Note

Hello, World? Domestic Software Patent Protection Stands Alone Due to Uncertain Subject Matter Eligibility Jurisprudence

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In the last sixteen years, software-related inventions have encompassed the majority of all utility patents issued in the United States. Further, studies estimate that spending within the global information technology market will grow to $4.6 trillion in 2023, as industries such as data security, cloud computing, and artificial intelligence continue to innovate and expand at alarming rates. Needless to say, software is a crucial and ever-expanding industry for the global economy. In a series of recent cases, however, the Supreme Court injected unpredictability into the patenting of software and computer-implemented inventions by overhauling the long-standing patentable subject matter doctrine.

Embodied in § 101 of the Patent Act, the "patentable subject matter" requirement for patent protection refers to the basic substantive categories of invention that Congress and the courts have considered to be appropriate for patenting. The Supreme Court's recent jurisprudence has massively expanded subject matter eligibility restrictions under § 101, thereby making it more difficult to obtain patent protection for certain types of inventions—notably, software inventions. As software patents have become more difficult to obtain and even more difficult to protect, the current patentable subject matter jurisprudence disparately harms

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small-scale inventors and startups who are reliant on the patent system to obtain crucial private capital from investors to support further innovation. Such issues are made glaringly apparent when comparing the domestic patentable subject matter jurisprudence to that of other technologically developed foreign nations, whose patent systems are more predictable and rewarding for software inventors.

The Supreme Court's recent pivot has been met with substantial criticism by members of the intellectual property community across the political spectrum. Politicians, academics, district court and Federal Circuit judges, inventors, and former United States Patent and Trademark Office (USPTO) Directors have criticized the Supreme Court's framework and have urged Congress to act. Sparked by a recent denial for rehearing en banc wherein the Federal Circuit was evenly divided on the contours of § 101, followed by the Supreme Court's refusal to grant certiorari, senators and prominent law organizations pitched legislative proposals on the Senate floor to abrogate the Supreme Court's framework and better protect emerging technologies, including software.

This Note pushes the need for legislative revision to counteract the negative effects of the Supreme Court's recent jurisprudence on the software industry and better align the United States with consistent global standards. Specifically, this Note thoroughly analyzes the history of the patentable subject matter doctrine, domestic proposals aimed at dismantling the current jurisprudence, and the way foreign patent systems handle patent eligibility restrictions for software inventions, to argue that domestic software innovation is disparately and negatively harmed by the Supreme Court's evolving framework for evaluating subject matter eligibility. Software innovation is paramount to the development of modern society, and thus the patent system should stand to support the patentability of software inventions, rather than hinder it.

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#include <stdio.h>

int main() {
     printf("Hello, World?\n");

     return 0;
}
```[1]

INTRODUCTION

In 2021, 63.1% of all utility patents[2] issued were "software-related."[3] In fact, in the last sixteen years, software-related inventions have encompassed the majority of *all* utility patents issued.[4] Studies estimate that spending within the global information technology market will grow to $4.6 trillion in 2023, as industries such as data security, cloud computing, and artificial intelligence continue to innovate and expand at alarming rates.[5] The United States currently sits at the center of this market,

1. The "Hello, World!" program is typically the first program an aspiring programmer creates to become familiar with the coding process. The program also symbolizes a programmer's introduction to the global world of computing. Here, the exclamation mark has been replaced with a question mark, signifying the uncertain footing that the domestic patentable subject matter jurisprudence stands on in relation to other developed patent systems. *See* The Software Guild, *The History of Hello World*, MEDIUM: THE SOFTWARE GUILD BLOG (July 17, 2015), https://medium.com/the-software-guild-blog/the-history-of-hello-world-175440f77776 [https://perma.cc/6P6J-HAX3].

2. There are three types of patents: (1) utility patents for new and useful inventions; (2) design patents for new, original, and ornamental designs; and (3) plant patents for distinct and new varieties of plants. *See Patent Process Overview*, U.S. PAT. & TRADEMARK OFF., https://www.uspto.gov/patents/basics/patent-process-overview [https://perma.cc/6X6S-P2K8] (differentiating the three types of patents).

3. Raymond Millien, *U.S. Patent Grants Fell 7% Last Year, but 'Software-Related' Grants Remained at 63%*, IPWATCHDOG (Mar. 21, 2022), https://ipwatchdog.com/2022/03/21/us-patent-grants-fell-7-last-year-software-related-grants-remained-63/id=147745 [https://perma.cc/4ANE-XG8S].

4. *See id.* (showing that the last year software related patents did not constitute the majority of utility patents granted was 2004, when such patents encompassed 48.9% of all patents issued).

5. *IT Industry Outlook 2023: Unlocking Potential*, COMPTIA 15 (Nov. 2022), https://comptiacdn.azureedge.net/webcontent/docs/default-source/research-reports/comptia-it-industry-outlook-2023_vfinal.pdf?sfvrsn=a4c823c_2 [https://perma.cc/9T94-BA5A].

representing 33% of the global tech market in 2022.[6] Needless to say, software is a crucial and ever-expanding industry for the global economy, and the United States currently finds itself center stage.[7]

These numbers, however, do not fully illustrate the current state of software innovation in the United States, as a modern and unpredictable spin on the patentable subject matter doctrine[8] has introduced uncertainty and risk into domestic intellectual property protection.[9] Specifically, the Supreme Court recently introduced a new framework for determining subject matter eligibility that has broadened the conception of patent-ineligible "abstract ideas."[10] This shifting patentable subject matter jurisprudence has already negatively impacted the software industry, particularly startups on the forefront of innovation,[11] and the reverberations threaten to challenge the United States' status as the global leader in software intellectual property.[12]

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6. *IT Industry Outlook 2022: Return to Strategy*, COMPTIA 15 (Nov. 2021), https://comptiacdn.azureedge.net/webcontent/docs/default-source/research-reports/comptia-it-industry-outlook-2022_fin.pdf?sfvrsn=8e44dcc3_0 [https://perma.cc/ZD3D-MVKJ].

7. *See id.* ("The United States is the largest tech market in the world . . . .").

8. "Patentable subject matter" generally refers to the basic substantive categories of invention that Congress and the courts have considered to be appropriate for patenting. *See Patent Subject Matter Eligibility*, U.S. PAT. & TRADEMARK OFF., https://www.uspto.gov/ip-policy/patent-policy/patent-subject-matter-eligibility [https://perma.cc/9AMZ-ERZJ] (defining the patentable subject matter doctrine); *see also* discussion *infra* Part I.A (introducing the constitutional and philosophical origins of the patentable subject matter doctrine in the United States).

9. *See* discussion *infra* Part I.B (analyzing the Supreme Court's recent cases which reformed the patentable subject matter doctrine).

10. For an analysis of patent-ineligible "abstract ideas," how they relate to software inventions, and how the Supreme Court's new framework broadens their conception, see *infra* Parts I.A–B.

11. *See* Jay P. Kesan & Runhua Wang, *Eligible Subject Matter at the Patent Office: An Empirical Study of the Influence of* Alice *on Patent Examiners and Patent Applicants*, 105 MINN. L. REV. 527, 592–93 (2020) (discussing how the software industry has more limited access to investment because of the United States' uncertain eligibility restrictions).

12. *See, e.g.*, *US Still World Leader in Patent Filings*, PHYS.ORG (Mar. 16, 2016), https://phys.org/news/2016-03-world-leader-patent.html [https://perma.cc/BKR7-REEB] ("While the United States of America maintains its premier position, the geography of innovation continues to shift and to evolve, with Asia,

The patentable subject matter doctrine derives from § 101 of the Patent Act.[13] Section 101 innocuously states that "[w]hoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent."[14] Thus, the base requirements for patent eligibility seem clear: the invention or improvement claimed by a patent must be "new and useful," and it must be embodied in a "process, machine, manufacture, or composition of matter."[15] Section 101's explicit text, however, merely represents the starting point for determining domestic restrictions on patentable subject matter, as the federal courts impose further restrictions on patents which recite "laws of nature," "natural phenomena," and "abstract ideas."[16] Inventions whose claims fall within one of these categories are barred from obtaining a patent under § 101 for lack of patentable subject matter.[17]

Though these judicially created categories were traditionally narrow in scope, the Supreme Court has recently developed a new test for determining whether a patent encapsulates ineligible subject matter.[18] By improperly conflating patentability requirements, this new standard has broadened the patentable subject matter doctrine to exclude and invalidate patents traditionally issued and protected by the United States' patent

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and in particular Japan, China and the Republic of Korea, forming the predominant geographical cluster . . . ."); *The State of Patent Eligibility in America: Part II: Hearing Before the S. Subcomm. on Intell. Prop. of the S. Comm. on the Judiciary*, 116th Cong. (2019) [hereinafter *Patent Eligibility Hearings Part II*] (statement of Jeffrey Birchak, Vice President of Intellectual Property, Fallbrook Technologies) ("[D]enying patent protections to U.S. researchers and inventors threatens U.S. leadership in global technology innovation . . . .").

13. 35 U.S.C. § 101.

14. *Id.*

15. *Id.*

16. Bilski v. Kappos, 561 U.S. 593, 601 (2010) ("The Court's precedents provide three specific exceptions to § 101's broad patent-eligibility principles: 'laws of nature, physical phenomena, and abstract ideas.'" (quoting Diamond v. Chakrabarty, 447 U.S. 303, 309 (1980))).

17. *See id.* at 602 ("The concepts covered by these exceptions are 'part of the storehouse of knowledge of all men . . . free to all men and reserved exclusively to none.'" (quoting Funk Bros. Seed Co. v. Kalo Inoculant Co., 333 U.S. 127, 130 (1948))).

18. *See* discussion *infra* Part I.B (deconstructing the Supreme Court's recent opinions on patentable subject matter and § 101 of the Patent Act).

system.[19] Such expansion has had a negative and disparate impact on certain areas of innovation, notably software and computer-implemented inventions.[20]

Unfortunately, expanding the patentable subject matter doctrine most negatively impacts small-scale inventors, such as startups, who continue to be major innovators in software and software-adjacent fields.[21] As software patents have become difficult to obtain and even more difficult to protect,[22] the current

19. *See generally* Ass'n for Molecular Pathology v. Myriad Genetics, Inc., 569 U.S. 576 (2013) (developing new standards for identifying patent-ineligible subject matter related to diagnostic methods); Mayo Collaborative Servs. v. Prometheus Lab'ys, Inc., 566 U.S. 66 (2012) (introducing a new test which has become an inconsistent standard for analyzing whether a patent is invalid as directed to an ineligible category of patentable subject matter); Alice Corp. Pty. Ltd. v. CLS Bank Int'l, 573 U.S. 208 (2014) (applying the test enumerated in *Mayo* to software patents, which fall under the judicially created "abstract idea" category of patent-ineligible subject matter).

