Chapter 12: Intellectual Property

Blueprint for Action

America's intellectual property (IP) laws and institutions must be considered as critical components for safeguarding U.S. national security interests, including advancing economic prosperity and technology competitiveness. Prioritization of IP policy is especially important given China is both leveraging and exploiting IP policies as a tool within its national strategies for emerging technologies. The United States must, at a minimum, articulate and develop national IP reforms and policies with the goal of incentivizing, expanding, and protecting artificial intelligence (AI) and emerging technologies,[1] at home and abroad. Such policies should be developed and proposed via the Executive Branch with a process that integrates the disparate departments and agencies that serve important roles in promoting U.S. innovation.

Recommendation

Recommendation: Develop and implement national IP policies and regimes to incentivize, expand, and protect AI and emerging technologies as part of national security strategies.

Action for the President:

- **Issue an Executive Order to prioritize IP policies for AI and critical emerging technologies.**
    - The President should issue an Executive Order to recognize IP policy as a national priority and establish a comprehensive process to reform and establish new IP policies and regimes for AI and critical emerging technologies that further national security, economic, and technology competitiveness strategies.
    - The Executive Order should:
        - Direct the Vice President, as Chair of the Technology Competitiveness Council (TCC)[2] or otherwise as chair of an interagency task force,[3] to oversee the comprehensive process;
        - Direct the Secretary of Commerce to:
            - Lead, on an ongoing basis, the development of proposals (Executive and/or Legislative Branch actions) to reform and establish new IP policies and regimes to incentivize, expand, and protect AI and emerging technologies;
            - In executing these responsibilities, coordinate with the Under Secretary of Commerce for Intellectual Property, the Director of the U.S. Patent and Trademark Office (USPTO), and other relevant Executive Branch agencies;

consult with the Director of the U.S. Copyright Office; and convene public deliberations, to include at a minimum academia and industry;

- Direct the USPTO Director, in his capacity as advisor to the President,[4] to:
  - Submit, within 90 days, a report to the Vice President, in their capacity as the head of the TCC or interagency task force, that (1) identifies and analyzes metrics, trends, and data necessary to inform IP policymaking, particularly as prioritized in the Executive Order; and (2) identifies the associated U.S. Executive Branch departments and agencies that will be required to provide any requisite data;
  - Submit, within 12 months from issuance of the first report, a second report, or portions on a rolling basis, to the Vice President that (1) comprehensively assesses the weaknesses in the current U.S. IP policies and regimes, relative to IP regimes of other nations, for incentivizing, expanding, and protecting innovation in AI and emerging technologies and supporting national strategies; (2) examines the non-exhaustive list of "IP considerations" (see second recommendation); and (3) proposes corresponding executive and legislative actions for reforming and establishing new IP policies and regimes;
  - Provide all necessary information and advice to the Vice President to enable a fulsome analysis of the IP proposals;
- Direct the Vice President to:
  - Lead an ongoing assessment of IP policies, regimes, and reform proposals from the Secretary of Commerce that should be implemented and integrated into national security, economic, and technology competitiveness strategies;
  - Empower the Secretary of Commerce to facilitate implementation of IP policies and regimes assessed as critical to national security, economic, and technology competitiveness strategies; and
- Direct Executive Branch departments and agencies to resource and support the Secretary of Commerce in executing these Executive Order efforts, including providing the identified metrics and trends.

Actions for the Secretary of Commerce and USPTO Director:

- **Establish, as necessary, in consultation with the Director of the USPTO, a committee of multidisciplinary experts, from within and outside the U.S. government, to provide technical and IP-related expertise and advice in implementing this Executive Order.**
- **Convene public deliberations, to include at a minimum academia and industry, in executing these Executive Order responsibilities. The outcome of these deliberations should inform proposed IP policies and regimes.**
- **Assess metrics and data necessary to inform IP policy.**
  - In assessing the proper metrics and data necessary to inform IP policy deliberation as required by the Executive Order, the Secretary of Commerce and USPTO

Director should take a whole-of-government approach. Due to the breadth of the IP considerations, including those delineated in this report, as well as the far-reaching impact of IP upon many segments of the U.S. economy and innovation ecosystem, there are many U.S. government entities that may already track relevant metrics or have the capability to expand their analyses to address the necessary prioritization of IP for AI and emerging technologies.

- For example, innovation and investment trends based on patent filings, and, where possible, licensing data—in various technology sectors, including by foreign countries, particularly China—should be analyzed (e.g., to assess quality and research trends[5]), with care not to rely solely on patent counting.
- Other potential metrics include but are not limited to tracking of patents self-declared as standard essential in comparison to patents actually licensed; licensing to unrelated parties; the impact of prior art on the U.S. patent and trademark examination systems; international filings for IP protections on U.S.-funded research, particularly without U.S. funders' or inventors' awareness; the ratio of U.S. companies filing for IP protections, as well as pursuing IP-related litigation, in the U.S. versus abroad; and patent assignment data.

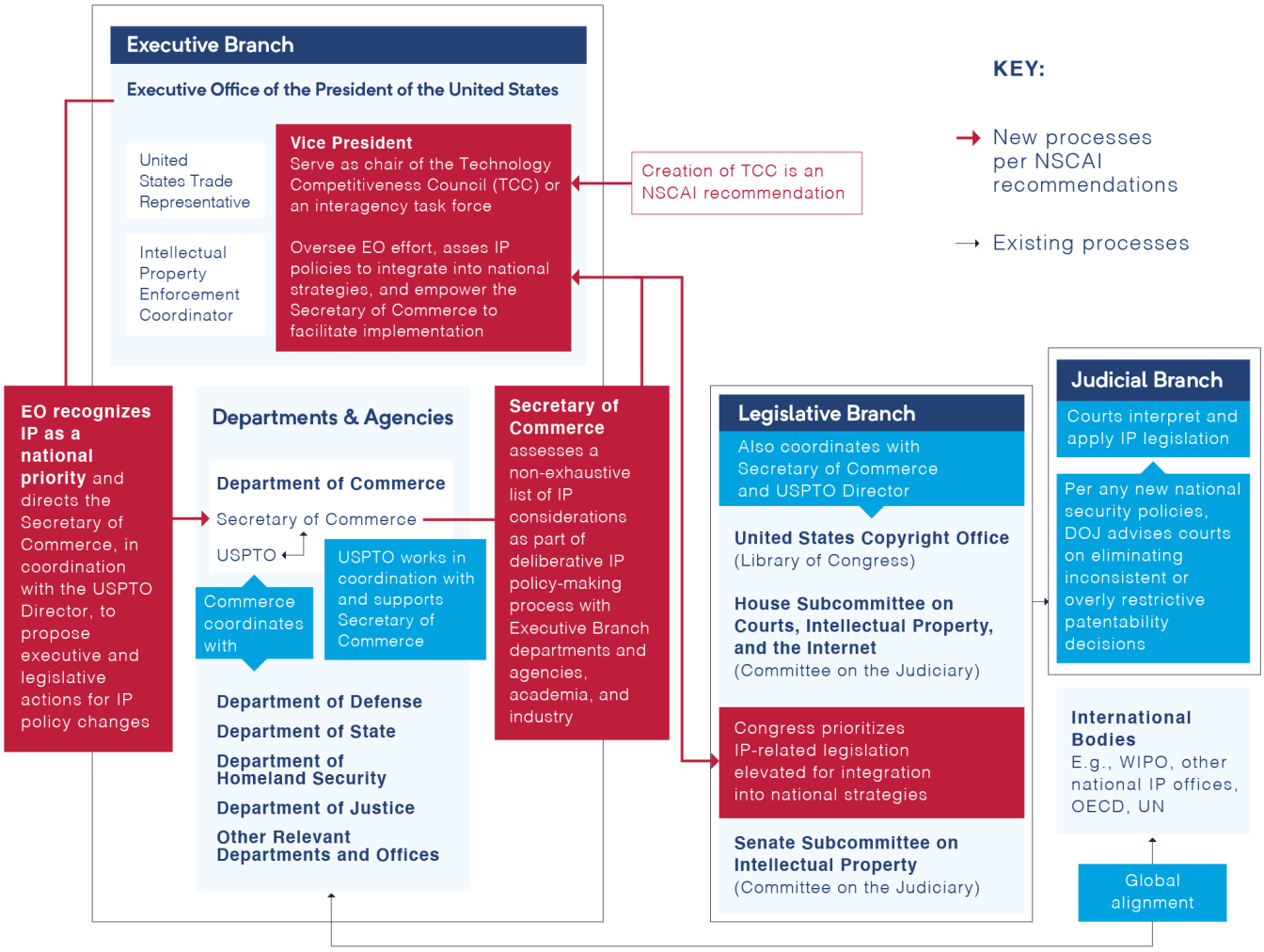
Action for the Department of Justice:

