-Mobile US.[89]

Further, Huawei has close ties with the Chinese government,[90] and the idea that a national government might sponsor or coordinate patent

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81. *Cf.* U.S. GOV'T ACCOUNTABILITY OFF., GAO-16-479, PATENT OFFICE SHOULD STRENGTHEN SEARCH CAPABILITIES AND BETTER MONITOR EXAMINERS' WORK 49–50 (June 2016) (finding potential need for increased time for patent examination).

82. *See* Christina Mulligan & Timothy B. Lee, *Scaling the Patent System*, 68 N.Y.U. ANN. SURV. AM. L. 289, 306–308 (2012).

83. *See id.*

84. *See id.*

85. *See id.*

86. *See* Jeanne Suchodolski, et al., *Innovation Warfare*, 22 N.C. J.L. & TECH. 175, 201–02 (2020). To be clear, the mere publication of prior art is not a bad act. But to the extent that a patent application is so low-quality that its text is non-enabling, that application is not actually prior art, but a later patent applicant would have to expend effort to prove this.

87. *See generally* Stroud & Lall, *supra* note 43, at 463.

88. *See* John Koetsier, *Samsung Beats IBM, Apple, Intel, Google for 2022 Patent Crown*; *56% of U.S. Patents Go to Foreign Firms*, FORBES (Jan. 14, 2023), https://www.forbes.com/sites/johnkoetsier/2023/01/14/samsung-beats-ibm-apple-intel-google-for-2022-patent-crown-56-of-us-patents-go-to-foreign-firms/ [https://perma.cc/6RX5-N2R6].

89. *See* David Shepardson, *Huawei, Verizon Agree to Settle Patent Lawsuits,* REUTERS (July 12, 2021), https://www.reuters.com/legal/transactional/huawei-verizon-agree-settle-patent-lawsuits-sources-2021-07-12/ [https://perma.cc/3ZFY-JCSE]; Lauren Goode, *Huawei Sues T-Mobile, Saying Carrier Violated Wireless Patents*, THE VERGE (July 8, 2016), https://www.theverge.com/2016/7/8/12133164/huawei-sues-t-mobile-saying-carrier-violated-wireless-patents [https://perma.cc/C46E-NV3J]; *Of Monopolies and Monocultures*, *supra* note 7, at 385–87.

90. *See, e.g.*, PERMANENT SELECT COMM. ON INTEL., U.S. HOUSE OF REPRESENTATIVES, INVESTIGATIVE REPORT ON THE U.S. NATIONAL SECURITY ISSUES POSED BY CHINESE TELECOMMUNICATIONS COMPANIES HUAWEI AND ZTE 13–16 (Oct. 8, 2012) (authored by Mike Rogers & C.A. Dutch Ruppersberger).

litigation against American firms is not far-fetched. Countries including France, Japan, and South Korea have established "sovereign patent funds" intended to aggregate and often monetize a country's patents around the world.[91] State-sponsored entities such as Australia's Commonwealth Scientific and Industrial Research Organisation have vigorously asserted patents against American companies.[92] Likewise, the U.S. Chamber of Commerce has warned that China could use a sovereign wealth fund to instigate a "suit against an American company in a sensitive industry such as military technology," and thereby obtain "proprietary information regarding sensitive technologies" through the ordinary and compulsory discovery processes of litigation.[93]

There are several reasons to think a plethora of low-quality foreign patents could end up interfering with domestic innovation.[94] In the analogous field of trademark law, scholars have already worried that high-volume applications for trademark registrations from China are crowding the market so that the United States might be "running out of trademarks."[95] And in the early 2000s, a glut of software patents of questionable validity enabled a variety of patent assertion business models to spring up and harass technology companies and Main Street businesses for decades.[96] Specifically, several judicial decisions around that time cut back on the patent eligibility doctrine that previously had limited the patentability of software.[97] Commentators have widely criticized the "patent troll" business models that arose as a result of these low-quality patents because, despite their likely invalidity, the high costs of litigation to reach an invalidity

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91. *See* Josh Landau, *IPR Successes: A Bridge to Sovereign Patent Funds,* PATENT PROGRESS (Oct. 9, 2017), https://www.patentprogress.org/2017/10/ipr-successes-bridge-sovereign-patent-funds/ [https://perma.cc/K6MZ-QBV4]; *Xuan-Thao Nguyen, Sovereign Patent Funds*, 51 U.C. DAVIS L. REV. 1257 (2018).

92. *See* Commonwealth Sci. & Indus. Res. Org. v. Cisco Sys., Inc., 809 F.3d 1295 (Fed. Cir. 2015).

93. Brief for Amici Curiae Chamber of Com. of the U.S.A. and Lawyers for Civil Just.at 15, In re Nimitz Techs. LLC, No. 2023-103 (Fed. Cir. Nov. 30, 2022) (per curiam) (quoting Maya Steinitz, *Whose Claim Is This Anyway? Third-Party Litigation Fundin*g, 95 MINN. L. REV. 1268, 1270 (2011)).

94. *See* Barton Beebe & Jeanne C. Fromer, *Are We Running out of Trademarks? An Empirical Study of Trademark Depletion and Congestion*, 131 HARV. L. REV. 945 (2018).

95. *See id.*

96. *See* Fabio E. Marino & Teri H. P. Nguyen, *From Alappat to Alice: The Evolution of Software Patents*, 9 HASTINGS SCI. & TECH. L.J. 1, 6 (2017); James Bessen, *A Generation of Software Patents*, 18 B.U. J. SCI. & TECH. L. 241, 243 (2012); Richard H. Stern, *Alice v CLS Bank: US Business Method and Software Patents Marching Towards Oblivion?*, 2014 EUR. INTELL. PROP. REV. 619, 620; Andrew Chin, *Ghost in the "New Machine:" How Alice Exposed Software Patenting's Category Mistake*, 16 N.C. J.L. & TECH. 623, 625 (2015) (describing the law during that period as a "category mistake"). *See generally* Charles Duan, *Examining Patent Eligibility*, 96 ST. JOHN'S L. REV. (forthcoming 2023).