20. To showcase the net uncertainty that the expanded patentable subject matter doctrine has caused, patent invalidations by district courts have increased by more than 141% since the Court's decision in *Alice*. Intell. Prop. L. Section of the State Bar of Nev., Comment Letter on Patent Eligibility Jurisprudence Study 4 (Sept. 7, 2021), https://downloads.regulations.gov/PTO-P-2021-0032-0060/attachment_1.pdf [https://perma.cc/BKL2-VTKC]. In an analysis of 724 software and information technology patents challenged in court post-*Alice*, 65.1% were invalidated on grounds of subject matter ineligibility. Mark A. Lemley & Samantha Zyontz, *Does* Alice *Target Patent Trolls?*, 18 J. EMPIRICAL LEGAL STUD. 47, 67–68 (2021).

21. *See* Joan Farre-Mensa et al., *What Is a Patent Worth? Evidence from the U.S. Patent "Lottery"* 35 (U.S. Pat. & Trademark Off. Econ. Working Paper, Paper No. 2015-5, 2019), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2704028 [https://perma.cc/57M5-GPVM] ("[S]tartups whose first patent application is approved create more jobs, enjoy faster sales growth, and are more innovative than startups with only randomly different inventions that fail to win patent protection.").

22. Regarding patent procedure, a prospective inventor must first file a patent application with the United States Patent and Trademark Office (USPTO). *See Patent Process Overview*, *supra* note 2 (detailing the step-by-step patent process). A "patent examiner" within the USPTO will ultimately decide whether to grant or reject the patent. *Id.* The process of writing a patent and working with a patent examiner is generally referred to as patent prosecution. *Id.* After a patent is granted, its validity may still be challenged in post-grant procedures before the USPTO. *See Inter Partes Disputes*, U.S. PAT. & TRADEMARK OFF., https://www.uspto.gov/patents/laws/america-invents-act-aia/inter-partes-disputes [https://perma.cc/6RMS-DU76] (summarizing post-grant review procedures). Alternatively, an alleged infringer can assert invalidity as an affirmative defense in court. *See* 35 U.S.C. § 282(b) (providing invalidity as an affirmative defense to patent infringement). Thus, there are many hurdles an inventor must overcome to obtain and later assert a patent.

patentable subject matter jurisprudence harms a startup's ability to obtain crucial private capital from investors to support further innovation.[23] While large companies may more easily pivot to other forms of intellectual property protection, such as maintaining proprietary trade secrets,[24] startups and individual inventors often rely on investors to keep their doors open, and patent eligibility is a core metric used by investors to assess a company's technology.[25] A decrease in domestic investment may lead to investors looking elsewhere, particularly overseas, where the patentable subject matter jurisprudence is more predictable than in the United States.[26] This predicament calls into question the stability of domestic, software-related intellectual property,

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23. *See Patent Eligible Subject Matter: Public Views on the Current Jurisprudence in the United States*, U.S. PAT. & TRADEMARK OFF. 41 (June 2022) [hereinafter *Public Views on the Current Jurisprudence*], https://www.uspto.gov/sites/default/files/documents/USPTO-SubjectMatterEligibility-PublicViews.pdf [https://perma.cc/CQE5-LPD3] ("Many stakeholders . . . pointed out that by deterring private investment in startups . . . the current law is having the effect of decreasing competition in several fields and concentrating the market in the hands of a few large, well-funded incumbents.").

24. While there are no registration fees associated with trade secret protection, technical trade secrets present other costs that large companies may more easily bear, such as costs to maintain reasonable security measures and opportunity costs. *See generally Types of Intellectual Property & Related Costs*, TRIANGLE IP, https://triangleip.com/types-of-intellectual-property [https://perma.cc/SS6D-ZPUL] ("Guarding the secret requires security measures, and these might accrue some costs."); *Frequently Asked Questions: Trade Secrets*, WORLD INTELL. PROP. ORG., https://www.wipo.int/tradesecrets/en/tradesecrets_faqs.html [https://perma.cc/7HX3-3B5V] ("[T]rade secrets involve no registration costs (though keeping the information confidential may entail high costs in certain cases) . . . .").

25. A study by David O. Taylor found that 72% of investors in the software industry cited patent eligibility as an important consideration in deciding whether to invest in companies developing technology. David O. Taylor, *Patent Eligibility and Investment*, 41 CARDOZO L. REV. 2019, 2058 tbl.12 (2020). Further, 39% stated that the decreased availability of patents related to software and the internet would somewhat or strongly decrease their willingness to invest. *Id.* at 2069 tbl.20.

26. *See* Am. Bar Ass'n Section of Intell. Prop. L., Comment Letter on Patent Eligibility Jurisprudence Study 4 (Sept. 2, 2021), https://www.regulations.gov/comment/PTO-P-2021-0032-0042 [https://perma.cc/H5TA-64PT] ("[C]ertain technologies are recognized as patent eligible in major competitor countries like China, but not in the U.S., which over time risks moving R&D overseas where these technologies may be more easily protected than in the [United States]. . . .").

and threatens to dislodge the United States' premier status in technological fields at the forefront of modern innovation.[27]

Further, the Supreme Court's stricter patentable subject matter doctrine goes against traditional policy justifications for patent systems, thereby disincentivizing innovation and progress.[28] Patent policy rests on the bedrock idea that, in exchange for the limited monopoly granted by a patent, an inventor must disclose the invention to the public in such a way as to enable a person of ordinary skill in the art to make and use the invention.[29] This limited monopoly incentivizes innovation by allowing an inventor to recoup losses from what are often expensive and lengthy research and development periods.[30] If obtaining a patent at the end of the research and development process is uncertain, corporations may decide to forego research altogether, thereby stifling innovation, or may decide to hold on to the innovative concept as a proprietary trade secret, thereby depriving the public of knowledge and modern innovation.

Thus, while the negative impacts of the current jurisprudence are felt most harshly by smaller inventors, large companies may stray away from developing potentially important technologies due to their uncertain patent eligibility status, leading to a net loss in domestic innovation.[31] Such discrepancies

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27. *See US Still World Leader in Patent Filings*, *supra* note 12 (noting that, while American patent filings still remain the highest in the world, international patent application filings are growing at an alarming rate, with Asian countries such as Japan, China, and Korea representing the bulk of this growth).

28. *See* Kennedy Stanley, *The Plot Thickens in the Convoluted Saga of Section 101 Patent Eligibility: Where Do We Go from Here?*, 23 TUL. J. TECH. & INTELL. PROP. 137, 149 (2021) ("[B]y narrowing the scope of patent eligibility, the *Alice*/*Mayo* test disincentivizes innovation and progress.").

29. *See* 35 U.S.C. § 112(a) (establishing patent law's "enablement" requirement, which encompasses the patent bargain); S. COMM. ON THE JUDICIARY, 90TH CONG., REP. OF THE PRESIDENT'S COMMISSION ON THE PATENT SYSTEM 3 (1966) ("[B]y affording protection, a patent system encourages early public disclosure of technological information, some of which might otherwise be kept secret.").

30. *See* Clark D. Asay, *Patent Schisms*, 104 IOWA L. REV. 45, 50 (2018) (discussing how patents provide economic incentives to pursue socially beneficial behavior).

31. *See, e.g.*, David O. Taylor, *Confusing Patent Eligibility*, 84 TENN. L. REV. 157, 240 (2016) ("If the prevailing perception is that, because of the eligibility requirement, patents will not be available to protect inventions, individuals and companies may not invest efficiently in research and development.");

between traditional patent law policy arguments and the current uncertain state of the law threaten to place American inventors on the cutting-edge of software innovation at a disadvantage in comparison to other countries.

This Note argues that the current state of the domestic patentable subject matter jurisprudence disparately and negatively affects domestic software innovation when compared with other global patent systems. Through analyzing domestic proposals to amend the Patent Act and foreign approaches to subject matter eligibility, this Note pushes the need for legislative solutions. Specifically, this Note advocates for statutorily limiting judicial discretion to make eligibility determinations, and for amending the Patent Act to incorporate emerging software and computer-implemented technologies—features of many major foreign patent systems. While these changes would limit judicial flexibility, this Note shows that such an outcome would promote beneficial and predictable outcomes for software inventors before both the United States Patent and Trademark Office (USPTO) and the federal courts, as well as better embody the patent bargain.

Part I of this Note examines the constitutional and philosophical origins of the patentable subject matter doctrine in the United States and analyzes the impacts of recent Supreme Court decisions which have reshaped the modern patentable subject matter jurisprudence. Part II focuses on efforts to alter the domestic patentable subject matter doctrine, such as the recently introduced Patent Eligibility Restoration Act.[32] Further, Part II gleans trends from various legislative proposals to analyze the prospective impacts they would have on software and computer-implemented inventions. Part III explores how foreign jurisdictions with strong patent systems handle the intersection of software and subject matter eligibility in comparison with current and proposed domestic policies. Finally, Part III concludes by arguing that the relative strength of domestic software intellectual property is weakened by the current patentable subject matter

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The Coal. for 21st Century Pat. Reform, Comment Letter on Patent Eligibility Jurisprudence Study 8 (Oct. 14, 2021), https://www.regulations.gov/comment/PTO-P-2021-0032-0098 [https://perma.cc/2NH3-6XRW] ("[A]lmost all economic sectors rely on computers and software to maintain a high level of productivity. A failure to protect these inventions may discourage further innovation, with potential ripple effects throughout the U.S. economy.").

32. Patent Eligibility Restoration Act of 2023, S. 2140, 118th Cong. (2023).

jurisprudence, and that lessons learned from global trends and domestic proposals could strengthen the United States' patent system.

I. PROGRAM INITIALIZING: THE EVOLUTION OF THE PATENTABLE SUBJECT MATTER DOCTRINE IN THE UNITED STATES

The domestic patentable subject matter doctrine originated in acts ratified by the first Congresses and remained relatively consistent until the last fifteen years. Beginning with *Bilski v. Kappos*[33] and culminating in *Alice Corp. Pty. Ltd. v. CLS Bank International*,[34] the Supreme Court introduced a new framework for making subject matter eligibility determinations. While the Supreme Court aimed to develop a consistent standard for distinguishing ineligible and eligible subject matter,[35] this framework has negatively impacted predictability before the USPTO[36] and federal courts.[37] This Part explores the philosophical origins of the patentable subject matter doctrine, unpacks the Supreme Court's evolving framework for making eligibility determinations, and examines the influence of the Supreme Court's recent decisions on both patent prosecution before the USPTO and litigation before the federal courts.

33. 561 U.S. 593 (2010).

34. 573 U.S. 208 (2014).

35. *Id.* at 217 ("In *Mayo*, we set forth a framework for distinguishing patents that claim laws of nature, natural phenomena, and abstract ideas from those that claim patent-eligible applications of those concepts.").