- **Advise courts on ensuring consistency on patentability decisions.**
  - The Department of Justice, through the Solicitor General and the Civil Appellate Section, should advise federal courts on eliminating confusing, inconsistent, or overly restrictive patentability decisions to ensure consistency with national security policies.

Action for Congress:

- **Prioritize proposed IP-related legislation to bolster U.S. national strategies, including for national security, economic interests, and technology competitiveness.**
  - Congress should prioritize legislative recommendations for IP policies and regimes elevated by the Vice President, as Chair of the TCC or an interagency task force. This is particularly important given Congress is responsible for passing patent and IP legislation that the USPTO and other relevant stakeholders execute and follow. Additionally, the U.S. Copyright Office is housed as a federal department within the Library of Congress as the principal advisor to Congress on copyright matters and administers copyright registrations.[6]

Executive Order to Prioritize IP Policies for AI and Emerging Technologies*



*This illustration is not comprehensive of all relevant U.S. government entities with intellectual property responsibilities

Recommendation

Recommendation: The Secretary of Commerce should assess and examine the following non-exhaustive list of "IP considerations," in coordination with the Under Secretary of Commerce for IP and the Director of the USPTO, as part of developing and proposing reforms and new IP policies and regimes to the Vice President.

Action for the Secretary of Commerce:

- **Assess and examine the following non-exhaustive list of 10 considerations for intellectual property as part of the reports submitted to the Vice President as mandated by the Executive Order.**

1. Patent Eligibility: The Secretary of Commerce should assess and articulate the impact of current patent eligibility laws on innovation in AI and emerging technologies from an economic, trade, and national security policy perspective to better inform the legislative and agency efforts on patent eligibility reform. America's IP regime has spurred American ingenuity since the late 18th century. By protecting "any new and useful process, machine, manufacture, or composition of matter" through stable legal institutions governed by the rule of law, inventors and investors have relied on America's IP system to provide the certainty necessary to justify large and risky R&D investments,[7] which are critical for technologies.[8] A strong and robust patent system is equally critical to incentivizing American innovation in AI and emerging technologies that affect national security.[9] Unfortunately, recent patent eligibility court rulings have narrowed the scope of inventions that are eligible for patent protection. This has resulted in a broad swath of innovation that is now ineligible for patent protection in both digital technologies and biopharma, among others.[10] The legal uncertainty for U.S. innovators and companies as to whether their inventions will be eligible for patent protection or susceptible to invalidation once granted is pervasive.[11] This uncertainty in turn has impacted investments in AI and technologies critical to national security. Empirical studies have proven that patents are causally linked to venture capital investments in startups, and, as a result, are causally linked to the success of startups.[12] Recent reports, however, reveal that investments in patent-intensive U.S. startups that develop critical technologies (e.g., computer hardware, semiconductors, medical devices and supplies, and pharmaceuticals and biotechnology) have declined relative to non–patent-intensive companies.[13] This is consistent with investors consistently reporting that patent eligibility is a key factor in their decisions whether to invest in a particular company's technologies or bring a new product to market.[14]

Legislation appears to be the only practical means to reform patent eligibility doctrine. The Judiciary, specifically the Supreme Court, has indicated an unwillingness to revisit its decisions in the past decade that have created this fundamental problem in patent eligibility doctrine.[15] The USPTO has adopted a framework for assessing patent eligibility during the examination process of patent applications, which has had positive results in providing greater certainty to patent applicants,[16] but the Federal Circuit does not seem inclined to follow USPTO guidance.[17]

Efforts to reform the patent eligibility doctrine by amending the relevant provision in the patent statutes failed in 2019.[18] Efforts continue to restart the legislative reform process. A national security point of view has not been expressed on the impact of patent eligibility law on technologies critical to national security, such as AI, microelectronics, 5G telecommunications, quantum computing, and biotechnology. A national security point of view on the impact of current patent eligibility laws on AI and emerging technologies should inform a national IP strategy.

2. Counter China's narrative on winning the innovation competition: The Secretary of Commerce, in coordination with relevant departments and agencies (e.g., Department of State, USTR), should address how the United States might best counter China's efforts to shape the narrative that it is winning the innovation competition based in part on its patent application filings and other interventions in its technology markets.[19] China has become the domestic forum with the highest number of patent application filings, and China's companies and inventors are the most prolific AI patent application filers globally.[20] This benchmark helps to shape the narrative that China has become the leader in innovation because intensive patenting has been shown to generally correlate to economic growth.[21] China also is garnering this reputation when it comes to emerging technologies such as AI.[22] Sources claim that China is outpacing the United States in filing worldwide AI-related patent applications.[23] However, high levels of patenting output is not necessarily indicative of high levels of inventive output.[24] Specifically, non-market factors driven by state-sponsored interferences can distort filings.[25] Moreover, China often files patents as a "numbers game," which can lead to mischaracterizing its technological prowess. Similarly, China's 5G companies declare the most patents as "standard essential," appearing to marry China's concerted, top-down strategy to advance its AI and emerging technology agenda by influencing international standards setting with its goals to dominate numeric benchmarks.[26] The Secretary of Commerce should examine what measures need to be undertaken to counterbalance the narrative of China's technological dominance based on selective patenting data.