97. *See* State St. Bank & Trust Co. v. Signature Fin. Grp., Inc., 149 F.3d 1368, 1370 (Fed. Cir. 1998).

decision forced small businesses into nuisance settlements.[98] History suggests that China's strategy of inducing high-volume patent filings regardless of quality may have substantial implications for the American economy.[99]

To be clear, the holder of a valid U.S. patent ought to have a right to assert that patent, regardless of the patent holder's nationality.[100] The concern here is that state-sponsored entities could strategically take advantage of the costs and procedures of protracted litigation to the detriment of American firms, regardless of the merits of the underlying patents in suit.[101] Given the wave of low-quality patent applications already present as discussed above, that concern is especially potent.[102]

C. Racing to the Bottom on Standard-Essential Patents

Information and communication technologies present another avenue for patent-based offense strategies. Wi-Fi, 5G, video encoding, television broadcasting, and more depend on common frameworks that enable products from competing firms to connect and communicate with each other.[103] An Apple smartphone must be able to speak the same languages as Verizon and AT&T cell phone towers, Cisco routers, Dell computers, and Android devices in order to support an efficient and connected technological environment.[104]

Those common languages are called "technical standards,"[105] typically developed by industry members and technical experts in national and international organizations.[106] Members of these organizations often hold patents covering critical parts of standardized technologies. If those "standard-essential patents" could be asserted freely, any one patent could disrupt critical communications systems.[107] As a result, almost every standard-setting organization requires patent holders to commit to licensing

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98. *See, e.g.*, Colleen Chien, *Startups and Patent Trolls*, 17 STAN. TECH. L. Rev. 461 (2013); FED. TRADE COMM'N, PATENT ASSERTION ENTITY ACTIVITY: AN FTC STUDY 90 (Oct. 2016) ("Many Study [patent assertion entity] licenses explicitly recited that . . . the license payment was not intended to reflect a reasonable royalty for alleged use of the patented technology, but instead was payment to resolve the litigation.").

99. *See* FED. TRADE COMM'N, *supra* note 98, at 30 (2016).

100. *See supra* Part I.

101. *Cf.* FED. TRADE COMM'N, *supra* note 98, at 3–4 (describing "Litigation PAES" that bring lawsuits "consistent with nuisance litigation").

102. *See supra* Section II.A.

103. *See* Ericsson, Inc. v. D-Link Sys., Inc., 773 F.3d 1201, 1208–09 (Fed. Cir. 2014); *see also* Charles Duan, *Internet of Infringing Things: The Effect of Computer Interface Copyrights on Technology Standards*, 45 RUTGERS COMPUT. & TECH. L.J. 1, 11–12 (2019).

104. Duan, *supra* note 103, at 11–12.

105. *Id.* at 24–25.

106. *See generally* Nat'l Acad. of Scis., Patent Challenges for Standard–Setting in the Global Economy 15 (Keith Maskus & Stephen A. Merrill eds., 2013).

107. *See id.* at 52–60. *See generally* Mark A. Lemley & Carl Shapiro, *Patent Holdup and Royalty Stacking*, 85 TEX. L. REV. 1991, 2025–28 (2007).

their patents on fair, reasonable, and nondiscriminatory ("FRAND") terms,[108] ensuring that those patents do not restrain competition and block companies seeking to use critical technologies such as Wi-Fi and 5G.[109]

China is a dominant player in technical standards and patents.[110] As of 2021, the USPTO identified about 106,000 patents declared relevant to 5G technology, with Huawei being the top holder; ZTE ranked among the top seven.[111] Many have questioned whether Huawei's 5G patents represent high-quality innovation.[112] Purportedly, China also has significant leadership control over key standard-setting organizations.[113] As standardized technologies such as 5G become increasingly essential to national security, IP-backed influence over technical standards demands scrutiny.

Furthermore, China also uses patents as an offense tool through litigation over these standard-essential patents.[114] Since most standardized technologies are used worldwide, a holder of standard-essential patents in multiple countries can freely choose, among those countries, where to bring suit.[115] This lucrative litigation has created a "race to the bottom," well-documented by Professor Jorge Contreras, among others, in which national courts compete to attract patent cases through legal enticements such as automatic preliminary injunctions, expedited proceedings, favorable legal methodologies, and worldwide damages awards that ignore the extraterritoriality principles of patents.[116]

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108. Duan*, supra* note 103, at 25–27.

109. *See* NAT'L ACAD. OF SCIS., *supra* note 106, at 61.

110. *See* U.S. PAT. & TRADEMARK OFF., PATENTING ACTIVITY BY COMPANIES DEVELOPING 5G 4–5 (Feb. 2022), https://www.uspto.gov/sites/default/files/documents/USPTO-5G-PatentActivityReport-Feb2022.pdf [https://perma.cc/E3T9-822P].

111. *See id.*

112. *See* Robert D. Atkinson, *How China's Mercantilist Policies Have Undermined Global Innovation in the Telecom Equipment Industry*, INFO. TECH. & INNOVATION FOUND. (June 22, 2020), https://itif.org/publications/2020/06/22/how-chinas-mercantilist-policies-have-undermined-global-innovation-telecom/ [https://perma.cc/9KAP-JEZY].

113. *See generally* Lindsay Gorman, *The U.S. Needs to Get in the Standards Game—with like-Minded Democracies*, LAWFARE (Apr. 2, 2020), https://www.lawfareblog.com/us-needs-get-standards-game%E2%80%94-minded-democracies [https://perma.cc/FQ3P-NCG9]; Melanie Hart & Jordan Link, *There Is a Solution to the Huawei Challenge*, AM. PROGRESS (Oct. 14, 2020), https://www.americanprogress.org/wp-content/uploads/2020/10/Solution-to-Huawei-Challenge-NEW.pdf [https://perma.cc/UDE4-GWTT].

114. *See* Stroud & Lall, *supra* note 43, at 455–63.

115. *See, e.g.*, Erik R. Puknys & Michelle Y. Rice, *Where Will Be the Most Favorable FRAND Forum?*, FINNEGAN (Mar. 2021), https://www.finnegan.com/en/insights/articles/CDMR-where-will-be-the-most-favorable-frand-forum.html [https://perma.cc/5YPF-N5MS]; Eli Greenbaum, *No Forum to Rule Them All: Comity and Conflict in Transnational FRAND Disputes*, 94 WASH. L. REV. 1085, 1087 (2019) ("FRAND disputes can spawn litigation in each country in which standard-compliant products and services are made available.").

116. *See* Jorge L. Contreras, *The New Extraterritoriality: FRAND Royalties, Anti-Suit Injunctions and the Global Race to the Bottom in Disputes over Standards-Essential Patents*,

Chinese courts have taken a leading position in this race.[117] Recently, Chinese courts have taken a page out of the playbook of U.S. courts, issuing "anti-suit injunctions" prohibiting litigants from pursuing their infringement cases over standard-essential patents in courts outside of China.[118] As Professors Peter Yu, Contreras, and Yu Yang explain, China's use of anti-suit injunctions has the "objective of making Chinese courts the 'preferred place' for international intellectual property dispute settlement" and is coterminous with the Chinese government's efforts to promote indigenous innovation by bulking up its patent system.[119]

By no means is a renewed focus on strengthening IP protections in China a bad thing.[120] However, rewriting litigation procedures in ways that tilt the playing field as part of a global race to the bottom over standard-essential patent litigation could harm not just U.S. innovators but American national interests as a whole.