36. The USPTO defers to Supreme Court precedent regarding patentability requirements when evaluating patent applications. *See, e.g.*, *Manual of Patent Examining Procedure*, U.S. PAT. & TRADEMARK OFF. § 2106 (Feb. 2023), https://www.uspto.gov/web/offices/pac/mpep/mpep-2100.pdf [https://perma.cc/LP8J-ZT9A] (binding patent examiners to Supreme Court precedent when making eligibility determinations). Further, a federal court may invalidate any patent granted by the USPTO if it finds the patent was granted in error. *See* 28 U.S.C. § 1295 (granting the Federal Circuit exclusive jurisdiction over patent appeals from the federal district courts and from decisions of the Patent Trial and Appeal Board).

37. *See infra* Part I.C (discussing the impact of the Supreme Court's new framework).

A. THE CONSTITUTIONAL AND PHILOSOPHICAL ORIGINS OF THE PATENTABLE SUBJECT MATTER DOCTRINE AND EARLY SUPREME COURT PRECEDENT

Congress's power to regulate patent law is directly derived from the Constitution, which states that "[t]he Congress shall have Power . . . [t]o promote the Progress of Science and useful Arts, by securing for limited Times to Authors and Inventors the exclusive Right to their respective Writings and Discoveries."[38] While under the Articles of Confederation the power to grant patents was implicitly delegated to the states, the growth of competing and inconsistent patent systems made the Framers quickly recognize the need for uniformity when protecting intellectual property rights.[39] Transferring patent regulation to the federal level promoted such uniformity by moving away from a patent system wherein individual states unilaterally determined patent rights.[40] Thus, when drafting the Federal Constitution, the Framers decided to grant patent rights to individuals as mandated and regulated by the federal government.[41]

After ratification, Congress rapidly established a national patent system, passing the Patent Act of 1790, titled "An Act to promote the progress of useful Arts."[42] The Patent Act of 1790 sowed the first seeds of the modern § 101 patentable subject matter doctrine, as it extended potential patent rights to "any art, manufacture, engine, machine, or device, or any invention or improvement upon."[43] Section 101's current text largely reads the same by extending patentability to "any new and useful process,

38. U.S. CONST. art. I, § 8, cl. 8.

39. Under the Articles of Confederation, the states retained all rights not explicitly bestowed upon Congress. ARTICLES OF CONFEDERATION of 1781, art. II. Since Congress was not given the right to grant patents, Congress never attempted to form a unified patent system, and the states were left to implement their own patent systems independent of and inconsistent with one another. *See* Edward C. Walterscheid, *To Promote the Progress of Science and Useful Arts: The Background and Origin of the Intellectual Property Clause of the United States Constitution*, 2 J. INTELL. PROP. L. 1, 1–3 (1994) (spelling out the history of patent rights under the Articles of Confederation and Congress's limited power in this area).

40. *See* THE FEDERALIST NO. 43, at 271–72 (James Madison) (Clinton Rossiter ed., 1961) (stating the right to useful inventions belongs to inventors, and states cannot separately make provisions regulating useful inventions).

41. *Id.*

42. Patent Act of 1790, ch. 7, 1 Stat. 109–12 (repealed 1793).

43. *Id.* § 4.

machine, manufacture, or composition of matter, or any new and useful improvement thereof."[44] The key difference being that the modern § 101 explicitly encapsulates patents aimed at a "process."[45] The express inclusion of "processes" is essential to protect modern innovation, as software and computer-implemented inventions often rely on one or more method or process claims to aptly protect the entire invention.[46]

However, the language of the numerous patent acts ratified throughout history serve only as a starting point for determining what constitutes patentable subject matter. Beginning in the Republic's earliest days, courts drew upon traditional English common law and treatises to delineate the boundaries of patent-eligible subject matter.[47] Early Supreme Court precedent began establishing clear distinctions between what a patent could and could not claim.[48] As new and innovative technologies emerged, so too did Supreme Court precedent rise to answer the

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44. 35 U.S.C. § 101.

45. *See* 35 U.S.C. § 100(b) ("The term 'process' means process, art or *method*, and includes a new use of a known process, machine, manufacture, composition of matter, or material." (emphasis added)). For example, a patent might claim a *method* for making a cake comprising placing flour in a bowl, cracking an egg in the bowl, pouring the contents into a pan, and so forth. Thus, the patent claims the process of making or doing something rather than the product itself—a cake. *See* Gene Quinn, *Drafting Patent Applications: Writing Method Claims*, IPWATCHDOG (June 18, 2016), https://ipwatchdog.com/2016/06/18/patent-applications-method-claims [https://perma.cc/22DP-NJEQ] (offering the cake example).

46. *See* Christopher E. Everett, Note, *Software Terminology: How to Describe a Software Invention in a United States Patent Application*, 29 NOVA L. REV. 693, 701 (2005) ("The use of methods or processes in software patents is widely used, because most software inventions are implemented in the computer by a method or algorithm.").

47. *See* Peter S. Menell, *Forty Years of Wondering in the Wilderness and No Closer to the Promised Land:* Bilski*'s Superficial Textualism and the Missed Opportunity to Return Patent Law to Its Technology Mooring*, 63 STAN. L. REV. 1289, 1294 (2011) ("Reflecting the tenor of the era, courts would develop the contours of patentable subject matter in a common law tradition drawing upon English court decisions, treatises, and developing U.S. precedent.").

48. In part due to the limitations of technology at the time, early cases involving patentable subject matter were aimed at drawing a distinction between natural forces, which could not be patented, and the application of such forces to new and useful inventions, which are patent-eligible. *See, e.g.*, Le Roy v. Tatham, 55 U.S. (14 How.) 156, 175 (1852) (discussing how newly discovered principles of nature are not patentable, but discrete applications of those principles are).

patentability questions posed by such technologies.[49] From these early cases arose three discrete judicially created categories of subject matter to which a claimed invention could not be directed: "law[s] of nature,"[50] "natural phenomen[a],"[51] and "abstract ideas."[52]

Since algorithms alone have no physical embodiment, software-related inventions are inherently abstract.[53] As such, courts historically analyze software and computer-implemented inventions under the "abstract idea" category of patent-ineligibility.[54] Consequently, broadening the "abstract idea" category to exclude more subject matter necessarily impacts and heightens the degree of difficulty required for inventors to claim patents in software and computer-related fields.

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49. *See, e.g.*, Funk Bros. Seed Co. v. Kalo Inoculant Co., 333 U.S. 127, 131–32 (1948) (holding that a combination of species of bacteria cannot be a statutory "invention" where "[t]he combination of species produces no new bacteria, no change in the . . . species of bacteria, and no enlargement of the range of their utility"); Gottschalk v. Benson, 409 U.S. 63, 71–72 (1972) (holding that a computer program which merely implements an algorithm digitally is unpatentable as the practical effect would be a patent on the algorithm itself).

50. *See Le Roy*, 55 U.S. (14 How.) at 175.

51. *See* Diamond v. Chakrabarty, 447 U.S. 303, 309–10 (1980) (explaining that while a physical phenomenon itself is not patent-eligible, distinct new and useful applications of such phenomena which abide by other patentability requirements are). The example the Supreme Court has used to illustrate this distinction is Newton's law of gravity. While the phenomenon of gravity itself cannot be patented, inventions which utilize the law of gravity in a new and useful way are patent-eligible. *Id.*

52. *See* Diamond v. Diehr, 450 U.S. 175, 185 (1981) ("A principle, in the abstract, is a fundamental truth; an original cause; a motive; these cannot be patented, as no one can claim in either of them an exclusive right." (quoting *Le Roy*, 55 U.S. (14 How.) at 175)).

53. *See* BEN KLEMENS, MATH YOU CAN'T USE: PATENTS, COPYRIGHT, AND SOFTWARE 44 (2006) ("[S]oftware has no physical manifestation beyond symbols on paper or bits on a hard drive, whereas it is generally assumed that patents apply to the manipulation of physical objects.").

54. *See, e.g.*, Intell. Ventures I LLC v. Cap. One Bank (USA), 792 F.3d 1363, 1365 (Fed. Cir. 2015) (holding patent claiming software which customized webpage content was invalid as an unpatentable "abstract idea"); Bascom Glob. Internet Servs., Inc. v. AT&T Mobility LLC, 827 F.3d 1341, 1347–51 (Fed. Cir. 2016) (analyzing software patent which claimed a method of filtering internet content under the "abstract idea" category of patent-ineligibility, but ultimately holding the patent was not invalid).

As briefly introduced above,[55] a core public policy theory which supports patent systems generally is the idea that, though patents create limited monopolies, the public will benefit from the disclosure of new inventions, thereby incentivizing innovation.[56] The policy rationale behind the patentable subject matter doctrine itself is that granting broad patents directed towards laws of nature, natural phenomena, and abstract ideas would stifle innovation much more than it would support it.[57] Using the earlier example of Newton's discovery of the law of gravity,[58] it would seem a discoverer should stand to benefit from their revelation, particularly where the natural principle had not previously been discovered or described. If such a phenomenon could be patented, however, then any future invention which incorporated gravitational force could potentially be liable for infringement. One can quickly recognize the disastrous effects that a rule of law which enables such broad patents would have on innovation and the economy. Thus, while the patent system benefits the public by disseminating new technologies and promoting innovation, left unchecked, overbroad patents would have the capability to "'inhibit further discovery by improperly tying up the future use of' these building blocks of human ingenuity."[59]

The issue courts must resolve is how to distinguish between those patents that claim ineligible subject matter and those that do not. Until recently, courts used several different tests to make this distinction, with the Federal Circuit most prominently adopting the "machine-or-transformation" test to determine the eligibility of process patent claims.[60] First explicitly enunciated

55. *See supra* notes 29–30 and accompanying text (describing the patent bargain with the granting of limited monopolies on one hand, and the public dissemination of information on the other).

56. *See* Benjamin N. Roin, Note, *The Disclosure Function of the Patent System (Or Lack Thereof)*, 118 HARV. L. REV. 2007, 2009–10 (2005) (discussing how the strongest forms of intellectual property protection incentivize public disclosure over keeping innovation secret, thereby accelerating the development of cumulative innovations).

57. *See* Mayo Collaborative Servs. v. Prometheus Lab'ys, Inc., 566 U.S. 66, 71 (2012) (stating that monopolizing basic tools of scientific and technological work would impede innovation).

58. *See supra* note 51 (providing the gravity example).