3. Impact of China's patent application filings on USPTO and U.S. inventors: The Secretary of Commerce, in coordination with the USPTO Director, should assess whether the USPTO requires additional resources, both human and technical, to ensure high-quality patent examination and recommend policies to address any concerns. In doing so, the Secretary of Commerce should assess the impacts of increased filings from China and AI-generated prior art (the term in patent law for the worldwide scientific and technical knowledge by which an invention is evaluated to determine if it is new). The large body of often low-quality prior art created by China's high-volume patenting has the potential to adversely impact global patent examination systems, including those of the USPTO.[27] At the same time, U.S. inventors may face hurdles in patenting around massive amounts of low-quality Chinese prior art.[28] The USPTO has also noted that stakeholders have raised the issues of whether AI may generate a proliferation of prior art, making it difficult to find relevant prior art for examination.[29]

4. Impediments to AI public-private partnerships and international collaboration: The Secretary of Commerce should assess any impediments to the IP contractual ecosystem to strengthen AI partnerships among national security departments and agencies, industry, and international collaboration. This should include assessing and addressing ambiguities in the Federal Acquisition Regulation and the Defense Federal Acquisition Regulation Supplement relevant to AI and data. AI development presents unique IP contractual issues. For example, industry AI developers will likely need access to relevant U.S. Government training data to develop AI-enabled government solutions or applications. If the solution or application is dual-use, the private entity may want to provide a license for the U.S. Government agency to access the AI application, but retain the IP in the AI model to license to others. But there are unanswered questions as to whether the U.S. Government agency has any IP rights or ownership in the model that was trained on its data.[30] The U.S. Government agency may also want to retain IP rights in order to avoid "vendor lock."[31] These outstanding questions about IP rights and ownership issues could also arise in international AI system R&D collaboration, where impediments can be amplified by conflicting national laws on IP and/or data protections.

5. IP protection for data: The Secretary of Commerce should assess whether there is a need for *sui generis* protection or additional IP-type of protections for data and propose policies and/or legislation if protection is deemed necessary. Data is critical to AI and machine learning (ML), but gaps may exist in current protection regimes afforded by patent or copyright. Inadequate protections for data may disincentivize the necessary investments in developing these critical data sets as well as public disclosure and sharing agreements.[32] While protections for data might be a future need, the U.S. should be proactive in assessing and addressing the necessity of such protections. The Secretary of Commerce also should explore ways to protect and incentivize creation of data sets while allowing the data to be shared at some point, particularly with smaller entities that might not otherwise be able to enter the market.[33] An analysis of the strengths and weaknesses of the European *sui generis* database protections should inform this assessment.[34]

6. Combat IP theft: The Secretary of Commerce, in coordination with relevant departments and agencies (e.g., USTR, Intellectual Property Enforcement Coordinator, the National Science Foundation, the Office of Science and Technology Policy,[35] as well as the Departments of Homeland Security,[36] Justice,[37] and State) should assess and identify additional efforts that the Executive Branch should undertake to counter IP theft threats, including actions in collaboration with allies and partners.[38] In particular, the Secretary of Commerce should clearly articulate that the U.S. counter–IP theft strategy will contain both criminal and civil economic dimensions. The Department of Commerce should utilize all available tools for establishing a deterrence regime to punish firms guilty of stealing U.S. IP and deter future IP theft to level the playing field for U.S. and allied firms. These tools should include placing offending companies on the Bureau of Industry & Security entity list,[39] blocking visas of key employees, or levying tariffs against products derived from stolen IP. Solutions that should be explored include training for allies and partners to stop

counterfeits at borders and efforts to increase individuals' respect for IP and recognition of and ways to avoid counterfeits. In addition, the Secretary should assess methods and means for strengthening and updating existing mechanisms available to American victims of trade-secret theft, including reintroducing legislation to strengthen the Economic Espionage Act by, for example, increasing damages available to trade-theft victims and extending the statute of limitations.[40]

7. Inventorship by AI: The Secretary of Commerce should assess the need for policy changes for issues raised by AI-generated inventions and creations, particularly as technologies evolve. The USPTO has determined that under current legal doctrine, an inventor must be a natural person and denied a patent application naming a machine as the inventor.[41] The U.S. is not alone in this position.[42] The USPTO also issued extensive requests for public comments on a variety of AI IP policy issues, including AI's impact on inventorship and ownership, as well as impacts on non-patent IP protections, such as copyright. As a result, the USPTO issued a comprehensive report of public views on AI and IP policy. The majority of commenters agreed that, given that current AI capabilities are limited to "narrow AI" (AI systems that are trained and perform individual tasks in well-defined domains) and artificial general intelligence is not yet a reality, current AI could neither invent nor author without human intervention.[43] The Secretary of Commerce should consult with allies and partners to ensure continued harmonization around the various IP issues raised by AI-generated inventions and creations and gain an understanding of China's strategies for addressing these issues, particularly as AI technologies move past narrow AI.

8. Global IP alignment: The Secretary of Commerce, in coordination with relevant departments and agencies (e.g., USPTO, IPEC, USTR, Department of Defense, Department of State), should work with partners and allies to develop global disincentives for IP theft and alleviate any inconsistencies in patent regimes that make it overly difficult for companies to protect their patents in multinational markets. In doing so, the Secretaries should leverage the Commission's recommendation that the United States and allies—through the Emerging Technology Coalition—explore coordinated approaches to IP (as part of the NSCAI-proposed critical area No. 4: Promoting and Protecting Innovation[44]), including a mutual agenda within the WIPO's Conversation on AI and IP and forums with broader mandates. The Secretaries also should assess whether current forums for dialogues on global IP alignment are sufficient or whether new forums or venues are necessitated, particularly given any changes to domestic IP policies or regimes identified during the review of the other IP considerations. For example, if the U.S. determines new protections or policies are needed for data, it may need to work with key allies and partners—bilaterally and multilaterally—to ensure global harmonization.