D. Using a Federal Agency, Designed to Protect American Innovators, Instead to Target Them

Maybe it is not such a surprise that Chinese patent holders can assert U.S. patents against U.S. companies. What is perhaps more surprising, though, is that one of the venues where Chinese patent holders do this is a federal agency established to protect U.S. companies from unfair foreign competition.[121] The U.S. International Trade Commission ("ITC") is an independent administrative agency that adjudicates unfair acts of importation into the United States.[122] Under Section 337 of the Tariff Act

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25 B.U. J. SCI. & TECH. L. 251, 280–83 (2019); Stefan Bechtold et al., *Forum Selling Abroad*, 92 S. CAL. L. REV. 487, 491 (2019).

117. *See, e.g.*, Ken Korea, *Anti-Suit Injunctions—a New Global Trade War with China?*, MANAGING IP (Aug. 3, 2022), https://www.managingip.com/article/2afz8grsj5i3uyxp19ji8/anti-suit-injunctions-a-new-global-trade-war-with-china [https://perma.cc/BP58-MAZS].

118. *See id.*

119. *E.g.*, Peter K. Yu, Jorge L. Contreras & Yu Yang, *Transplanting Anti-Suit Injunctions*, 71 AM. U. L. REV. 1537, 1604, 1610 (2021–2022); *see also* Mark Cohen, *China's Practice of Anti-Suit Injunctions in SEP Litigation: Transplant or False Friend?*, *in* SEAN M. O'CONNOR, 5G AND BEYOND: INTELLECTUAL PROPERTY AND COMPETITION POLICY IN THE INTERNET OF THINGS 1, 2–4 (Jonathan M. Barnett ed., 2023).

120. *See* OFF. OF THE U.S. TRADE REP., *supra* note 6, at 50 (noting that "[r]ight holders welcomed amendments to the Patent Law" in China); Yukon Huang & Jeremy Smith, *China's Record on Intellectual Property Rights Is Getting Better and Better*, FOREIGN POL'Y (Oct. 16, 2019), https://foreignpolicy.com/2019/10/16/china-intellectual-property-theft-progress/ [https://perma.cc/GF5H-Y3JZ].

121. *See, e.g.*, Jonathan R.K. Stroud, *The China Syndrome: The International Trade Commission's Rising Importance For Enforcing International Trade Secret Violations*, UPDATE, May–June 2013, at 10.

122. *See generally* SHAYERAH ILIAS, CONG. RSCH. SERV., RS 22880, INTELLECTUAL PROPERTY RIGHTS PROTECTION AND ENFORCEMENT: SECTION 337 OF THE TARIFF ACT OF 1930, at 3 (2009).

of 1930, the ITC investigates patent and other IP infringement as a species of those unfair acts and has the power to exclude infringing articles from importation.[123] Because the importer of infringing articles is sometimes outside the jurisdiction of federal courts, the agency serves an important purpose of policing and enforcing IP rights at the border, making the ITC investigation an important tool for mitigating IP theft by foreign nations.[124]

Statutes make clear that the ITC is intended to support *American* inventors against foreign infringers.[125] To qualify for an investigation to be brought, a complainant before the ITC must prove a "domestic industry," showing that it engages in productive activities under the relevant patent within the United States.[126] One cannot ask the ITC to block the importation of infringing computer chips, for example, without making the patented chips in the United States.[127] The agency also must consider a list of U.S.-centric public interest factors before ordering any exclusion of imported articles.[128] Those public interest factors would seem to be an ideal way for the ITC to incorporate national security concerns into its decision-making.[129] Finally, since the agency's authority is limited to border control, American companies operating purely domestic businesses ought to be immune to the agency's jurisdiction.[130]

In recent years, though, every one of these protections has been undermined—in large part due to the ITC's efforts toward expansion of authority.[131] The agency (with the support of statutory amendments) has interpreted "domestic industry" broadly, such that a foreign patent holder can minimally satisfy the requirement by licensing a patent to just one U.S. company, even one unwilling to participate in the investigation.[132] The

123. *See* Tariff Act of 1930, 19 U.S.C. § 1337(d)(1) (as amended).

124. *See* Stroud, *supra* note 121, at 10.

125. *See* Tariff Act § 337(a)(2), 19 U.S.C. § 1337.

126. *See id.* (providing for a remedy for patent infringement "only if an industry in the United States, relating to the articles protected by the patent, copyright, trademark, mask work, or design concerned, exists or is in the process of being established"); Colleen V. Chien, *Protecting Domestic Industries at the ITC*, 28 SANTA CLARA HIGH TECH. L.J. 169, 177–78 (2011).

127. *See* Tariff Act § 337(a)(2), 19 U.S.C. § 1337.

128. *See* 19 U.S.C. § 337(d)(1) (providing for orders excluding articles from importation "after considering the effect of such exclusion upon the public health and welfare, competitive conditions in the United States economy, the production of like or directly competitive articles in the United States, and United States consumers").

129. *See generally* Kenny Mok, *In Defense of 5G: National Security and Patent Rights Under the Public Interest Factors*, 88 U. CHI. L. REV. 1971, 1997–2010 (2021).

130. *See, e.g.*, ClearCorrect Operating v. Int'l Trade Comm'n, 810 F.3d 1283, 1290 (Fed. Cir. 2015) ("Thus, when there is no importation of 'articles' there can be no unfair act, and there is nothing for the Commission to remedy.").

131. *See generally* Charles Duan & Bill Watson, *The International Trade Commission's Authority in Domestic Patent Disputes*, R ST. INST POL'Y STUDY: 2018., June 2018, at 2–4.