59. Alice Corp. Pty. Ltd. v. CLS Bank Int'l, 573 U.S. 208, 216 (2014) (quoting *Mayo*, 566 U.S. at 85).

60. *See* Bilski v. Kappos, 561 U.S. 593, 598 (2010) ("The Court of Appeals ruled that . . . the so-called machine-or-transformation test[] was the sole test

in *Gottschalk v. Benson*,[61] the machine-or-transformation test states that a patented process is eligible only when (1) the patent claims are tied to a particular machine or apparatus, or (2) the claims transform a particular article into a different state or thing.[62]

The Supreme Court rejected the machine-or-transformation test as the sole criterion on which to rest process patent eligibility determinations in *Bilski v. Kappos*.[63] According to the Court, exclusive use of the test would create uncertainty surrounding software patentability, as such inventions are not necessarily tied to physical machines.[64] While the machine-or-transformation test may be one consideration, it cannot be solely dispositive.[65] Further, the Supreme Court stated in *Bilski* that the Federal Circuit's application of the machine-or-transformation test was too mechanistic and thus had the potential to be both overinclusive and underinclusive.[66] In rejecting the sole application

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to be used for determining the patentability of a 'process' under the Patent Act . . . ."). *See generally* Minki Kwon, Note, *Waiting for Godot: A Proposal for the Supreme Court to Revisit Post*-Mayo *Patent Eligibility Question*, 48 AIPLA Q.J. 489, 504–06 (2020) (discussing the various tests used by the Federal Circuit and Supreme Court prior to the test enumerated in *Mayo*). To review the importance of process patent claims for software inventions, see *supra* notes 45–46 and accompanying text.

61. 409 U.S. 63, 71–72 (1972).

62. *In re* Bilski, 545 F.3d 943, 954 (Fed. Cir. 2008).

63. 561 U.S. at 612–13 (holding the machine-or-transformation test cannot be the exclusive test in determining what constitutes a patentable process under § 101).

64. *See id.* at 605 ("[T]he machine-or-transformation test would create uncertainty as to the patentability of software, advanced diagnostic medicine techniques, and inventions based on linear programming, data compression, and the manipulation of digital signals."); *see also* Brief for the Business Software Alliance as Amicus Curiae in Support of Affirmance at 25, *Bilski*, 561 U.S. 593 (No. 08-964) ("[T]here is no reason to distinguish between software that runs on personal computers and software that operates on the Internet. But at least one district court has concluded that *Bilski* mandates such a distinction.").

65. *See Bilski*, 561 U.S. at 604 (describing the machine-or-transformation test as "a useful and important clue" for determining patent-eligible processes, but not the sole criterion); Ultramercial, Inc. v. Hulu, LLC, 772 F.3d 709, 716–17 (Fed. Cir. 2014) (applying the machine-or-transformation test post-*Bilski* while recognizing the test is merely a "useful clue" rather than dispositive).

66. *See Bilski*, 561 U.S. at 604 ("[*Gottschalk*] explicitly declined to 'hold that no process patent could ever qualify if it did not meet [machine-or-transformation] requirements.' *Flook* took a similar approach, 'assum[ing] that a valid process patent may issue even if it does not meet [the machine-or-

of the machine-or-transformation test, the Supreme Court emphasized *Gottschalk*'s focus on a claimed invention's prospective preemptive effect on future innovation rather than its tie to a particular machine or apparatus.[67]

The Supreme Court's rejection of the machine-or-transformation test as the primary criterion on which to base the patentability of process claims left a hole in the patentable subject matter analysis and put courts on a shaky foundation when making eligibility determinations.[68] Rather than use a single consistent test post-*Bilski*, courts utilized a myriad of existing tests in conjunction with the machine-or-transformation test to get at the central question of whether a claimed invention was directed to a patent-ineligible category.[69] Left in this wake was an amalgamation of different standards that were disparately used and inconsistently applied.[70] Software inventions were directly impacted by this confusion due to the nature of software itself.[71] Since software does not exist in a physical state beyond its

transformation test]." (second, third, and fourth alterations in original) (first quoting *Gottschalk*, 409 U.S. at 71; then quoting Parker v. Flook, 437 U.S. 584, 588 n.9 (1978))).

67. *See id.* at 610–12 (emphasizing the preemptive effect of the patent at issue and ultimately stating that "[a]llowing petitioners to patent risk hedging would pre-empt use of this approach in all fields, and would effectively grant a monopoly over an abstract idea").

68. For a dedicated analysis of the machine-or-transformation test and the impacts of *Bilski*, see Mark A. Lemley et al., *Life After* Bilski, 63 STAN. L. REV. 1315, 1326 (2011) ("*Bilski* makes clear that while the Supreme Court has no intention of abandoning [the categories of ineligible subject matter], neither does it intend to provide further guidance. Perhaps even worse, the guidance we have from the machine-or-transformation test isn't helping.").

69. One example is the "point of novelty" test, which dissects a claim into its individual limitations to discern the invention's original contribution to the prior art. *See generally Flook*, 437 U.S. at 587–88 (holding that a claim was unpatentable because its only novel feature was an improved mathematical formula). For a general discussion of tests used by the Federal Circuit when making eligibility distinctions, see Kwon, *supra* note 60.

70. *See* John M. Golden, Flook *Says One Thing,* Diehr *Says Another: A Need for Housecleaning in the Law of Patentable Subject Matter*, 82 GEO. WASH. L. REV. 1765, 1770 (2014) ("Since the Supreme Court issued its *Bilski* decision in 2010, the law of subject-matter eligibility has plunged into a seemingly ever widening maelstrom of uncertainty.").

71. *See* Seong-hee Lee, *Software Patent Eligibility: A Call for Recognizing and Claiming Concrete Computer Programs*, 95 J. PAT. & TRADEMARK OFF. SOC'Y 402, 402–03 (2013) ("The latest attempt . . . to clarify software patent eligibility has been largely unsuccessful and only demonstrated that the court is deeply fractured on the issue of software eligibility.").

implementation in hardware, software patentability is called into question when certain tests look for a hook to a tangible result or a tie to a machine or apparatus.[72]

With this background, the Supreme Court embarked on a mission to clarify and develop the patentable subject matter doctrine throughout the 2010s, the results and effects of which may have inhibited rather than supported domestic software innovation.[73]

B. THE SUPREME COURT BREATHES NEW LIFE INTO THE PATENTABLE SUBJECT MATTER DOCTRINE

Despite the above considerations, the patentable subject matter hurdle was relatively easy to overcome for those seeking and/or enforcing patents prior to *Bilski*.[74] The *Bilski* decision showed that the Court was willing to address the doctrine to better adapt the patent system to modern technologic realities, in part because earlier standards for discerning subject matter eligibility handled software-related inventions with uncertainty.[75] The Supreme Court began developing a new test for determining whether a patent claimed ineligible subject matter in *Mayo Collaborative Services v. Prometheus Laboratories, Inc.*[76] The patent at issue in *Mayo* claimed a diagnostic method[77] for determining the proper dosage of thiopurine drugs for variable patients suffering from autoimmune diseases.[78] The Supreme Court held that the patent claims were invalid as they were "directed to" a

72. *See supra* notes 53, 64–69 and accompanying text (discussing the nonphysical nature of software and the difficulty in fashioning certain tests to determine software patentability).

73. *See infra* Parts I.C.1–2 (detailing the Supreme Court's efforts and ultimate impact during this time).

74. *See* Lemley & Zyontz, *supra* note 20, at 49 ("In 1998, the Federal Circuit effectively did away with patentable subject matter limitations, extending patents to anything in any form which produced a 'useful result,' even a result that was just a number.").

75. *See supra* note 64 and accompanying text.

76. 566 U.S. 66, 72–73 (2012).

77. For a more in-depth discussion of the patentability of diagnostic methods falling under the "laws of nature" category of patent-ineligibility, see Elaine H. Nguyen, Note, *Scalpels Over Sledgehammers: Saving Diagnostic Patents Through Judicial Intervention Rather than Legislative Override*, 70 DUKE L.J. 1631 (2021).

78. *Mayo*, 566 U.S. at 72–73.

patent-ineligible "law of nature."[79] However, rather than end the inquiry there, the Supreme Court looked into whether the claimed process could be rendered valid by including several unconventional steps which would confine the patent claims to a particular, useful application of the law of nature.[80] Thus, the Supreme Court first looked at whether the claim was directed to a category of patent-ineligible subject matter and, since it was, the Court considered whether other aspects of the claimed process could make it eligible.

Though *Mayo* was principally concerned with laws of nature, the analytical framework the Supreme Court laid out was subsequently applied to software through the "abstract idea" category of patent-ineligible subject matter in *Alice Corp. Pty. Ltd. v. CLS Bank International*.[81] *Alice* concerned patents on a computer-implemented process for mitigating settlement risk.[82] In determining whether the contested patents were eligible, *Alice* concretely established and further developed the *Mayo* framework as the test to be used moving forward to determine whether any patent attempts to claim ineligible subject matter.[83] In what

79. *See id.* at 87 ("The presence here of the basic underlying concern that these patents tie up too much future use of laws of nature simply reinforces our conclusion that the processes described in the patents are not patent eligible . . . ."). Generally, "laws of nature" are considered unpatentable because the inventor is attempting to claim something that exists in the world naturally without human intervention. *See* Douglas L. Rogers, *After* Prometheus*, Are Human Genes Patentable Subject Matter?*, 11 DUKE L. & TECH. REV. 434, 441 (2012) ("[N]othing made by humans can flout laws of nature, and all physical objects must be derived in part from products found in nature. However, humans did not invent laws of nature or physical phenomena, so these are not 'new.'" (footnote omitted)).

80. Though laws of nature, natural phenomena, and abstract ideas themselves are unpatentable, discrete applications of such categories in new and useful ways are patentable. *See Mayo*, 566 U.S. at 83–85 (comparing the patent at issue with past patents which were held to be valid because they confined a law of nature to a "particular, useful application of the principle").

81. 573 U.S. 208, 212 (2014).

82. *Id.* ("The patents at issue in this case disclose a computer-implemented scheme for mitigating 'settlement risk' . . . by using a third-party intermediary.").

83. *Id.* at 217 ("In *Mayo*, we set forth a framework for distinguishing patents that claim laws of nature, natural phenomena, and abstract ideas from those that claim patent-eligible applications of those concepts.").