9. Democratize innovation and IP ecosystems: The Secretary of Commerce should assess whether additional Executive Branch efforts are necessary to expand the innovation base and democratize access to and create more jobs in the innovation and IP ecosystem.[45]

The USPTO, in collaboration with the Secretary of Commerce, has undertaken initiatives to expand the U.S. innovation base by creating the National Council for Expanding American Innovation (NCEAI) to develop a comprehensive national strategy to increase equity and fuel the U.S. innovation ecosystem by encouraging, empowering, and supporting all future innovators.[46] The Secretary of Commerce should ensure that the USPTO has the full support of the Executive Branch in these initiatives. As part of the NCEAI initiative, the Secretary of Commerce also should focus on assessing and identifying potential actions and tools that can fast-track processes and streamline guidance for startups seeking IP protections and ensuring resources for assisting small and medium-sized entities. Such a focus is particularly important when comparing the impact of litigation costs and potentially overly burdensome processes in the U.S., relative to other countries, on U.S. inventors' decisions to pursue IP protections in the United States.[47]

10. "Standard essential" patents process[48]: The Secretary of Commerce, in coordination with relevant departments and agencies (e.g., USPTO, NIST, and the Department of State), should assess policies by which the U.S. can serve a leadership role in and ensure U.S. firms are able to fully participate in the processes by which "standard essential" patents are claimed and asserted.[49] This would help ensure the continuing legitimacy of the standard-setting process, a privately developed method for efficiently coordinating development

and deployment of new technologies in the marketplace, and deflect Beijing's attempt to dominate or manipulate these processes through its own coordination of firms from China. Chinese Communist Party leadership has articulated a linkage between patent leadership in emerging technologies like AI and the standards-setting processes for these same technologies.[50] Current trends confirm China's intention to use both patents and standards to lead in technological innovation.[51] Additional mechanisms may be necessary to protect the integrity of international standards-setting as well as to protect and promote U.S. innovation, such as identifying efforts by foreign governments to influence, directly or indirectly, standard-setting organizations. This would also include identifying foreign governments subsidizing or otherwise incentivizing the over-declaration of patents as "standard essential"[52] or creating barriers to U.S. participation in foreign standard-setting bodies. The Secretary of Commerce also should explore how the U.S. government might support smaller U.S. companies and inventors fully participating in the standard-setting process and encourage the observation of licensing or legal disputes in foreign jurisdictions by U.S. government officials from U.S. Embassies and Missions. Relatedly, the Secretary of Commerce, in coordination with the Director of the USPTO, should assess foreign court rulings on licensing that may impact U.S. national sovereignty to determine a coherent U.S. position or response.[53]

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[1] For a discussion of the U.S. government's efforts to define and prioritize critical emerging technologies, as well as the Commission's recommended eight emerging technologies key to U.S. national competitiveness, see Chapter 16 of this report and its associated Blueprint for Action.

[2] NSCAI recommended the creation of a Technology Competitiveness Council in its 2020 Interim Report and Third Quarter Recommendations. See *Interim Report and Third Quarter Recommendations*, NSCAI at 180 (Oct. 2020), https://www.nscai.gov/previous-reports/ ("Technology Competitiveness Council, led by the Vice President and with a Commissioned Assistant to the President as the day-to-day coordinator, to fill this role.") If the TCC is not established as recommended by the Commission, the Commission recommends that the Vice President should lead these efforts.

[3] If the TCC is not established, the President, through an Executive Order, should establish a task force to address the mandate recommended here.

[4] The USPTO Director "shall advise the President, through the Secretary of Commerce, on national and certain international intellectual property policy issues." 35 U.S.C. § 2.

[5] As an example, an examination of China's patents can provide insight into its biotechnology and genomics research and plans. See Kristy Needham, *Exclusive: China Gene Firm Providing Worldwide COVID Tests Worked with Chinese Military*, Reuters (Jan. 30, 2021), https://www.reuters.com/article/us-china-genomics-military-exclusive/exclusive-china-gene-firm-providing-worldwide-covid-tests-worked-with-chinese-military-idUSKBN29Z0HA.

[6] *Overview of the Copyright Office*, U.S. Copyright Office (last accessed Feb. 2, 2021), https://www.copyright.gov/about/.

[7] NSCAI staff engagement with Professor Adam Mossoff, Antonin Scalia Law School, George Mason University (Oct. 7, 2020); David J. Kappos, *National Security Consequences of U.S. Patent (In) eligibility*, Morning Consult (Nov. 4, 2019), https://morningconsult.com/opinions/national-security-consequences-of-u-s-patent-ineligibility/.

[8] For example, the Supreme Court's controversial 1980 decision in *Diamond v. Chakrabarty*, which classifies a genetically modified bacterium as a patentable innovation (under Section 101), "was a key factor in spurring the explosive growth in the biotech industry in the ensuing decade in the U.S. The *Chakrabarty* Court's recognition that the products of biotech research are patentable, especially when such products are living organisms or represent the building blocks of life, paved the way for dramatic advances in the life sciences and in medical treatment, such as in cancer research." While the U.S. was the first country to patent genetic modification of living organisms (critical for cancer research), other countries refused to patent such innovations for more than a decade. This led to the U.S. becoming the birthplace of the biotech revolution. Similarly, the Supreme Court's 1981 decision in *Diamond v. Diehr* that an invented process using "a computer program was not automatically an 'abstract idea' or 'algorithm' that precluded patent protection" was key for providing reliable patent rights that enabled the high-tech revolution of the late 20th century. Kevin Madigan & Adam Mossoff, *Turning Gold to Lead: How Patent Eligibility Doctrine Is Undermining U.S. Leadership in Innovation*, George Mason Law Review, Vol. 24 at 942-946 (2017), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2943431.

[9] Technologies critical to national security interests include AI, microelectronics, 5G telecommunications, quantum computing, and biotechnology. For more information on various U.S. government efforts to define and prioritize critical emerging technologies and the Commission's recommended list of critical emerging technologies, see Chapter 16 of this report and its associated Blueprint for Action. See also *Interim Report and Third Quarter Recommendations*, NSCAI at 138 (Oct. 2020), https://www.nscai.gov/previous-reports/. There also is a convergence of technologies with the infusion of AI across all technologies. See Joint Written Testimony of Dr. Eric Schmidt et al. before the House Committee on Armed Services, Subcommittee on Intelligence and Emerging Threats and Capabilities, *Interim Review of the National Security Commission on Artificial Intelligence Effort and Recommendations* (Sept. 17, 2020), https://docs.house.gov/meetings/AS/AS26/20200917/110996/HHRG-116-AS26-Wstate-SchmidtE-20200917.pdf.

[10] See *Alice Corp. v. CLS Bank Int'l*, 134 S. Ct. 2347, 2360 (2014) (holding that a computer program for facilitating complex international financial transactions is an abstract idea and cannot be patented); see also *Association for Molecular Pathology v. Myriad Genetics, Inc.*, 133 S. Ct. 2107, 2117 (2013) (holding that isolated DNA for laboratory and medical uses is an unpatentable natural phenomenon); *Mayo Collaborative Services v. Prometheus Laboratories, Inc.*, 566 U.S. 66, 72-73 (2012) (holding that a diagnostic medical treatment for an autoimmune disorder is an unpatentable discovery of a law of nature); *Bilski v. Kappos*, 561 U.S. 593, 609 (2010) (holding that a business method for hedging investment risk is an abstract idea and not a patentable invention); Kevin Madigan & Adam Mossoff, *Turning Gold to Lead: How Patent Eligibility Doctrine Is Undermining U.S. Leadership in Innovation*, George Mason Law Review, Vol. 24 at 946-952 (2017), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2943431.