132. *See* Tariff Act, 19 U.S.C. § 337(a)(3)(C); Stephen E. Kabakoff & Andrew G. Strickland, *Leveraging Standing and Domestic Industry Activities of Third Parties in Patent-Based ITC Investigations*, INTELL. PROP. & TECH. L.J. 25, 27 (2014).

public interest factors have received virtually no attention in ITC final determinations for decades,[133] and the agency has manufactured several ways to use purely domestic activity to support infringement findings, applying its exclusionary powers to block importation of staple articles that themselves infringe no asserted patents.[134]

The unsurprising result has been an influx of ITC investigations in which *foreign* patent holders target American firms.[135] In a study of recent investigations, there were over four times as many foreign-against-domestic ITC investigations as there were of the expected domestic-against-foreign type.[136] Excluding investigations involving American companies against each other or involving only foreign ones (both of which are odd for other reasons), the ITC appears to be more often used against American innovators than in support of them.[137] And this does not count patent assertion entities for which the full chain of ownership is unknown.[138]

The ITC is often considered a favored forum for patent assertion because of its powerful remedies and expedited timelines.[139] As a protection for U.S. intellectual property against foreign misappropriation, this makes a great deal of sense. However, the fact that the ITC has been turned on its head reflects not just a need for reform of the agency[140] but a more general lack of attention to patents' offense capacity.

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133. *See* Veronica Ascarrunz et al., *Public Interest at the ITC*, JD SUPRA (Mar. 15, 2022), https://www.jdsupra.com/legalnews/public-interest-at-the-itc-3044140/ [https://perma.cc/97TQ-4DZ9] ("The Commission, however, rarely denies remedies based on the public interest factors, and has only done so on three occasions, and not since 1984.").

134. *See* Comcast Corp. v. Int'l Trade Comm'n, 951 F.3d 1301, 1306–10 (Fed. Cir. 2020); Joe Mullin, *The International Trade Commission Is Opening the Door to Abusive Patent Owners and Endangering U.S. Businesses*, ELEC. FRONTIER FOUND. (July 15, 2020), https://www.eff.org/deeplinks/2020/07/international-trade-commission-opening-door-abusive-patent-owners-and-endangering [https://perma.cc/DC9J-E2DP].

135. *See generally* Charles Duan, *The U.S. International Trade Commission: An Empirical Study of Section 337 Investigations*, R ST. INST. POL'Y STUDY, Nov. 2021.

136. *See id.* at 8–9.

137. *See id.* at 8 fig.5.

138. *See Bell Semic Unloads Against Multiple Targets with Just One Among Thousands of Patents*, RPX CORP. (May 19, 2022), https://www.mondaq.com/unitedstates/patent/1194520/bell-semic-unloads-against-multiple-targets-with-just-one-among-thousands-of-patents [https://perma.cc/2U44-EWRY] (noting complex and incomplete ownership information for one ITC complainant in the semiconductor industry).

139. *See* William P. Atkins & Justin A. Pan, *An Updated Primer on Procedures and Rules in 337 Investigations at the U.S. International Trade Commission*, 18 U. BALT. INTELL. PROP. L.J. 105, 110–11 (2010).

140. *See Schweikert, Delbene Introduce Legislation to Protect American Industry, Workers, and Consumers from Patent Trolls*, SCHWEIKERT (Sept. 7, 2021), https://schweikert.house.gov/2021/09/07/schweikert-delbene-introduce-legislation-protect-american-industry/ [https://perma.cc/4G2C-NVWP]; Wayne Brough, *The Competition Issue Congress Isn't Talking About: Patent Abuse and ITC Reform*, THE HILL (Sept. 22, 2022), https://thehill.com/opinion/international/3654836-the-competition-issue-congress-isnt-talking-about-patent-abuse-and-itc-reform/ [https://perma.cc/LDP2-88JE].

III. A RESILIENT U.S. PATENT SYSTEM

To protect the United States from foreign abuses of its own patent system, more than simplistic measures are required. Simple attempts like blocking foreign applicants from obtaining U.S. patents would be no more effective than trying to block cyberattacks based on Internet addresses.[141] Resilient IP laws require layers of trust and security to ensure that granted patents and other rights represent valuable innovation, not tools of exploitation.[142] The following proposals work toward such a resilient IP system.

A. Ensuring Trustworthiness in Patents

To defend against foreign abuses among other things, the patent system must be a "trusted system." This concept of trustworthiness is an unconventional but apt metaphor, drawn from the field of computer security.[143] There, a trusted system can be relied upon to perform a function accurately and reliably, and in particular, one that is secured against improper access and misuse.[144] A computer system that distributes digital identification cards or encryption keys, for example, must be trustworthy so that malfeasants cannot improperly gain access and commit identity theft, for example.[145] Similarly, the patent system distributes valuable resources in the form of patents, and the American public trusts that system to grant patents correctly, to protect valuable innovation without imposing unwarranted costs of litigation.[146] Flooding the United States with low-

141. *See* Jacob Schindler, *Rubio's Huawei Proposal Should Worry US Tech, Pharma Companies*, IAM MAG. (June 23, 2019), https://www.iam-media.com/law-policy/rubios-huawei-proposal-should-worry-us-tech-pharma-companies [https://perma.cc/N4L7-PJ5T] (identifying concerns with bill proposing to limit Huawei from enforcing U.S. patents); Kieren McCarthy, *You're Huawei Off Base on This, Rubio: Lawyers Slam US Senator's Bid to Ban Chinese Giant from Filing Patent Lawsuits*, THE REGISTER (June 21, 2019), https://www.theregister.co.uk/2019/06/21/huawei_patents_rubio/ [https://perma.cc/MZH4-ZKNM].

142. *See, e.g.*, U.S. Gov't Accountability Office, Intellectual Property: Assessing Factors That Affect Patent Infringement Litigation Could Help Improve Patent Quality 28–32 (2013) (discussing patent stakeholder's concerns about impact of low-quality patents on litigation and legal uncertainty).

143. The metaphor is especially apt given the ongoing recognition of a connection between patents and national security. *See generally Of Monopolies and Monocultures*, *supra* note 7, at 374–87.

144. *See, e.g.*, ELAINE BARKER ET AL., A PROFILE FOR U.S. FEDERAL CRYPTOGRAPHIC KEY MANAGEMENT SYSTEMS 136 (Nat'l Inst. of Standards & Tech., Special Pub. 800-152, (2015), https://nvlpubs.nist.gov/nistpubs/SpecialPublications/NIST.SP.800-152.pdf (defining trust as the "ability to perform certain functions or services correctly, fairly and impartially"); Cynthia E. Irvine & Karl Levitt, *Trusted Hardware: Can It Be Trustworthy?*, 44 PROC. ANN. DESIGN AUTOMATION CONF. 1, 1 (2007).

145. BARKER, *supra* note 144, at 7 (discussing importance of secure management of encryption keys).

146. U.S. GOV'T ACCOUNTABILITY OFFICE, *supra* note 142, at 28–29.

quality, questionable patents exploits gaps in this trust, as does turning litigation systems against U.S. interests. These gaps must be identified and ultimately closed.