has been termed the "*Alice*/*Mayo* framework,"[84] a court must follow a two-step inquiry to determine whether a patent is invalid for claiming ineligible subject matter.[85] At *Alice*/*Mayo* step one, a court "must first determine whether the claims at issue are directed to a patent-ineligible concept."[86] If they are not, the analysis is complete, and the patent is not invalid on subject matter eligibility grounds.[87] If the claims *are* directed to a patent-ineligible concept, however, then under *Alice*/*Mayo* step two, a court must "examine the elements of the claim to determine whether it contains an 'inventive concept' sufficient to 'transform' the claimed [patent-ineligible concept] into a patent-eligible application."[88]

Applying the *Alice*/*Mayo* framework to the patents at issue, the Supreme Court first found that the patents were directed to the patent-ineligible "abstract idea of intermediated settlement."[89] At *Alice*/*Mayo* step two, the Court held that abstract ideas "which merely require generic computer implementation" fail to transform that abstract idea into a patent-eligible invention.[90] Additionally, the Court emphasized that simply applying "'well-understood, routine, conventional activit[ies]' previously known to the industry"[91] to an otherwise abstract idea likewise fails to recite an "inventive concept" sufficient to confer eligibility.[92] Thus, brushing with a broad stroke, the Supreme Court

84. The Federal Circuit generally refers to the test set forth in *Mayo* and clarified by *Alice* as the "*Alice*/*Mayo* framework" or "test." *See, e.g.*, Roche Molecular Sys., Inc. v. CEPHEID, 905 F.3d 1363, 1368 (Fed. Cir. 2018) ("Under the *Alice*/*Mayo* two-step framework . . . ."); *see also* Illumina, Inc. v. Ariosa Diagnostics, Inc., 967 F.3d 1319, 1325 (Fed. Cir. 2020) ("[W]e consider the claims under the *Alice*/*Mayo* test.").

85. *Alice Corp.*, 573 U.S. at 217–18.

86. *Id.* at 218.

87. *See id.* at 217 (explaining when and how courts move from step one to step two of the *Alice*/*Mayo* test (citing Mayo Collaborative Servs. v. Prometheus Lab'ys, Inc., 566 U.S. 66, 77–78 (2012))).

88. *Id.* at 221 (quoting *Mayo*, 566 U.S. at 72, 80).

89. *Id.* at 217.

90. *Id.* at 221.

91. *Id.* at 225 (alteration in original) (quoting *Mayo*, 566 U.S. at 73).

92. Regarding the search for an "inventive concept" under *Alice*/*Mayo*, the Court stated it will consider the elements of each claim both individually and as an "ordered combination" to determine whether the additional elements "transform the nature of the claim" into a patent-eligible application. *Id.* at 217–18 (quoting *Mayo*, 566 U.S. at 78–79). In so doing, the Court emphasized

invalidated the patents in *Alice* for claiming patent-ineligible subject matter,[93] while simultaneously firmly establishing the *Alice*/*Mayo* framework as the test to be followed by the courts and the USPTO when making subject matter eligibility determinations.[94] While the *Alice*/*Mayo* framework was designed to encourage predictability by developing and applying a uniform test to be used in future cases, in practice, the test has become a source of inconsistency before both the USPTO and the federal courts.[95]

C. THE NEGATIVE IMPACTS OF THE *ALICE*/*MAYO* FRAMEWORK ON SOFTWARE AND COMPUTER-IMPLEMENTED PATENTS

An inventor faces a compounding problem when asserting subject matter eligibility as the *Alice*/*Mayo* test creates two layers of inconsistency. First, when trying to obtain a patent before the USPTO, the inventor must conform to an individual patent examiner's application of *Alice*/*Mayo* to the patent at issue.[96] Second, even if the USPTO grants the inventor's patent, whenever the patent owner brings an infringement lawsuit, a federal judge may independently determine whether the patent recites eligible subject matter without deference to the USPTO.[97] This Section deconstructs these layers of uncertainty and showcases the net negative effect that the *Alice*/*Mayo* framework has had on predictability.

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searching for something within the limitations of the patent which is "sufficient to ensure that the patent in practice amounts to significantly more than a patent upon the [ineligible concept] itself." *Id.* at 218 (alteration in original) (quoting *Mayo*, 566 U.S. at 72–73).

93. The patent failed at *Alice*/*Mayo* step two as the mere implementation of an abstract idea on a generic computer is insufficient to transform ineligible subject matter into a patent-eligible application. *See id.* at 223–24 ("Given the ubiquity of computers . . . wholly generic computer implementation is not generally the sort of 'additional feature[e]' that provides any 'practical assurance that the process is more than a drafting effort designed to monopolize the [abstract idea] itself.'" (alterations in original) (quoting *Mayo*, 566 U.S. at 77)).

94. *See id.* at 218–26 (applying the *Alice*/*Mayo* framework to the patents at issue).

95. *See infra* Part I.C (showing how both the USPTO and federal courts inconsistently apply the *Alice*/*Mayo* framework, leading to a net loss in innovation).

96. *See* Part I.C.1 (showing inconsistencies in patent examination before the USPTO).

97. *See* Part I.C.2 (showing inconsistent applications of *Alice*/*Mayo* by federal courts making subject matter eligibility determinations).

1. The Rise in § 101 Rejection Rates Before the USPTO

Though the Supreme Court has clearly established the *Alice*/*Mayo* two-step framework as the determinative test for § 101 considerations, the Court's adoption of it has raised several questions. At the USPTO, wherein patents are first considered and later issued by expert patent examiners, both the cost to prosecute software-related patents and the number of software patents that have been rejected on § 101 eligibility grounds have increased post-*Alice*.[98] A comparatively higher number of rejections suggests that patent agents and inventors working with the USPTO have been unable to distinguish eligible from ineligible subject matter to a reliable degree.[99] Such uncertainty threatens to crowd out smaller inventors and startups who are unable to afford to extensively prosecute their patents.[100]

In the face of rising uncertainty, members of Congress, industry leaders, individual inventors, and other interested parties have directed comments to the USPTO to clarify the state of the domestic patentable subject matter doctrine.[101] To provide clarity, the USPTO has issued several guidance letters explaining how it planned to apply the *Alice*/*Mayo* framework internally when examining patent applications.[102] The USPTO has

98. An analysis of over 4.48 million office actions issued by the USPTO found that "[u]ncertainties in patent eligibility increased after *Alice*" and that applicants in certain areas of software, such as computer networks and graphical user interfaces, "spent more time and money on overcoming § 101 rejections after *Alice*." Kesan & Wang, *supra* note 11, at 556, 591. Though other technologies, such as bioinformatics, have faced even higher rates of rejection then software art units, inventors have still faced "increased costs of patent prosecution for software inventions." *Id.* at 591–92.

99. *See id.* at 528 ("Since the Supreme Court ruling in *Alice Corp. v. CLS Bank*, the industry has been confronting uncertainties in the prosecution of patent applications and in patent enforcement as a result of the law governing patent eligibility . . . ." (footnote omitted)).

100. *See supra* notes 23–25 and accompanying text (discussing the impact of uncertainty in patent prosecution on startups).

101. For example, in response to the USPTO's July 2021 request for public comments on the current state of the patent eligibility jurisprudence, the USPTO received 141 unique written submissions. *Public Views on the Current Jurisprudence*, *supra* note 23, at 3, 16. Comments were primarily submitted by industry coalitions, individual companies, law firms/practitioners, academics, universities, and individual inventors. *Id.*

102. *See, e.g.*, 2019 Revised Patent Subject Matter Eligibility Guidance, 84 Fed. Reg. 50, 50–53 (Jan. 7, 2019) (opening public comment period and grouping "abstract ideas" into the subcategories of mathematical concepts, methods of

officially migrated the policies set forth in the guidance letters to the Manual of Patent Examining Procedure (MPEP), the guidebook adhered to by patent examiners throughout the patent prosecution process.[103]

At first glance, it would appear the official guidance has had a beneficial impact on construing subject matter eligibility before the USPTO. Just one year after the guidance was published, the USPTO found that the rate of *Alice*-effected technologies—namely software and computer-implemented inventions—receiving a first office action[104] with a § 101-based rejection had decreased by 25%.[105] However, public comments to the USPTO in 2021 revealed that such numbers might not be consistent with the experiences of numerous inventors and corporations, and that rejection rates for *Alice*-effected technologies instead depend on factors such as the specific technology sought to be patented and the size of the party seeking the patent.[106]

Larger tech giants, such as Google, have advocated for the current patentable subject matter jurisprudence, arguing that the *Alice*/*Mayo* framework serves as a "forcing function" for inventors to include more details in their patent applications,

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organizing human activity, and mental processes); October 2019 Patent Eligibility Guidance Update, 84 Fed. Reg. 55942, 55943 (Oct. 18, 2019) (providing a new set of examples as well as a discussion of issues raised by the earlier comment period).

103. *See Manual of Patent Examining Procedure*, *supra* note 36, § 2106 (laying out USPTO criteria for subject matter eligibility).

104. An "office action" is "written correspondence from the patent examiner" which requires a "response from the applicant in order for prosecution of the application to continue." *Responding to Office Actions*, U.S. PAT. & TRADEMARK OFF., https://www.uspto.gov/patents/maintain/responding-office-actions [https://perma.cc/2C56-VQ9L]. An office action may contain a patent examiner's reasoning for not allowing certain claims in a patent application, including § 101-based rejections. *Id.*

105. *Public Views on the Current Jurisprudence*, *supra* note 23, at 12. The USPTO's study further indicated that "uncertainty" in patent examination, defined as "the variation in decision-making on subject matter eligibility among examiners within a technology area," decreased by 44%. *Id.*

106. At the request of Senators Tillis, Hirono, Cotton, and Coons, the USPTO opened a public comment period to seek input on how the current patentable subject matter jurisprudence impacts investment and innovation, particularly in technologies such as artificial intelligence, quantum computing, and other computer-related inventions. Patent Eligibility Jurisprudence Study, 86 Fed. Reg. 36257, 36257 (July 9, 2021). Further, the USPTO inquired into the experiences of interested parties at both the prosecution stage before the USPTO and the litigation stage in court. *Id.* at 36259.

thereby incentivizing better patent writing.[107] While this may be true, large corporations are precisely those players in the patent system who can afford to spend more time writing and prosecuting lengthy patents. Coalitions who encompass the perspectives of smaller inventors, such as the American Bar Association (ABA), state that uncertain patent prosecution practices have had disparately negative repercussions on small businesses and individual inventors.[108]

Inconsistencies before the USPTO are magnified when compared with the global playing field, where eligibility standards are more regularly mandated by statute and more consistently applied.[109] For example, between August 2014 and September 2017, 17,743 patent applications were rejected and subsequently abandoned within the United States on § 101 eligibility grounds.[110] Of those 17,743 applications that were rejected as "patent ineligible," 1,694 patents claiming "the same or similar" inventions were granted by the European Patent Office (EPO), by the China National Intellectual Property Administration, or by both.[111] This means that just under 10% of all domestic patents rejected on § 101 grounds were considered patentable by other highly developed patent systems in countries which directly compete with the United States. While not all these invalidated patents necessarily involved software,[112] the fact that

107. *See* Google LLC, Comment Letter on Patent Eligibility Jurisprudence Study 8 (Oct. 15, 2021), https://www.regulations.gov/comment/PTO-P-2021-0032-0106 [https://perma.cc/LSA2-UG6H] ("We ensure that our patent applications clearly explain how the invention provides a new technical solution to a technical problem . . . . In doing so, we generate higher-quality patent applications that meet with more success both in the U.S. and in foreign patent offices.").