[11] A former Chief Judge of the Federal Circuit lamented this uncertainty while testifying before the U.S. Senate Judiciary Committee's Intellectual Property Subcommittee: "It is important for me, as a retired [Federal Circuit] judge, to acknowledge that the courts alone created this problem. … If I, as a judge with 22 years of experience deciding patent cases on the Federal Circuit's bench, cannot predict outcomes based on case law, how can we expect patent examiners, trial judges, inventors and investors to do so?" See Testimony of Judge Paul R. Michel (Ret.), U.S. Court of Appeals for the Federal Circuit, before the U.S. Senate Committee on the Judiciary, Subcommittee on Intellectual Property, *The State of Patent Eligibility in America: Part I* (June 4, 2019), https://www.judiciary.senate.gov/imo/media/doc/Michel%20Testimony.pdf. The U.S. Chamber of Commerce recently observed that uncertainty surrounding patent-eligible subject matter and the viability of biopharmaceutical companies' business models is posing "an existential threat to the United States' position as the undisputed global leader in biopharmaceutical innovation." Art of the Possible: U.S. Chamber International IP Index, U.S. Chamber of Commerce, Global Innovation Policy Center at 10 (2020), https://www.theglobalipcenter.com/wp-content/uploads/2020/02/023881_GIPC_IP_Index_2020_FullReport_A_04b.pdf. The former Director of the USPTO similarly emphasized the importance of certainty to innovation in the U.S.: "[t]o ensure that our nation remains at the forefront of AI and other technologies, we must, among other things, provide a reliable and predictable legal framework to incentivize and protect innovation here at home." See USPTO Responses to Questions for the Record by Senator Tillis, Hon. Andrei Iancu, Under Secretary of Commerce for Intellectual Property and Director of the U.S. Patent and Trademark Office, as Witness, U.S. Senate Committee on the Judiciary, Subcommittee on Intellectual Property, *Oversight of the U.S. Patent and Trademark Office* at 11 (hearing held March 13, 2019, responses submitted Aug. 15, 2019), https://www.judiciary.senate.gov/imo/media/doc/Iancu%20Responses%20to%20QFRs2.pdf.

[12] See Joan Farre-Mensa, et al., *What Is a Patent Worth? Evidence from the U.S. Patent "Lottery,"* National Bureau of Economic Research (Dec. 2018), https://www.nber.org/papers/w23268 (finding an almost double increase in chance of a startup receiving venture capital investments if it has a patent, and further finding this causally linked to a higher rate of success in startups); Stuart J.H. Graham, et al., **High Technology Entrepreneurs and the Patent System: Results of the 2008 Berkeley Patent Survey**, Berkeley Technology Law Journal, Vol. 24, No. 4 at 255-327 (July 4, 2009), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=142904.

[13] Surveys and industry reports demonstrate that "investment has shifted away from patent-intensive industries." Mark F. Schultz, *The Importance of an Effective and Reliable Patent System to Investment in Critical Technologies*, Alliance for U.S. Startups and Investors for Jobs at 24-37 (July 2020), https://static1.squarespace.com/static/5746149f86db43995675b6bb/t/5f2829980ddf0c536e7132a4/1596467617939/USIJ+Full+Report_Final_2020.pdf. For example, a look at a subset of patent-reliant technologies (core internet networking, wireless communications, internet software, operating system software, semiconductors, pharmaceuticals, drug discovery, surgical devices, and medical supplies) shows a significant decrease in funding, from 21% of total venture capital funding in 2004 to only 3.2% in 2017. *U.S. Startup Company Formation and Venture Capital Funding Trends 2004 to 2017*, Alliance for U.S. Startups and Investors for Jobs at 9 (June 2019), https://static1.squarespace.com/static/5746149f86db43995675b6bb/t/5d14b7bb46692200012463e0/1561638845187/USIJ+--+U.S.+Startup+Formation+Trends+--+2014-2017.pdf.

[14] David Taylor, *Patent Eligibility and Investment*, Cardozo Law Review at 2055-2056 (2020), http://cardozolawreview.com/patent-eligibility-and-investment/.

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[15] See, e.g., *Hikma Pharmaceuticals USA Inc. v. Vanda Pharmaceuticals Inc.*, No. 18-817 (Jan. 13, 2020) (cert. denied); *Athena Diagnostics, Inc. v. Mayo Collaborative Services, LLC*, No. 19-430 (Jan. 13, 2020) (cert. denied); *HP Inc. v. Berkheimer*, No. 18-415 (Jan. 13, 2020) (cert denied). In *Athena*, all 12 active judges of the Federal Circuit, the appellate court from which the decision was appealed to the Supreme Court, agreed that the diagnostic methods at issue should be patent eligible, but the majority indicated that they had to find the inventions ineligible for patent protection pursuant to Supreme Court precedent. *Athena Diagnostics, Inc. v. Mayo Collaborative Services, LLC*, No. 19-430 (Jan. 13, 2020) (cert. denied). On Jan. 29, 2021, however, the Supreme Court asked for a response to a petition for certiorari appealing a decision from the Federal Circuit that a drive shaft is not eligible for patent protection because the alleged invention is based on a natural law. *American Axle & Manufacturing Inc. v. Neapco Holdings LLC*, No. 20-891 (Jan. 29, 2021). See also Rebecca Lindhorst, *Two-Stepping Through Alice's Wasteland of Patent-Eligible Subject Matter: Why the Supreme Court Should Replace the Mayo/Alice Test*, Case Western Reserve Law Review at 759 (2019), https://scholarlycommons.law.case.edu/cgi/viewcontent.cgi?article=4813&context=caselrev.

[16] In January 2019, the USPTO published the initial framework in a Revised Guidance and requested public comment on the Guidance. See 84 Fed. Reg. 50, *United States Patent and Trademark Office: 2019 Revised Patent Subject Matter Eligibility Guidance*, U.S. Patent and Trademark Office (Jan. 7, 2019), https://www.federalregister.gov/documents/2019/01/07/2018-28282/2019-revised-patent-subject-matter-eligibility-guidance. Once the USPTO received comments, it issued an Update to the Guidance: *October 2019 Update: Subject Matter Eligibility*, U.S. Patent and Trademark Office (Oct. 2019), https://www.uspto.gov/sites/default/files/documents/peg_oct_2019_update.pdf. The Revised Guidance and the Update were later incorporated into the newest edition of the USPTO's Manual of Patent Examining Procedure when it was revised in June 2020. See *Manual of Patent Examining Procedure*, United States Patent and Trademark Office at § 2103–2106.07(c) (June 2020), https://www.uspto.gov/web/offices/pac/mpep/index.html. Since the USPTO issued the patent eligibility guidance, uncertainty in the examination process has significantly decreased for technologies affected by the *Alice* decision. Office of the Chief Economist, *Adjusting to Alice: USPTO Patent Examination Outcomes After Alice Corp. v. CLS Bank International*, United States Patent and Trademark Office at 6-7 (April 2020), https://www.uspto.gov/sites/default/files/documents/OCE-DH_AdjustingtoAlice.pdf (demonstrating with statistical significance that the Guidance decreased uncertainty as to patent eligibility determinations in the first-action stage of examination by 44% for *Alice*-affected technologies).