Correctness in patent grants is the cornerstone of this trustworthiness. The patent laws limit patents to novel,[147] nonobvious,[148] and sufficiently described[149] inventions within the range of allowable subject matter.[150] These statutory and constitutional requirements work interconnectedly to ensure that patent rights are granted only for technologies of value to the public.[151] However, it is widely known, from government studies and outside commentary, that patent examiners have limited time and resources to review patent applications thoroughly.[152]

Dedicating greater resources to the USPTO for patent examination would be an important step in this respect. That is not to say that the agency should act unequally between foreign and domestic applications; again, discrimination by applicant nationality would be bad policy and have troubling repercussions.[153] Instead, increasing the quality of patent grants across the board would discourage high-volume, low-quality patent filings, protecting American innovators from the costs of an unnecessarily crowded patent space.

Back-end procedures for validating the correctness of already granted patents are equally important for patent trustworthiness. There are several procedures, including *ex parte* reexamination[154] and *inter partes* review,[155] that give the USPTO the opportunity to take a second look and make corrections to past actions.[156] These proceedings have proven their accuracy, with the Federal Circuit fully or partially affirming *inter partes* review decisions over 80% of the time.[157] These proceedings verify the patent system, and without verification, there can be no trust.[158]

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147. *See* 35 U.S.C. § 102.

148. *See* 35 U.S.C. § 103.

149. *See* 35 U.S.C. § 112(a)–(b).

150. *See* 35 U.S.C. § 101.

151. *See, e.g.*, Graham v. John Deere Co. of Kan. City, 383 U.S. 1, 6 (1966).

152. *See, e.g.*, U.S. GOV'T ACCOUNTABILITY OFF., *supra* note 81; Michael D. Frakes & Melissa F. Wasserman, *Is the Time Allocated to Review Patent Applications Inducing Examiners to Grant Invalid Patents? Evidence from Microlevel Application Data*, 99 REV. ECON. & STAT. 550, 550 (2017); Brian Fung, *Inside the Stressed-out, Time-Crunched Patent Examiner Workforce*, WASH. POST (Aug. 1, 2014), https://www.washingtonpost.com/news/the-switch/wp/2014/07/31/inside-the-stressed-out-time-crunched-patent-examiner-workforce/ [https://perma.cc/68BN-5PQ6].

153. *See supra* notes 47–51 and accompanying text.

154. *See* 35 U.S.C. § 302; Megan M. La Belle, *Patent Law as Public Law*, 20 GEO. MASON L. REV. 41, 56 (2012).

155. *See* 35 U.S.C. § 311.

156. *See generally* La Belle, *supra* note 154, at 50–55 (describing public importance of challenges to patent validity).

157. *See* Daniel F. Klodowski et al., *IPR, CBM, and PGR Statistics for Final Written Decisions Issued in October Through December 2022*, FINNEGEAN: AT THE PTAB BLOG (Jan. 31, 2023), https://www.finnegan.com/en/insights/blogs/at-the-ptab-blog/ipr-cbm-and-

The USPTO's ongoing focus on "robust and reliable patents" is very much consistent with patent trustworthiness.[159] A patent that is fully vetted by examination and verifiable after the fact is one that represents value, attracts investment, does not present a potential for abuse, and ultimately is robust and reliable.[160] Some have used the phrase "robust and reliable," however, to suggest that patents should effectively be incontestable by making those verification procedures less available and harder to use.[161] To do this, though, could very well invite foreign adversaries to exploit a patent system with fewer validation measures, the harms from which would likely outweigh any benefit.

Transparency in patent ownership and assertion should be another area of focus.[162] Again, in the field of computer security, the auditability and accountability of uses of a trusted system are critical for diagnosing and preventing abuse.[163] Patent law similarly incorporates layers of accountability and auditing information, including disclosure of inventors' biographical information[164] and recordation of assignments of patent ownership.[165] But in the same way that cyber attackers veil themselves with intermediary proxy computers, patents, and patent litigation can be veiled in layers of corporate shells and contracts, complicating auditing of abusive practices.[166] The USPTO previously initiated an effort to identify the real

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pgr-statistics-for-final-written-decisions-issued-in-october-through-december-2022.html [https://perma.cc/S5H7-SWTD].

158. *See* La Belle, *supra* note 154, at 56–58.

159. *See* Request for Comments on USPTO Initiatives to Ensure the Robustness and Reliability of Patent Rights, 87 Fed. Reg. 60130, 60130–31 (Oct. 4, 2022).

160. *See id.* at 60130 (defining "robustness and reliability of patents" as "ensur[ing] that the patent rights granted by the USPTO fulfill their intended purpose of furthering the common good, incentivizing innovation, and promoting economic prosperity").

161. *See, e.g.*, Comments of AUTM at 2, USPTO Initiatives to Ensure the Robustness and Reliability of Patent Rights, 87 Fed. Reg. 60130 (Oct. 4, 2022), https://autm.net/AUTM/media/Region-Meetings/Documents/AUTM-Comments-for-Docket-ID-Number-PTO-2022-0025.pdf ("There is only one way to improve the robustness and reliability of U.S. patent rights . . . . [T]he US must dramatically reform or eliminate the IPR procedure and restore the ability of successful plaintiffs to obtain injunctive relief.").

162. *See* Stroud & Lall, *supra* note 43, at 455 ("The goal of requiring mandatory ownership disclosures is to provide notice to, at the very least, the U.S. government and its national security apparatus regarding the extent that international companies own and may seek to assert their patents by licensing or suing U.S. companies in U.S. courts, and thus gain an economic advantage in critical technologies.").

163. *See, e.g.*, NAT'L COMPUT. SEC. CTR., A GUIDE TO UNDERSTANDING AUDIT IN TRUSTED SYSTEMS 4, https://apps.dtic.mil/sti/pdfs/ADA392821.pdf ("Audit trails are used to detect and deter penetration of a computer system and to reveal usage that identifies misuse.").

164. *See* 35 U.S.C. § 115(a)–(c); 37 C.F.R. § 1.63(b).

165. *See* 35 U.S.C. § 261 (permitting but not requiring recordation of patent assignments with the USPTO); 37 C.F.R. § 3.31.