108. *See* Am. Bar Ass'n Section of Intell. Prop. L., *supra* note 26 (voicing particular concern with the "[n]egative effects on small businesses, midsize ones, and individual innovators, to whom patent protection of new technology is critical to their success and ability to secure investment . . . .").

109. For a more in-depth discussion of patent systems in foreign jurisdictions in comparison to the United States, see *infra* Part III.B.I.

110. Kevin Madigan & Adam Mossoff, *Turning Gold into Lead: How Patent Eligibility Doctrine Is Undermining U.S. Leadership in Innovation*, 24 GEO. MASON L. REV. 939, 956 (2017).

111. *Id.*

112. The Madigan & Mossoff study does not precisely differentiate between the contents of the rejected patents. However, the study noted that art units that typically implicate software, such as computer architecture, computer

nearly one out of every ten patents rejected by the USPTO on § 101 grounds gained protection elsewhere shows domestic intellectual property risks being overtaken by patent systems with more consistent standards.[113]

2. The Inconsistent Application of the *Alice*/*Mayo* Framework by the Federal Courts

Thus far, the discussion has mostly been limited to the *Alice*/*Mayo* framework's various impacts on the patent prosecution process before the USPTO. However, a flaw in the United States' patent system, and a primary reason for the great uncertainty seen today surrounding software subject matter eligibility, is that courts may refuse to defer to both USPTO guidance and the MPEP.[114] Though USPTO metrics may indicate that, because of USPTO guidance, there is less uncertainty applying § 101 throughout the patent prosecution process, defending a patent's validity in court encompasses an entirely different set of standards as the USPTO lacks actual substantive rulemaking authority.[115] The Federal Circuit has recently emphasized that it is not bound to follow nor grant significant deference to either USPTO guidance or the MPEP.[116] Perhaps somewhat ironically, a principal reason for such a lack of deference is because the Federal Circuit states that it must be "mindful of the need for *consistent*

networking, video, and, to some extent, business methods, all received higher rejection rates following *Alice*. *Id.* at 954. Further, the Patent Trial and Appeal Board's now-defunct "Covered Business Method" program, wherein software business method patents could be challenged "by any person willing to pay the filing fee," invalidated 97.8% of the patents it reviewed. *Id.*

113. For an analysis of foreign patent systems, see *infra* Part III.A.

114. *See, e.g.*, Cleveland Clinic Found. v. True Health Diagnostics LLC, 760 F. App'x 1013, 1020 (Fed. Cir. 2019) ("While we greatly respect the PTO's expertise on all matters relating to patentability, including patent eligibility, we are not bound by its guidance."); *In re* Rudy, 956 F.3d 1379, 1383 (Fed. Cir. 2020) ("We are not, however, bound by the Office Guidance, which cannot modify or supplant the Supreme Court's law regarding patent eligibility, or our interpretation and application thereof.").

115. *See* Jonathan S. Masur, *Regulating Patents*, 2010 SUP. CT. REV. 275, 276–77 (2010) ("[T]he Patent and Trademark Office (PTO) has never had substantive rule-making authority. Courts, therefore, have taken center stage. In particular, the Federal Circuit has assumed near-total authority over patent policy and doctrine, which is a position held by no other appellate court over any area of law." (footnote omitted)).

116. *See supra* note 114.

application of our case law."[117] Thus, an inventor must not only grapple with inconsistencies within the USPTO itself to obtain a patent, but once a patent is granted the inventor is met with further uncertainty should they attempt to assert the patent against an alleged infringer in court.

Creating further unreliability is the fact that federal judges inconsistently apply the *Alice*/*Mayo* framework from district to district, specifically with respect to patents claiming software or computer-implemented inventions.[118] Further, individual judges on the Federal Circuit apply inconsistent standards at each step of *Alice*/*Mayo*, producing uncertainty as to which standard any particular judge will apply in a given case.[119] Many Federal Circuit judges thus interpret *Alice*/*Mayo* under standards that conflict with a different judge's interpretation.[120] The Federal Circuit's recent denial of a petition for rehearing en banc in *American Axle & Manufacturing, Inc. v. Neapco Holdings LLC* showcases this reality, as the court was evenly split on the subject matter eligibility issue.[121] The Supreme Court has yet to weigh in on the patentable subject matter issue since *Alice*, reflected by its refusal to grant certiorari to review the split Federal Circuit opinion in *American Axle*.[122]

But perhaps the federal courts' subject matter eligibility constructions are not all bad. One common benefit cited by *Alice*/*Mayo* supporters is that stricter subject matter eligibility standards better help defendants protect themselves from frivolous lawsuits brought by "patent trolls."[123] As opposed to other

117. *Cleveland Clinic Found.*, 760 F. App'x at 1020 (emphasis added).

118. In a review of 808 Federal Circuit and district court cases since the Supreme Court decided *Alic*e, one study found that federal courts invalidated patents on eligibility grounds in 65.1% of software or information technology cases. Lemley & Zyontz, *supra* note 20, at 68.

119. *See* Matthew B. Hershkowitz, Note, *Patently Insane for Patents: A Judge-by-Judge Analysis of the Federal Circuit's Post-*Alice *Patentable Subject Matter Eligibility of Abstract Ideas Jurisprudence*, 28 FORDHAM INTELL. PROP. MEDIA & ENT. L.J. 109, 168–70 (2017) (analyzing how judges on the Federal Circuit approach questions of subject matter eligibility as they relate to abstract ideas).

120. *See id.*

121. *See* 967 F.3d 1285 (Fed. Cir. 2021), *cert. denied*, 142 S. Ct. 2902 (2022) (mem.).

122. *Id.*

123. "Non-practicing entities," often colloquially referred to as "patent trolls," are typically entities which intentionally obtain broad patents, or

challenges to a patent's validity, such as novelty or nonobviousness challenges,[124] subject matter eligibility issues under § 101 are often resolved at the motion to dismiss stage of litigation.[125] Parties who often find themselves as defendants in court are thus more likely to favor the current jurisprudence to potentially save litigation costs.[126]

However, though early dismissal may be a convenient shortcut for savvy litigants, it undercuts the judicial process by preventing inventors from having their day in court to defend and vindicate their invention(s). Further, as many commentators have shown, federal judges applying the *Alice*/*Mayo* framework often improperly conflate statutory patentability requirements, leading to the early dismissal of cases under the guise of § 101 when, in reality, the underlying considerations are based on other statutory provisions which are not traditionally

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purchase patents from bankrupt startups, for the sole purpose of profiting off infringement suits. *See* Paul Morinville, *Big Tech's Great Patent Troll Smash and Grab*, IPWATCHDOG (Jan. 7, 2022), https://ipwatchdog.com/2022/01/07/big-techs-great-patent-troll-smash-grab/id=142518 [https://perma.cc/C8EC-WAZD] (offering the common definition of and exploring the broader context behind "patent trolls").

124. While the issues of novelty and nonobviousness are not the topic of this Note, these terms will appear several times throughout. "Novelty" under § 102 is the requirement that a claimed invention be new, meaning no single prior art reference discloses the invention in its entirety. JONATHAN S. MASUR & LISA LARRIMORE OUELLETTE, PATENT LAW: CASES, PROBLEMS & MATERIALS 47 (2d ed. 2022). "Nonobviousness" under § 103 is the requirement that a claimed invention be more than an obvious change/improvement over an existing invention. *Id.* at 132.

125. *See* Am. Intell. Prop. L. Ass'n, Comment Letter on Patent Eligibility Jurisprudence Study 5 (Oct. 15, 2021), https://www.regulations.gov/comment/PTO-P-2021-0032-0108 [https://perma.cc/EW3K-QJGV] ("In litigation, courts may find an invention ineligible for patent protection as a matter of law and dismiss infringement actions without trial under a Rule 12(b)(6) dismissal or a summary judgment."). *But see id.* ("[T]his short-cut procedure glosses over fact issues underlying that test and prevents the examination of the merits of an invention at trial.").

126. *See, e.g.*, Google LLC, *supra* note 107, at 12–13 (discussing how favorable early outcomes in litigation suits lead to decreased costs); Jeff Becker et al., *Legislative Change on the Horizon: Proposed Changes to Patent Eligible Subject Matter and Functional Claiming*, 31 INTELL. PROP. & TECH. L.J. 3, 4 (2019) (arguing that the costs of defending against patent trolls have significantly decreased in the wake of *Alice*, with the savings potentially being used to fund further innovation).

resolved at the motion to dismiss stage.[127] Consequently, a patentee might permanently lose their patent rights depending on how a district judge construes a patent's claim limitations early in litigation, an issue that is further magnified should the patentee be unable to afford an appeal. Thus, as with the USPTO, the current jurisprudence in the courts continues to favor larger corporations who can crowd out smaller inventors, thereby stifling American invention.

This Part's discussion reflects the uncertain footing on which the current domestic patentable subject matter jurisprudence stands. In the first instance, inventors have a difficult time adequately claiming their inventions and receiving patents from the USPTO. Even after a patent is issued, its validity is still subject to great scrutiny from courts who refuse to grant significant deference to USPTO constructions of the *Alice*/*Mayo* framework, and which apply varying and inconsistent standards themselves. This inconsistency is a unique bug, rather than a feature, of the United States' patent system, and undermines the patent bargain as inventors may elect to not disclose their inventions if patentability is uncertain.[128] The remainder of this Note showcases how the United States' approach to subject matter eligibility fails to align with global standards—specifically regarding software and computer-implemented inventions—and analyzes legislative proposals for altering the current jurisprudence.

II. PUSHING COMMIT: PROPOSED LEGISLATIVE CHANGES AND DOMESTIC TRENDS RELATING TO EVOLVING PATENTABLE SUBJECT MATTER JURISPRUDENCE

The Supreme Court's establishment of the *Alice*/*Mayo* framework as the exclusive test for determining subject matter eligibility has spurred movements across the political spectrum

127. *See, e.g.*, Taylor, *supra* note 31, at 159 ("[T]he Supreme Court's test for eligibility—while derived from its interpretation of 35 U.S.C. § 101 as including several implicit (some would say non-statutory) exceptions—is based on several policy concerns better addressed by other statutory patent law doctrines.").

128. *See supra* notes 29–30, 55–56 and accompanying text (discussing the "patent bargain," wherein the patentee gains monopoly power in exchange for publicly disclosing their invention).

for patentable subject matter reform.[129] This Part sets forth various proposals for such reform, as well as analyzes the prospective effects such reformations would have both in infringement proceedings and before the USPTO. This Part ultimately argues that the most viable proposals are those which statutorily define categories of ineligible subject matter while simultaneously limiting a court's discretion to conflate patentability requirements or to consider evidence outside a patent's four corners when making § 101 eligibility determinations.