[17] Though the USPTO Guidance on patent eligibility applies at the USPTO, the Federal Circuit has held that it is not bound by the Guidance and, if any conflicts arise between it and case precedent from the Federal Circuit and the Supreme Court, precedent will override the Guidance. See *Cleveland Clinic Foundation v. True Health Diagnostics LLC*, 760 F. App'x 1013, 1020 (Fed. Cir. 2019) (non-precedential) ("While we greatly respect the PTO's expertise on all matters relating to patentability, including patent eligibility, we are not bound by its guidance."); see also *In re Rudy*, 956 F.3d 1379, 1383 (Fed. Cir. 2020) (precedential) (citing *Cleveland Clinic Foundation*, 760 F. App'x at 1021 ("To the extent the Office Guidance contradicts or does not fully accord with our caselaw, it is our caselaw, and the Supreme Court precedent it is based upon, that must control.").

[18] Michael Borella, *The Zombie Apocalypse of Patent Eligibility Reform and a Possible Escape Route*, Patent Docs (Feb. 4, 2020), https://www.patentdocs.org/2020/02/the-zombie-apocalypse-of-patent-eligibility-reform-and-a-possible-escape-route.html?utm_source=feedburner&utm_medium=feed&utm_campaign=Feed%3A+PatentDocs+%28Patent+Docs%29 (citing an interview wherein Senator Thom Tillis, Chairman of the Senate Judiciary Committee's Subcommittee on Intellectual Property, recognized that his 2019 patent eligibility reform proposal did not have a "path forward" to become a bill in that Congress).

[19] Solely relying on patent counting is not reflective of innovation. See Jonathan Putnam, et al., *Innovative Output in China*, at 32 (Aug. 2020) (pending revision), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3760816.

[20] Patrick Thomas & Dewey Murdick, *Patents and Artificial Intelligence: A Primer*, Center for Security and Emerging Technology at 10 (Sept. 2020), https://cset.georgetown.edu/wp-content/uploads/CSET-Patents-and-Artificial-Intelligence.pdf.

[21] Jonathan M. Barnett, *Patent Tigers and Global Innovation*, CATO at 14 (Winter 2019/2020), https://www.cato.org/sites/cato.org/files/2019-12/v42n4-2.pdf.

[22] WIPO's Patent Cooperation Treaty (PCT) procedure allows inventors to indicate an intent to file patent applications in multiple countries. However, while in the subsequent national phase applications, a third country examines the patent and makes its own determination to grant. Therefore, experts assert that national phase applications are a better indicator for monitoring high-quality patent filings than filings under the PCT system. For information on PCT and national phase process, see *PCT FAQs*, WIPO (April 2020), https://www.wipo.int/pct/en/faqs/faqs.html; *WIPO Technology Trends 2019: Artificial Intelligence*, WIPO at 61-63, https://www.wipo.int/edocs/pubdocs/en/wipo_pub_1055.pdf; George Leopold, *China Dominates AI Patent Filings*, EnterpriseAI (Aug. 31, 2020), https://www.enterpriseai.news/2020/08/31/china-dominates-ai-patent-filings/ ("Beijing has become a fierce defender of intellectual property linked to what planners consider a strategic technology"). Although China has a high level of PCT filings, the associated national phase applications are significantly lower. See *Patent Cooperation Treaty Yearly Review 2020: The International Patent System*, WIPO at 50 and 55 (2020), https://www.wipo.int/edocs/pubdocs/en/wipo_pub_901_2020.pdf.

[23] Yuki Okoshi, *China Overtakes U.S. in AI Patent Rankings*, Nikkei Asia (March 10, 2019), https://asia.nikkei.com/Business/Business-trends/China-overtakes-US-in-AI-patent-rankings ("Chinese companies have surged ahead of their U.S. counterparts on a Nikkei ranking of the top 50 patent filers for artificial intelligence over the past three years, expanding their presence in the world's most prominent high-tech battleground."); Andrew Snowdon, *UK Ranked Fourth in the World for Number of Blockchain Patents Filed But Is Falling Behind for AI Patents*, UHY Hacker Young (Jan. 21, 2019), https://www.uhy-uk.com/insights/uk-ranked-fourth-world-number-blockchain-patents-filed-falling-behind-ai-patents ("New Artificial Intelligence technology developments dominated by Chinese companies").

[24] *5G Technological Leadership*, Hudson Institute at 2 (Dec. 2020), https://s3.amazonaws.com/media.hudson.org/Hudson_5G%20Technological%20Leadership.pdf ("There are important limitations with using patent counting as a measure of innovative output, as economists and statisticians have long recognized. … This is why economists consider information about the number of patents to be a 'noisy' indicator of innovative output. … What matters is the quality, not the quantity of patents."); Jonathan Putnam, et al., Innovative Output in China, at 32 (Aug. 2020) (pending revision), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3760816; Jonathan M. Barnett, *Patent Tigers and Global Innovation*, CATO (Winter 2019/2020), https://www.cato.org/sites/cato.org/files/2019-12/v42n4-2.pdf.

[25] Michael Mangelson, et al., *Trademarks and Patents in China: The Impact of Non-Market Factors on Filing Trends and IP Systems*, U.S. Patent and Trademark Office at 1 (Jan. 2021), https://www.uspto.gov/sites/default/files/documents/USPTO-TrademarkPatentsInChina.pdf (discussing China's subsidies for trademark and patent application filings); Testimony of Mark Cohen, Senior Counsel on China in the Office of Policy and International Affairs in the United States Patent and Trademark Office, Before House Committee on the Judiciary, *International Antitrust Enforcement: China and Beyond* (June 7, 2016), https://www.uspto.gov/about-us/news-updates/statement-mark-cohen-house-committee-judiciary (discussing numerous strategies used by China to increase patent filings).

[26] See *Meeting the China Challenge: A New American Strategy for Technology Competition*, Working Group on Science and Technology in U.S.-China Relations at 29 (Nov. 16, 2020), https://asiasociety.org/sites/default/files/inline-files/report_meeting-the-china-challenge_2020.pdf [*hereinafter* Meeting the China Challenge]; Matthew Noble, et al., *Determining Which Companies Are Leading the 5G Race*, IAM (July/Aug. 2019), https://www.twobirds.com/~/media/pdfs/news/articles/2019/determining-which-companies-are-leading-the-5g-race.pdf?la=en&hash=8ABA5A7173EEE8FFA612E070C0EA4B4F53CC50DE. For example, as of February 2020, Huawei and ZTE filed the most number of "standard essential" patents (SEP)s for 5G technologies, but assessments of these filings are critical of the quality of these patents. Jed John Ikoba, *Huawei Has Filed the Most 5G Patents Globally as of February 2020–A Report*, Gizmochina (June 2, 2020), https://www.gizmochina.com/2020/06/02/huawei-has-the-most-5g-standard-essential-patents-globally/.