166. *See, e.g.*, Stroud & Lall, *supra* note 43, at 464–65; LISA LARRIMORE OUELLETTE & HEIDI WILLIAMS, HAMILTON PROJECT, REFORMING THE PATENT SYSTEM 11–13 (2020), https://www.hamiltonproject.org/assets/files/Ouellette_Williams_LO_6.16_FINAL.pdf [https://perma.cc/8HUY-3K95].

parties in interest owning patents,[167] Senator Leahy recently introduced a bill on the subject,[168] and a recent dispute in the U.S. District Court for the District of Delaware highlighted difficulties with transparency in patent litigation funding and control.[169] Knowing the avenues that foreign countries are using to take advantage of patents is essential to identifying systemic vulnerabilities.

B. Championing Forum Fairness, Not Forum Selling

Anti-suit injunctions and worldwide FRAND patent judgments are symptoms of a larger, global race to the bottom among courts to attract lucrative standard-essential patent lawsuits.[170] Called "forum selling," an extensive body of scholarly literature has considered the perverse incentives and outcomes that result from courts jockeying to attract patent cases.[171]

The United States should position itself as a global leader for fairness across forums for patent litigation. Ending the race to the bottom likely requires coordination across major court systems either to return to national patents' traditional territorial limits[172] or to establish a decisive worldwide procedure for standard-essential patent litigation.[173] A coordinated approach is superior to the alternative of participating in the race to the bottom by trying to make American courts more attractive to litigants or exacting penalties for outside FRAND litigation.[174] Any such approaches must contend with the historically supported likelihood that other nations like China will transplant those U.S. approaches and probably exaggerate them,[175] ultimately to the detriment of American innovators and the worldwide patent system overall.

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167. *See* Changes to Require Identification of Attributable Owner, 79 Fed. Reg. 4105–06 (proposed Jan. 24, 2014) (not codified).

168. *See* Pride in Patent Ownership Act, S. 2774, 117th Cong. (Sept. 21, 2021).

169. *See* In re Nimitz Techs. LLC, No. 2023-103, slip op. at 4–6 (Fed. Cir. Dec. 8, 2022) (per curiam); Christopher Yasiejko, *Judge Behind Litigation-Funding Probe Unloads After Forced Pause*, BLOOMBERG L. (Dec. 2, 2022), https://news.bloomberglaw.com/ip-law/judge-behind-litigation-funding-probe-unloads-after-forced-pause [https://perma.cc/YU7P-GUSQ].

170. *See* Contreras, *supra* note 115.

171. *See* Daniel Klerman & Greg Reilly, *Forum Selling*, 89 S. CAL. L. REV. 241, 248–50 (2016) (noting procedural techniques by which the Eastern District of Texas preferentially treated patent cases); J. Jonas Anderson, *Court Competition for Patent Cases*, 163 U. PA. L. REV. 631, 661–666 (2015); Bechtold, Frankenreiter & Klerman, *supra* note 115, at 534–36 (describing competition for patent cases across foreign jurisdictions); J. Jonas Anderson & Paul R. Gugliuzza, *Federal Judge Seeks Patent Cases*, 71 DUKE L.J. 419, 445–47 (2021) (identifying procedural issues in the Western District of Texas).

172. *See* Greenbaum, *supra* note 115, at 1117–19.

173. *See* Contreras, *supra* note 116, at 282–83.

174. *Id.* at 283–86.

175. *See* Yu et al., *supra* note 119, at 1593–95; Cohen, *supra* note 119, at 9–17.

At the same time, policymakers must consider the ongoing problem of forum selling domestically.[176] Ongoing questions about patent litigation in the federal courts of the Eastern and Western Districts of Texas show that the forum selling problem is recurrent and problematic within the United States and not just across nations.[177] If the United States is to be a global leader in opposing unfair judicial competition, it must demonstrate to the world that its own court system can lead in fairness as well.

C. Promoting Competition as a National Security Defense

Competition is the foundation of a robust American economy.[178] It delivers high-quality goods at the best prices to consumers, avoids the stagnation of monopoly, and encourages firms to out-innovate each other in order to compete with each other.[179] Competition is also critical to national security because it forces companies in sensitive industries to compete on product cybersecurity and mitigates the potential formation of technological "monocultures" that are especially vulnerable to cyberattacks.[180]

Ideally, patents and competition work in tandem.[181] Patents grant temporary protection from immediate copying of a firm's innovations, while also encouraging competitors to develop alternative technologies that design around those patents.[182] In practice, though, gaps in the law occasionally enable the patenting of technologies that cannot be worked around competitively, without justifiable reasons.[183]

In the context of technical standards, for example, a company cannot avoid a standard-essential patent without foregoing the entire market of standard-compatible products; one cannot feasibly sell laptops with

176. *See* Klerman & Reilly, *supra* note 165.

177. *See* Anderson & Gugliuzza, *supra* note 171; Susan Decker, *Chief Justice Backs Plan to Review Patent Trial Forum-Shopping*, BLOOMBERG L. (Jan. 1, 2022), https://news.bloomberglaw.com/ip-law/chief-justice-backs-plan-to-review-patent-trial-forum-shopping [https://perma.cc/3SQW-MCKV]; Brian J. Love & James Yoon, *Predictably Expensive: A Critical Look at Patent Litigation in the Eastern District of Texas*, 20 STAN. TECH. L. REV. 1, 6–12 (2017); Yan Leychkis, *Of Fire Ants and Claim Construction: An Empirical Study of the Meteoric Rise of the Eastern District of Texas as a Preeminent Forum for Patent Litigation*, 9 YALE J.L. & TECH. 193, 195–96 (2007); Joe Mullin, *EFF Asks Appeals Court to "Shut Down the Eastern District of Texas,"* ARS TECHNICA (Oct. 30, 2015), http://arstechnica.com/tech-policy/2015/10/eff-asks-appeals-court-to-shut-down-the-eastern-district-of-texas/ [https://perma.cc/PLQ9-WEDP].

178. *See, e.g.*, Philippe Aghion et al., *Competition and Innovation: An Inverted-U Relationship*, 120 Q.J. ECON. 701, 702–03 (2005).

179. *See id.* at 707.

180. *See Of Monopolies and Monocultures*, *supra* note 7, at 394–96.

181. *Id.* at 399–400.

182. *See, e.g.*, Ill. Tool Works Inc. v. Indep. Ink, Inc., 547 U.S. 28, 43 n.4 (2006) (citing sources).