A. DATA-DRIVEN DOMESTIC PROPOSALS FOR ALTERING PATENTABLE SUBJECT MATTER JURISPRUDENCE LARGELY ABROGATE THE *ALICE*/*MAYO* FRAMEWORK

Ever since the Supreme Court handed down *Alice* and *Mayo*, countless commentators in the intellectual property community, including federal judges and high-ranking officers within the USPTO, have called for patentable subject matter reform.[130] In 2021, Senators Tillis, Hirono, Cotton, and Coons requested that the USPTO undertake a study to evaluate the current state of subject matter eligibility in the United States.[131] To prepare the study, the USPTO solicited public comments on how the current subject matter eligibility jurisprudence affects the conduct of

129. *See Tillis, Coons Introduce Landmark Legislation to Restore American Innovation*, THOM TILLIS: U.S. SENATOR FOR N.C. (June 22, 2023), https://www.tillis.senate.gov/2023/6/tillis-coons-introduce-landmark-legislation-to-restore-american-innovation [https://perma.cc/45JM-CCBB] ("[T]here is now widespread bipartisan agreement in Congress and across all recent Administrations that reforms are necessary to restore the United States to a position of global strength and leadership in key areas of technology and innovation . . . .").

130. *See, e.g.*, Anthony J. Fuga, *USPTO Director Iancu Calls for Section 101 Patent Eligibility Reform in Farewell Speech*, HOLLAND & KNIGHT: SECTION 101 BLOG (Jan. 27, 2021), https://www.hklaw.com/en/insights/publications/2021/01/uspto-director-iancu-calls-for-section-101-patent-eligibility-reform [https://perma.cc/3FGY-9HNP] ("[Former USPTO Director Iancu] wondered whether the courts would address Section 101. 'If the courts cannot do it, then will Congress step in with legislation and finally liberate our country from this quandary?'"); Anthony J. Fuga, *Judge O'Malley: "Absurd" That Supreme Court Won't Address Subject Matter Eligibility*, HOLLAND & KNIGHT: SECTION 101 BLOG (Mar. 28, 2022), https://www.hklaw.com/en/insights/publications/2022/03/judge-omalley-absurd-that-supreme-court-wont-address-section-101 [https://perma.cc/8T22-B9B4] ("Have you ever seen all 12 active judges on a single circuit beg the Supreme Court for guidance, and the Supreme Court say no? It's absurd.").

131. *See* Patent Eligibility Jurisprudence Study, 86 Fed. Reg. 36257, 36257 (July 9, 2021) (stating the above Senators requested the USPTO undertake a study to evaluate the domestic patentable subject matter jurisprudence).

businesses, the *Alice*/*Mayo* framework's impact in specific computer-related industries such as artificial intelligence and quantum computing, and perceived differences in subject matter eligibility requirements between foreign jurisdictions and the United States.[132] Senators Tillis and Coons used the public comments, the official study published by the USPTO,[133] and numerous committee hearings[134] to draft the Patent Eligibility Restoration Act of 2023 (PERA).[135]

1. The Patent Eligibility Restoration Act and the Nullification of Judicially Created Categories of Ineligible Subject Matter

The goal of PERA is to reinvigorate uniformity and predictability within the United States' patent system to promote innovation.[136] PERA was largely proposed to counteract the Supreme Court's evolving patentable subject matter jurisprudence and better align the United States with foreign jurisdictions.[137] The Act represents a complete overhaul of § 101 and the common law enshrouding it by explicitly clarifying categories of ineligible subject matter, limiting court discretion, and abrogating the Supreme Court's *Alice*/*Mayo* framework.[138]

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132. *Id.*

133. *See Public Views on the Current Jurisprudence*, *supra* note 23.

134. *See, e.g.*, *Patent Eligibility Hearings Part II*, *supra* note 12.

135. Patent Eligibility Restoration Act of 2023, S. 2140, 118th Cong. (2023). Note that a previous version of PERA was introduced in the 117th Congress. Patent Eligibility Restoration Act of 2022, S. 4734, 117th Cong. (2022). Following a change in session, Senators Tillis and Coons reintroduced PERA with slight revisions in 2023. Hereinafter, all references to "PERA" or "proposed § 101" refer to the recently introduced 2023 version of the bill.

136. *See Tillis, Coons Introduce Landmark Legislation*, *supra* note 129 ("This bill affirms the basic principle that the patent system is central to promoting technology-based innovation.").

137. *See id.* ("Unfortunately, our current Supreme Court's patent eligibility jurisprudence is undermining American innovation and allowing foreign adversaries like China to overtake us in key technology innovations.").

138. *See* Patent Eligibility Restoration Act § 101(b) (explicitly defining patent-ineligible subject matter); Brian Pomper & Marc Ehrlich, *Tillis Bill Would Restore Needed Clarity and Predictability in Patent Eligibility Law*, IPWATCHDOG (Nov. 10, 2022), https://ipwatchdog.com/2022/11/10/tillis-bill-restore-needed-clarity-predictability-patent-eligibility-law/id=152866 [https://perma.cc/6YN9-ZW2A] ("By abrogating the Court's eligibility test that has put patent protection into disarray and providing eligible subject-matter categories with limited exclusions, the Patent Eligibility Restoration Act will provide increased clarity and predictability while giving inventors the certainty they need to

The largest change put forth by PERA is the strict delineation of patent-ineligible subject matter in proposed § 101(b).[139] To start, proposed § 101(b)(1) explicitly identifies five categories of ineligible subject matter.[140] By statutorily defining ineligible subject matter, PERA abates the need for courts to develop common law surrounding subject matter eligibility. Despite this, the enumerated categories appear to serve the same underlying goal as the *Alice*/*Mayo* framework—namely, to prevent the inhibition of "further discovery by improperly tying up the future use of these building blocks of human ingenuity."[141] For example, mental processes which can be performed solely in the human mind[142] or processes which occur in nature wholly independent of human activity[143] would likely not be patentable under either

invest in groundbreaking technologies."); Eileen McDermott, *Tillis and Coons Bill Would Eliminate All Judicial Exceptions to Patent Eligibility*, IPWATCHDOG (June 22, 2023), https://ipwatchdog.com/2023/06/22/tillis-coons-bill-eliminate-judicial-exceptions-patent-eligibility [https://perma.cc/V5SR-JKDM] ("If this bill passes it will nullify all Supreme Court precedent relating to patent eligibility, and specifically overrule *Mayo, Myriad* and *Alice*. The Federal Circuit and Supreme Court would need to start from scratch . . . .").

139. Patent Eligibility Restoration Act § 101(b).

140. The five categories set forth by proposed § 101(b)(1) are the following: (A) "[a] mathematical formula that is *not* part of a claimed invention" as set forth in § 101(a); (B)(i) "[s]ubject to clause [B](ii), a process that is substantially economic, financial, business, social, cultural, or artistic, even though not less than 1 step in the process refers to a machine or manufacture"; (C) a process that (i) "is a mental process performed solely in the human mind," or (ii) "occurs in nature wholly independent of, and prior to, any human activity"; (D) "[a]n unmodified human gene, as that gene exists in the human body"; and (E) "[a]n unmodified natural material, as that material exists in nature." *Id.* § 101(b)(1) (emphasis added).

141. Alice Corp. Pty. Ltd. v. CLS Bank Int'l, 573 U.S. 208, 216 (2014) (quoting Mayo Collaborative Servs. v. Prometheus Lab'ys, Inc., 566 U.S. 66, 85 (2012)).

142. Such as computational methods, certain business methods, or "methods of organizing human activity." *See, e.g.*, *In re* Sturgeon, 839 F. App'x 517, 519 (Fed. Cir. 2021) (holding a method for creating floral arrangements on electronic display screens was an unpatentable mental process).

143. *Compare* Funk Bros. Seed Co. v. Kalo Inoculant Co., 333 U.S. 127, 130 (1948) (holding that a human-created combination of bacteria was not patentable subject matter because the new combination did not give rise to any characteristics which could not already be found in nature), *with* Diamond v. Chakrabarty, 447 U.S. 303, 311 (1980) (holding that a human-created species of bacteria could be patentable subject matter if the artificial species is "markedly different" than anything found in nature).

Alice/*Mayo* or PERA.[144] Thus, while both frameworks aim to prevent granting monopoly power over fundamental "building blocks" of innovation, the PERA definitions remove ambiguities to subsequently make the patent system more predictable. Such a change would result in courts exercising traditional statutory interpretation theories when making patentability determinations, rather than applying the ever-shifting *Alice*/*Mayo* framework.

Further, PERA carves out specific exceptions aimed at computer-implemented processes to promote uniformity and consistency when applying proposed § 101 requirements to such inventions. Specifically, proposed § 101(b)(1)(A)[145] and § 101(b)(1)(C)(i)[146] encapsulate computer-implemented algorithms and immediately appear to unilaterally prohibit such subject matter. However, these prescribed categories are only patent-ineligible if claimed "as such."[147] The "as such" bar thus contemplates that subject matter falling under these exclusions, such as software, would be patentable if the inventor claims discrete applications rather than the underlying idea itself.[148] Such an outcome harkens back to the Supreme Court's policy justifications for the machine-or-transformation and *Alice*/*Mayo* tests: to negate the preemptive impact of abstract ideas by confining eligibility to discrete applications of such ideas.[149]

Other provisions of PERA specifically account for what are sometimes considered "non-technological" processes.[150] For

144. Such examples would likely be considered an "abstract idea" and a "natural phenomena," respectively, under the *Alice*/*Mayo* framework.

145. Patent Eligibility Restoration Act § 101(b)(1)(A) ("A mathematical formula that is not part of a claimed invention in a category described in subsection (a).").

146. *Id.* § 101(b)(1)(C)(i) ("A process that . . . is a mental process performed solely in the human mind . . . .").

147. *Id.* § 101(b).

148. As shown throughout Part III, "as such" bars are common in foreign jurisdictions and do not prohibit patents directed at discrete applications of otherwise excluded subject matter. *See infra* Part III.A (assessing global trends related to the patentable subject matter jurisprudence).

149. *See, e.g.*, Alice Corp. Pty. Ltd. v. CLS Bank Int'l, 573 U.S. 208, 216 (2014) ("We have described the concern that drives this exclusionary principle as one of pre-emption.").