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[27] The potential impact of Chinese patent prior art that must be examined at the USPTO can be likened to what is happening to the USPTO trademark application process. An influx of fraudulent trademark applications from China, supported by monetary incentives from the Chinese government, is likely damaging the integrity of the U.S. trademark registration process, including by imposing unpredictability in examination process schedules. *Hearing on Fraudulent Trademarks: How They Undermine the Trademark System and Harm American Consumers and Businesses*, U.S. Senate Committee on the Judiciary, Subcommittee on Intellectual Property (Dec. 3, 2019), https://www.judiciary.senate.gov/meetings/fraudulent-trademarks-how-they-undermine-the-trademark-system-and-harm-american-consumers-and-businesses; Barton Beebe & Jeanne C. Fromer, *Are We Running Out of Trademarks? An Empirical Study of Trademark Depletion and Congestion*, Harvard Law Review (Feb. 9, 2018), https://harvardlawreview.org/2018/02/are-we-running-out-of-trademarks/; Josh Gerben, *Massive Wave of Fraudulent US Trademark Filings Likely Caused by the Chinese Government Payments*, Gerben (last accessed Jan. 3, 2021), https://www.gerbenlaw.com/blog/chinese-business-subsidies-linked-to-fraudulent-trademark-filings/.

[28] Jeanne Suchodolski, et al., *Innovation Warfare*, North Carolina Journal of Law & Tech at 201 (Dec. 2020), https://ncjolt.org/articles/volume-22/volume-22-issue-2/innovation-warfare/.

[29] *Public Views on Artificial Intelligence and Intellectual Property Policy*, U.S. Patent and Trademark Office at iii (Oct. 2020), https://www.uspto.gov/sites/default/files/documents/USPTO_AI-Report_2020-10-07.pdf [*hereinafter* USPTO AI IP policy report].

[30] Richard Vray & Jane Mutimear, *Artificial Intelligence: Navigating the IP Challenges*, Mobile World Live (Feb. 16, 2019), https://www.mobileworldlive.com/intellectual-property-news/artificial-intelligence-navigating-the-ip-challenges.

[31] David Deptula, *The Growing Importance of Data Rights in Defense Acquisition*, Forbes (Oct. 16, 2018), https://www.forbes.com/sites/davedeptula/2018/10/16/the-growing-importance-of-data-rights-in-defense-acquisition/?sh=165063242a04.

[32] In the USPTO report surveying stakeholders for perspectives on IP policy for AI, "commenters were nearly equally divided between the view that new intellectual property rights were necessary to address AI inventions and the belief that the current U.S. IP framework was adequate to address AI inventions. Generally, however, commenters who did not see the need for new forms of IP rights suggested that developments in AI technology should be monitored to ensure needs were keeping pace with AI technology developments. The majority of opinions requesting new IP rights focused on the need to protect the data associated with AI, particularly ML." USPTO AI IP policy report at 15; *Id.* at 38 ("[a] smaller number of commenters did suggest a reconsideration of whether additional protections of datasets and databases could be useful to spur investment in high-quality data of vetted/assured provenance.").

[33] See USPTO AI IP policy report at 15.

[34] *Protection of Databases*, European Commission (June 1, 2018), https://ec.europa.eu/digital-single-market/en/protection-databases; USPTO AI IP policy report at 38.

[35] This includes the Joint Committee on the Research Environment (JCORE).

[36] This includes U.S. Customs and Border Protection.

[37] This includes the Computer Crime and Intellectual Property Section (CCIPS).

[38] Meeting the China Challenge at 16 ("In concert with allies and like-minded countries, the U.S. should investigate, punish, and condemn such acts and identify ways to induce changes in China's maneuvers through counter-espionage, law enforcement, diplomatic pressure, and professional training in scientific integrity.").

[39] Press Release, The U.S. Department of Commerce, *Statement from Secretary Ross on The Department's 77 Additions to the Entity List for Human Rights Abuses, Militarization of the South China Sea and U.S. Trade Secret Theft* (Dec. 18, 2020), https://www.commerce.gov/news/press-releases/2020/12/statement-secretary-ross-departments-77-additions-entity-list-human.

[40] Charles Barquist & Maren Laurence, *How a Biden Administration Would Shape IP Policy*, Law 360 (Oct. 19, 2020), https://www.law360.com/articles/1319716/how-a-biden-administration-would-shape-ip-policy; Sean Lyngaas, *As China Tensions Mount, U.S. Officials Outline Efforts to Combat Economic Espionage*, CyberScoop (Dec. 12, 2018), https://www.cyberscoop.com/china-tensions-mount-u-s-officials-outline-efforts-combat-economic-espionage/; see also 18 U.S.C. § 1831 (regarding economic espionage); 18 U.S.C. §1832 (regarding theft of trade secrets).

[41] Robert Bahr, *Decision on Petition: Application No. 16/524,350*, U.S. Patent and Trademark Office (2020), https://www.uspto.gov/sites/default/files/documents/16524350_22apr2020.pdf.

[42] Consistent with U.S. policy that an inventor must be a human "natural person," in January 2020 the European Patent Office (EPO) and the UK Intellectual Property Office (UKIPO) rejected two patent applications that identified the AI machine as the inventor. The EPO and UKIPO found that the applications met the requirements for patentability, but they rejected the applications because the inventor was not a "human being." See Emma Woollacott, *European Patent Office Rejects World's First AI Inventor*, Forbes (Jan. 3, 2020), https://www.forbes.com/sites/emmawoollacott/2020/01/03/european-patent-office-rejects-worlds-first-ai-inventor/?sh=2915e17d5cd0; Angela Chen, *Can an AI Be an Inventor? Not Yet*, MIT Technology Review (Jan. 8, 2020), https://www.technologyreview.com/2020/01/08/102298/ai-inventor-patent-dabus-intellectual-property-uk-european-patent-office-law/; *EPO Provides Reasoning for Rejecting Patent Applications Citing AI as Inventor,* IPWatchdog (Jan. 28, 2020), https://www.ipwatchdog.com/2020/01/28/epo-provides-reasoning-rejecting-patent-applications-citing-ai-inventor/id=118280/.

[43] USPTO AI IP policy report at ii-iii.

[44] See the Chapter 15 Blueprint for Action and its associated Annex for more details on the proposed critical areas for international alignment for the Emerging Technology Coalition. Critical Area No. 4, as detailed in the Blueprint for Action and Annex, is "Promoting and protecting innovation, including through intellectual property alignment." Recognizing the importance of IP to promote and protect innovation, the critical area proposes coordination on assistance to nations in developing strong and aligned IP regimes, coordinated efforts to stop IP theft and counter-cyberespionage, and aligning on a mutual agenda within IP-related multilateral forums.