183. *See* FED. TRADE COMM'N, THE EVOLVING IP MARKETPLACE: ALIGNING PATENT NOTICE AND REMEDIES WITH COMPETITION 191–94 (2011), http://www.ftc.gov/os/2011/03/110307patentreport.pdf [https://perma.cc/CPE3-43SA].

alternative, incompatible Wi-Fi for example.[184] The FRAND obligation, requiring reasonable and nondiscriminatory licensing of standard-essential patents, exists precisely to mitigate the potential competition harm resulting from these patents.[185]

In some cases, patents are cleverly written to cover regulatory schemes, such that to comply with the law, one must infringe those patents.[186] In one recent case, for example, the manufacturer of a half-century-old drug obtained a patent not on the drug or its formulation, but on the regulatory safety procedure for distributing the drug, thereby precluding generics and even improved drugs from entering the market on the off-patent drug.[187] These "mandatory infringement" patents present major problems for robust competition policy, but they are unsurprisingly highly attractive to those looking to exploit IP rights to the greatest extent.[188]

Minimizing anticompetitive uses of these kinds of marginal patents will enhance the resilience of the U.S. patent system against foreign adversaries hoping to exploit it as an offense tool. Unfortunately, though, the focus on competition has occasionally been forgotten in the context of patents.[189] Conversations about standard-essential patents sometimes treat the FRAND commitment as a mere private contract,[190] despite the commitment's fundamental public role in protecting technological and market competition.[191] As the United States engages with the world as a leader on standard-essential patent litigation issues, it should make competition the centerpiece of that engagement.

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184. *See, e.g.*, *id.* at 191 ("While firms may not formally commit to using a standard in producing their products, as a practical matter they will generally find it necessary to use standardized technology if it becomes successful in the marketplace."); Lemley & Shapiro, *supra* note 107, at 2016–17.

185. *See, e.g.,* FED. TRADE COMM'N, *supra* 183, at 191–94.

186. *See* Charles Duan, *Mandatory Infringement*, 75 FLA. L. REV. 219, 253–56 (2023).

187. *See* Rebecca Robbins, *A Drug Company Exploited a Safety Requirement to Make Money*, N.Y. TIMES (Feb. 28, 2023), https://www.nytimes.com/2023/02/28/business/jazz-narcolepsy-avadel-patents.html [https://perma.cc/YU6B-E4FK].

188. *See* Duan, *supra* note 186, at 245–47, 249–53.

189. *See id.* at 264–68.

190. *See, e.g.*, FTC v. Qualcomm Inc., 969 F.3d 974, 997 (9th Cir. 2020) (noting "policy arguments of several academics and practitioners with significant experience in SSOs, FRAND, and antitrust enforcement, who have expressed caution about using the antitrust laws to remedy what are essentially contractual disputes between private parties engaged in the pursuit of technological innovation").

191. *See* Microsoft Corp. v. Motorola, Inc., 795 F.3d 1024, 1052 & n.22 (9th Cir. 2015); FED. TRADE COMM'N, *supra* note 183, at 194 (proposing a particular interpretation of the FRAND commitment as "necessary for consumers to benefit from competition among technologies to be incorporated into the standard—competition that the standard setting process itself otherwise displaces.").

D. Engaging the Whole of Government on Innovation Policy

The policy goal of patent law is to maintain the United States' leadership in technology, not in patent counts. China itself, with its failed attempts to "innovate" by subsidizing patent filings, is a cautionary warning against equating patents with innovation: it is easy to boost quantities of patents at the expense of quality and actual technological growth.[192]

Instead, the United States government must take a whole-of-government approach to technology.[193] The patent system is an important part of that approach, but so are resources for STEM education that build the next generation of innovators.[194] So are high-skilled immigration policies that bring in the best talent from abroad.[195] So are research grant and innovation prize programs that can provide different and additional incentives.[196] So are diversity initiatives that ensure that the next great scientist or inventor is not lost.[197]

Artificial intelligence exemplifies the importance of accounting for the whole of government in innovation policy.[198] There is little doubt that AI technology is a strategic asset of importance both to national security and American technological leadership.[199] The United States has made tremendous investments in AI and has considered implementing numerous arms of policy in order to be the frontrunner in AI technology.[200] IP law circles, though, have largely focused on a narrow equation that more

192. *See* U.S. PAT. & TRADEMARK OFF., *supra* note 68, at 8–9.

193. "Whole-of-government" is a public administration concept involving "public services agencies working across portfolio boundaries to achieve a shared goal and an integrated government response to particular issues." Tom Christensen & Per Lægreid, *The Whole-of-Government Approach to Public Sector Reform*, 67 PUB. ADMIN. REV. 1059, 1060 (2007) (quoting MGMT. ADVISORY COMM., CONNECTING GOVERNMENT: WHOLE OF GOVERNMENT RESPONSES TO AUSTRALIA'S PRIORITY CHALLENGES (2004)).

194. *See The Role of STEM Education in Innovation*, STEAMSPIRATIONS (May 21, 2023), https://steamspirations.com/26123-2/ [https://perma.cc/2CLA-5Z6H].

195. *See* Caleb Watney, *The Egghead Gap*, 63 NEW ATLANTIS 85, 91–92 (2021).

196. *See* Suchodolski et al., *supra* note 86, at 227–35 (describing role of federal research and development spending).

197. *See, e.g.*, Doug Irving, *The Power of Invention–and the Value of Diversity and Inclusion*, THE RAND CORP. (May 4, 2021), https://www.rand.org/blog/rand-review/2021/05/the-power-of-invention-and-the-value-of-diversity-and-inclusion.html [https://perma.cc/P7WP-FRCK].

198. *See* Maintaining American Leadership in Artificial Intelligence, Exec. Order No. 13859, 84 Fed. Reg. 3967, 3967 (Feb. 11, 2019).

199. *See, e.g.*, NAT'L SEC. COMM'N ON A.I., *supra* note 4.