[45] "To maintain our technological leadership, the United States must seek to broaden our intellectual property ecosystem demographically, geographically, and economically." *Expanding Innovation*, USPTO (last accessed Jan. 3, 2021), https://www.uspto.gov/initiatives/expanding-innovation (quoting USPTO Director Andrei Iancu).

[46] *Remarks by Commerce Secretary Wilbur L. Ross at the First Meeting of the National Council for Expanding American Innovation*, U.S. Department of Commerce (Sept. 14, 2020), https://www.commerce.gov/news/speeches/2020/09/remarks-commerce-secretary-wilbur-l-ross-first-meeting-national-council; *Support the National Council for Expanding American Innovation*, USPTO (last accessed Jan. 3, 2021), https://www.uspto.gov/initiatives/expanding-innovation/national-council-expanding-innovation/support-national-council.

[47] "A significant proportion of lawyers are advising clients with products in the global market to patent in China, Germany, and even the U.K. instead of the U.S. The U.S. is losing the fight to be the major center of patents, investment, and tech because it is easier and less expensive for companies to file and ensure their patents are enforced in other countries than in the U.S." NSCAI staff engagement with Robert Taylor, owner of RPT Legal Strategies, PC (Oct. 8, 2020).

[48] Through the standards-setting process, standards-setting bodies (e.g., ISO, IEC, IEEE, ITU, and others) often require that patent owners self-identify patents that *may be* deemed essential in a future standard. This requirement aims to ensure transparency and often requires commitments by these patent owners to license their patents fairly, reasonably, and non-discriminatorily. However, these standards-setting bodies do not assess whether a patent is essential or not, leaving these determinations to private companies negotiating licenses or, if there is a dispute, to courts. See *IEEE SA Standards Board Bylaws*, IEEE, https://standards.ieee.org/about/policies/bylaws/sect6-7.html#loa.

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[49] See Chapter 15 of this report and its associated Blueprint for Action for the coordinated U.S. national plan to support international technology efforts and its first component on shaping international technical standards. Also see the Chapter 15 Annex for more details on proposed international technical standards-setting recommendations for NIST, the Department of State, and other critical Departments and Agencies. NSCAI recommends that the U.S. government provide greater attention to and resourcing for international technical standardization efforts; increase interagency coordination on AI-related standards-setting; strengthen partnerships and collaboration with the private sector, particularly through a federal advisory committee and a grant program to enable small and medium-sized U.S. AI companies to participate in international standardization efforts; and increase international alignment with key partners and allies. See also Meeting the China Challenge at 27.

[50] Dai Hong, the director of China's National Standardization Committee's Industrial Standards Department, stated in January 2018, as the research for China Standards 2035 was launched: "In today's world, industry, technology, and innovation are developing rapidly. The new generation of information technology industry represented by artificial intelligence, big data, cloud computing, etc. is emergent. International technology research and development and patent distribution have not yet been completed. Global technical standards are still being formed. This offers the opportunity to realize the transcendence of China's industry and standards." See translated quote from January 20, 2018, on the China News Network in Emily de la Bruyère & Nathan Picarsic, *China Standards 2035: Beijing's Platform Geopolitics and 'Standardization Work in 2020,'* Horizon Advisory at 6 (April 2020), https://www.horizonadvisory.org/china-standards-2035-first-report. Additionally, the Guangdong High People's Court published an October 2013 opinion piece that argued "for Chinese enterprises to make a revival, there is only one road to take: strengthen our capacity for innovation, and only by gaining control over SEPs can Chinese companies avoid being 'led by the nose.'" It cited Chief Judge Qiu Yongqing, who ruled against the U.S. firm InterDigital in its lawsuit against Huawei and argued that "Chinese enterprises should bravely employ anti-monopoly lawsuits to break technology barriers and win space for development." See David Cohen & Douglas Clark, *China's Anti-Monopoly Law as a Weapon Against Foreigners*, IAM-media (Nov./Dec. 2018), https://kidonip.com/wp-content/uploads/2018/11/IAM92_China-anti-monopoly_section_0.pdf.

[51] Jeanne Suchodolski, et al., *Innovation Warfare*, North Carolina Journal of Law & Tech at 201 n. 130 (Dec. 2020), https://ncjolt.org/articles/volume-22/volume-22-issue-2/innovation-warfare/ (China's firms recognize the strategic importance of standards-setting activities and that participation in those forums provides the legal means to both access and influence developing technologies). "In recent years the PRC government decided that promoting Chinese standards in global standards bodies via the work of Huawei and other Chinese companies is key to realizing techno-nationalist goals for technological ascension. Viewed in this context, Huawei is in the vanguard of the Chinese effort to establish dominance in both the number and significance of Chinese patents that are deemed "standard essential" to 5G standards … it is in the U.S. interest to deflect Beijing's attempt to dominate the standard-setting process." See Meeting the China Challenge at 29. See also Matthew Noble, et al., *Determining Which Companies Are Leading the 5G Race*, IAM (July/August 2019), https://www.twobirds.com/~/media/pdfs/news/articles/2019/determining-which-companies-are-leading-the-5g-race.pdf.

[52] Over-declaration is already present in 5G. See Matthew Noble, et al., *Determining Which Companies Are Leading the 5G Race*, IAM (July/August 2019), https://www.twobirds.com/~/media/pdfs/news/articles/2019/determining-which-companies-are-leading-the-5g-race.pdf.

[53] Countries are increasingly seeking to attract inventors by setting favorable global royalty rates (see the U.K.'s decision in *Unwired Planet v. Huawei*) or by controlling the jurisdiction in which companies may file for injunctive relief or pursue litigation. For example, licensing disputes have recently led to additional satellite litigation involving broader issues of international law and comity between China and other legal jurisdictions. Experts predict disputes to increase and warn of cycle of anti-suit, "anti-antisuit," and "anti-anti-antisuit" injunctions. See Mark Cohen, *Wuhan and Anti-Suit Injunction*, China IPR Blog (Dec. 28, 2020), https://chinaipr.com/2020/12/28/wuhan-and-anti-suit-injunctions/; Dani Kass, *FRAND Rate 'Nightmare' Raises Call For International Tribunal*, Law360 (Jan. 14, 2021), https://www.law360.com/articles/1343824/frand-rate-nightmare-raises-call-for-international-tribunal/; Michael Renaud, et al., *Key Considerations for Global SEP Litigation–Part 1*, National Law Review (Oct. 30, 2019), https://www.natlawreview.com/article/key-considerations-global-sep-litigation-part-1; Michael Renaud, et al., *Key Considerations for Global SEP Litigation–Part 2*, National Law Review (Nov. 5, 2019), https://www.natlawreview.com/article/key-considerations-global-sep-litigation-part-2; Zhao Qishan & Lu Zhe, *Statistics of Chinese SEP Cases in 2011-2019*, LexField (2020), https://chinaipr2.files.wordpress.com/2020/07/statistics-of-chinese-sep-cases-in-2011-2019-lexfield9892.pdf.