200. *See* Maintaining American Leadership in Artificial Intelligence, 84 Fed. Reg. at 3967 ("Artificial Intelligence will affect the missions of nearly all executive departments and agencies . . . ."); National Artificial Intelligence Initiative Act of 2020, 15 U.S.C. § 9413(d)(1) (creating interagency committee to "provide for interagency coordination of Federal artificial intelligence research, development, and demonstration activities and education and workforce training activities and programs of Federal departments and agencies").

patents mean more AI, so limitations on the granting of patents in the field are tantamount to impediments to American AI leadership.[201]

However, the reality is not so simple—AI development in the United States often progresses as an especially high-value form of "user innovation," in which technologists make advancements not just to sell products but to use the improvements in their own larger businesses.[202] A medical technology company might build a new natural-language data model for physician terminology, not because the company's clients want to buy the model, but to incorporate the model into online services that it

201. *See, e.g.*, Andrei Iancu & David J. Kappos, *U.S. Intellectual Property Is Critical to National Security*, CTR. FOR STRATEGIC & INT'L STUD. (Dec. 7, 2021), https://www.csis.org/analysis/us-intellectual-property-critical-national-security [https://perma.cc/4PHP-DUBQ] (calling for "providing strong IP rights to incentivize and protect the huge investments required to make those discoveries" in AI); Katyanna Quach, *AI-Friendly Patent Law Needed for "National Security", Ex-USPTO Boss Says*, THE REGISTER (Aug. 2, 2022), https://www.theregister.com/2022/08/02/ai_patent_reform/ [https://perma.cc/G96T-RRLK] ("Rejecting AI patents, however, we're told, will keep knowledge of the latest commercial applications of the technology from the public and hamper innovation."); Sujai Shivakumar, *Securing Intellectual Property for Innovation and National Security*, CTR. FOR STRATEGIC & INT'L STUD. (Mar. 3, 2022), https://www.csis.org/analysis/securing-intellectual-property-innovation-and-national-security [https://perma.cc/T849-79B2] (arguing that "policies that weaken protection of U.S.-owned patents" have "the potential to do significant damage to the United States' innovation engine and, by extension, to its national security"); Kristen Osenga, *Changing the Story: Artificial Intelligence and Patent Eligibility*, JUST SEC. (Oct. 25, 2021), https://www.justsecurity.org/78727/changing-the-story-artificial-intelligence-and-patent-eligibility/ [https://perma.cc/6LG5-34CH] ("While innovations in the AI field are in part driven by rapidly improving computing capabilities, the incentives to produce these innovations are lagging because patent protection is often unavailable.").

202. *See, e.g.*, Carlos Muñoz Ferrandis & Marta Duque Lizarralde, *Open Sourcing AI: Intellectual Property at the Service of Platform Leadership*, 13 J. INTELL. PROP. INFO. TECH. & E-COM. L. 224, 225–26 (2022), (noting "continuous increment in the number of open-source software (OSS) projects related to AI"); Alex Engler, *How Open-Source Software Shapes AI Policy*, BROOKINGS (Aug. 10, 2021), https://www.brookings.edu/research/how-open-source-software-shapes-ai-policy/ [https://perma.cc/5Z56-ZWFU]; Nathan Calvin & Jade Leung, Who Owns Artificial Intelligence? A Preliminary Analysis of Corporate Intellectual Property Strategies and Why They Matter 6–7 (Feb. 2020) (unpublished working paper), https://www.fhi.ox.ac.uk/wp-content/uploads/GovAI-working-paper-Who-owns-AI-Apr2020.pdf [https://perma.cc/U6GF-7A84] (noting cross-purposes of patents and open-source strategies for AI innovators); Patrick Shafto, *Why Big Tech Companies Are Open-Sourcing Their AI Systems*, THE CONVERSATION (Feb. 22, 2016), https://theconversation.com/why-big-tech-companies-are-open-sourcing-their-ai-systems-54437 [https://perma.cc/H3EE-N9MX]; ERIC VON HIPPEL, DEMOCRATIZING INNOVATION 19–22 (2005); Francisco Bernardo et al., *Interactive Machine Learning for End-User Innovation*, 2017 PROC. AAAI SPRING SYMP. 369, 372 (proposing "the creation of [interactive machine learning] tools that aim to support end-user innovation, and it can also suggest new uses of IML in creating or improving [user-innovation toolkits] across a variety of application domains"); Eric von Hippel et al., *A Journey into User Innovation*, RES.-TECH. MGMT., Apr. 20, 2023, at 32 (noting open research questions on "how can product and service developers—both user and producer developers—innovate using artificial intelligence (AI) and machine learning to create new designs better and faster").

provides—the company creates AI to use rather than to sell.[203] In a wide variety of industries characterized by user innovation, research finds that widespread patenting can have unexpected and counterintuitive effects since user innovators often rely on different IP strategies and can find their efforts stymied by broad-scoped patents.[204]

Furthermore, not all AI patents are alike.[205] As Professor Nikola Datzov explains in a forthcoming paper, a specific patent applying a trained AI model to a useful product domain is likely eligible for patenting, and such a patent is very much unlike a broadly stated patent on AI-based data processing that could span whole swaths of products.[206] These special characteristics of the AI technology environment help to explain Professor Datzov's findings of tremendous levels of AI investment and innovation in the United States in the years after the Supreme Court sharply demarcated patent eligibility law in 2014:[207]

> AI private investment in the U.S. has been substantially stronger than any other country in the world, rising from approximately $5 billion in 2014 to more than $52.8 billion in 2021. By comparison, China—which was the next closest—totaled $17.21 billion in private investment in 2021. In total private investment in AI from 2013 to 2021, the U.S. once again dominated with $149.0 billion compared to China's $61.9 billion . . . . [S]ubstantial existing research demonstrates the ability of AI startups, generally, to be competitive and successful in the absence of extensive patent protection.[208]

Based on this unintuitive relationship between patents and AI investment, Professor Datzov recommends a cautious approach to altering the law of patent eligibility, with a greater emphasis on policy for data resources that serve as a foundation for new AI development.[209] That approach exemplifies how, in an especially significant technological area, the focus for national competitiveness need not be solely on IP protection, but on the full range of policy tools available in the United States.

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203. *See* Marley Capper, *AI Tech Helping Radiology Patients Understand Testing at Central IL Hospital*, WCIA (Mar. 23, 2023), https://www.wcia.com/news/health-news/ai-tech-helping-radiology-patients-understand-testing-at-central-il-hospital/ [https://perma.cc/ZD56-XD5W].

204. *See* VON HIPPEL, *supra* note 202, at 112–17.

205. *See* Nikola Datzov, *The Role of Patent (In)Eligibility in Promoting Artificial Intelligence Innovation*, 92 UKMC L. REV. (forthcoming 2023) (manuscript at 24–30).

206. *See id.*

207. *See* Alice Corp. Pty. Ltd. v. CLS Bank Int'l, 134 S. Ct. 2347, 2360 (2014).

208. Datzov, *supra* note 205, at 55, 57.

209. *See id.* at 58.

CONCLUSION

Maintaining American leadership in international technological competition demands a multifaceted, nuanced approach across a wide range of domestic and international policies. Patent and other intellectual property laws must offer both a defense strategy to protect American innovators from misappropriation, and protection from offense strategies exploiting U.S. patents and patent laws. To mitigate these offense uses, patent laws must be treated as infrastructure for innovation, securing it against abuse and misuse as we would secure any other national strategic asset.