150. Such processes are referred to as "non-technological" as a shorthand for processes which have software implementations, but otherwise are not technological. *See In re* Bilski, 545 F.3d 943, 1010 (Fed. Cir. 2008) (Mayer, J.,

example, proposed § 101(b)(1)(B) (Non-Technological Processes Clause) states a person may not obtain a patent for the following, if claimed as such:

> (i) Subject to clause (ii), a process that is substantially economic, financial, business, social, cultural, or artistic, even though not less than 1 step in the process refers to a machine or manufacture. (ii) The process described in clause (i) shall *not* be excluded from eligibility for a patent *if* the process cannot practically be performed without the use of a machine or manufacture.[151]

Thus, certain non-technological processes which appear categorically barred may be patent-eligible if they can only be practically performed through the use of a machine or manufacture.[152] By establishing this restriction, the Non-Technological Processes Clause aims to counteract the preemptive effect of so-called "business method" patents which often involve rudimentary computer implementations of economic- or business-oriented algorithms that could otherwise largely be carried out in one's mind.[153] This is reminiscent of *Alice*/*Mayo* step two's goal

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dissenting) ("[A] process is non-technological where its inventive concept is the application of principles drawn not from the natural sciences but from disciplines such as business, law, sociology, or psychology."). *See generally* Christopher M. Holman, *The* Mayo *Framework Is Bad for Your Health*, 23 GEO. MASON L. REV. 901, 901 (2016) (describing the Supreme Court's handling of "non-technological" processes). Note that a previous iteration of PERA also referred to such processes as "non-technological" processes. *See* Patent Eligibility Restoration Act of 2022, S. 4734, 117th Cong. § 101(b)(1)(B)(i) (2022) (barring patent eligibility for a "non-technological economic, financial, business, social, cultural, or artistic process").

151. Patent Eligibility Restoration Act § 101(b)(1)(B)(i)–(ii) (emphasis added).

152. *Id.* § 101(b)(1)(B)(ii).

153. A "business method" patent is a utility patent "whose subject matter, or the nature of the invention for which a patent was granted, is 'a method of doing or conducting business.'" Larry J. Guffey, *Business Method Patents: What They Are – Why Clients and Service Providers Should Care*, 33 MD. BAR J. 25, 26 (2000). The Supreme Court has often been skeptical of business method patents, evidenced by its invalidation of the patent at issue in *Bilski*. *See* Roman Perchyts, Note, *Business Method Patents: Let the PTAB Kill Them All? A Case for Narrow Reading of CBM Review Eligibility*, 2018 U. ILL. J.L. TECH. & POL'Y 433, 437 (2018) ("In addition to denying patent protection to the business method at issue, *Bilski* significantly heightened the scrutiny of the patent eligibility of business methods. However, the *Bilski* court did not categorically deny protection to all business method patents." (footnote omitted)).

of restraining a patent's preemptive impact.[154] Further, by prohibiting non-technological processes in all other instances, even when the patent claim recites one or more ties to a machine or manufacture,[155] the Non-Technological Processes Clause limits the qualifiers a court may consider when making eligibility determinations.[156]

The language within the Non-Technological Process Clause referring to a "machine or manufacture" is analogous to the presently disfavored machine-or-transformation test.[157] This change, however, does not represent a reversion to old practices.[158] Rather, PERA focuses on the preemptive effect the invention would have on future innovation by only allowing patents on processes which appear in the Non-Technological Processes Clause if they can solely be performed with the use of a machine or manufacture.[159] In this manner, processes that can be performed in one's mind, even if the patent ties the process to a machine or manufacture, are not patent-eligible.[160] This focus aligns with Supreme Court precedent rejecting the Federal Circuit's exclusive application of the machine-or-transformation test for employing it too mechanistically rather than focusing on an invention's

154. Under *Alice*/*Mayo* step two, "method claims, which merely require generic computer implementation, fail to transform [an] abstract idea into a patent-eligible invention." *Alice Corp.*, 573 U.S. at 221. By limiting eligibility to certain types of non-technological processes that can only be practically performed on a machine or manufacture, PERA aligns with Supreme Court precedent while constraining court discretion. *See id.* at 223 (explaining that "[s]tating an abstract idea while adding the words 'apply it with a computer'" would be insufficient for subject matter eligibility concerns).

155. Proposed § 101(b)(1)(B)(ii) applies *only* if the process can *only* be practically carried out through "the use of a machine or manufacture." Patent Eligibility Restoration Act § 101(b)(1)(B)(ii). If a non-technological process is thus capable of being performed without the use of a machine, then a patent cannot claim the process, regardless of whether the patent ties the non-technological process to some discrete implementation. *Id.*

156. *Id.* § 101(b)(1)(B).

157. *See supra* notes 64–68 and accompanying text (discussing the present context surrounding the machine-or-transformation test).

158. Recall that the Supreme Court held that the machine-or-transformation test "would create uncertainty as to the patentability of software." Bilski v. Kappos, 561 U.S. 593, 605 (2010).

159. Patent Eligibility Restoration Act § 101(b)(1)(B)(ii).

160. This contrasts with the Federal Circuit's original construction of the machine-or-transformation test, wherein processes are eligible if there is a tie to a machine or manufacture even if the process could theoretically be performed in the human mind. *See supra* notes 64–68 and accompanying text.

preemptive effect.[161] It is notable, however, that there is no corresponding provision in proposed § 101 that requires a process not mentioned in the Non-Technological Processes Clause be embodied in a machine or manufacture. This appears to be an area where courts would have more discretion, subject to proposed § 101(c) discussed below.[162]

Other PERA provisions similarly transform the underlying goals of Supreme Court precedent into definite and manageable standards. Proposed § 101(c)(1)(A) states that, in determining whether an invention's subject matter is eligible for patent protection, eligibility shall be determined "by considering the claimed invention *as a whole* and without discounting or disregarding any claim element."[163] By emphasizing that claimed inventions be evaluated "as a whole," PERA again partially relates back to language used by the Supreme Court when devising the machine-or-transformation test, but stops short of statutorily embodying it.[164] The "as a whole" language further recounts the machine-or-transformation test's underlying policy goals because, though a claim or claim element read in isolation may be an abstract idea having a preemptive effect, the claim or claim set read "as a whole" may apply the abstract idea "to a known structure or process."[165] Such applications "may be well deserving of patent protection," or are "at the very least not barred at the threshold by § 101."[166] Thus, PERA again creates new law by

161. Indeed, the first case explicitly introducing what became the machine-or-transformation test largely focused on the preemptive effect of the abstract idea at issue. *See* Gottschalk v. Benson, 409 U.S. 63, 71–72 (1972) ("The mathematical formula involved here has no substantial practical application except in connection with a digital computer, which means that if the judgment below is affirmed, the patent would wholly pre-empt the mathematical formula and in practical effect would be a patent on the algorithm itself."); *see also Bilski*, 561 U.S. at 610–12 (rejecting the machine-or-transformation test as the sole criterion for construing process claims and re-asserting *Gottschalk*'s emphasis on the preemptive effect of the abstract idea).

162. Patent Eligibility Restoration Act § 101(c) (limiting discretion of examiners and courts to make eligibility determinations).

163. *Id.* § 101(c)(1)(A) (emphasis added).

164. *See* Diamond v. Diehr, 450 U.S. 175, 188 (1981) ("In determining the eligibility of respondents' claimed process for patent protection under § 101, their claims must be considered *as a whole*." (emphasis added)).

165. *Id.* at 187 ("It is now commonplace that an *application* of a law of nature or mathematical formula to a known structure or process may well be deserving of patent protection.").

166. *Id.* at 187–88.

clarifying policy goals, statutorily grounding existing precedent, and limiting the breadth of court discretion.

PERA also aims to prevent conflating § 101 patentable subject matter issues with other patentability requirements. For example, while proposed § 101(a) largely retains the current language of § 101, it eliminates the requirement that an invention or discovery be "new *and* useful," instead stating that such invention or discovery need only be "useful."[167] Striking the word "new" serves to signify to judges and the USPTO that § 101 patentable subject matter requirements should not be compared to nor confused with § 102 novelty considerations.[168] Further, proposed § 101(c)(1)(B) (Prohibited Considerations Clause) states that, in making eligibility determinations, a court must do so without regard to "(i) the manner in which the claimed invention was made; (ii) whether a claim element is known, conventional, routine, or naturally occurring; (iii) the state of the applicable art, as of the date on which the claimed invention is invented;"[169] or "(iv) any other consideration in section 102, 103, or 112."[170] Thus, proposed § 101(c)(1)(B)(iv) expressly prohibits a court from basing eligibility determinations on other patentability requirements within the Patent Act—namely §§ 102, 103, and 112.[171] The language embodied by the other subsections similarly

167. *Compare* 35 U.S.C. § 101 ("Whoever invents or discovers any new and useful process, . . . or any new and useful improvement thereof . . . ."), *with* Patent Eligibility Restoration Act § 101(a) ("Whoever invents or discovers any useful process, . . . or any useful improvement thereof . . . ."). Further, while the current Patent Act does not define "useful," PERA does. Patent Eligibility Restoration Act § 100(k) ("The term 'useful' means, with respect to an invention or discovery, that the invention or discovery has a specific and practical utility from the perspective of a person of ordinary skill in the art to which the invention or discovery pertains.").

168. For a more detailed discussion on how the *Alice*/*Mayo* framework conflates and confuses distinct patentability requirements, see Taylor, *supra* note 31, at 178–83 (discussing how each analytic step in the *Alice*/*Mayo* framework goes beyond the traditional bounds of § 101 and bleeds into other statutory requirements).

169. PERA is referencing "prior art" in subclause (iii), which is "[t]he collection of information available to the public before a patent application is filed." MASUR & OUELLETTE, *supra* note 124, at 12. Prior art is principally relevant for questions of novelty or nonobviousness. *Id.* As such, proposed § 101(c)(1)(B)(iii) clarifies that patentable subject matter determinations are distinct from other patentability issues.

170. Patent Eligibility Restoration Act § 101(c)(1)(B).

171. *See id.* § 101(c)(1)(B)(iv).

parallel patentability requirements.[172] Finally, proposed § 101(c)(1)(B)(ii), in addition to clarifying patentable subject matter considerations, firmly departs from the *Alice*/*Mayo* framework, under which a court considers whether a claim element is known, conventional, or routine when determining whether an otherwise abstract idea is patentable.[173] Thus, PERA concretely defines patentable subject matter requirements apart from other patentability doctrines.

2. The Patent Eligibility Restoration Act Promotes Consistency by Limiting Court Discretion

Limiting a court's discretion to make eligibility determinations prevails as a constant, palpable theme throughout PERA. By specifically enumerating patent-ineligible categories of subject matter, and by further limiting the factors a court may consider when making eligibility determinations, proposed § 101 moves away from developing the patentable subject matter doctrine through common law, and more towards explicit statutory definitions. For example, the Prohibited Considerations Clause, introduced above, largely restricts a court's discretion to make eligibility determinations that would be standard under the *Alice*/*Mayo* framework.[174] This is primarily to prevent a court from conflating patentable subject matter issues with other patentability requirements, such as novelty or nonobviousness.[175] The Prohibited Considerations Clause makes this purpose explicit by preventing a court from scrutinizing subject matter eligibility under any patentability requirement found in §§ 102, 103, or 112 of the Patent Act.[176]

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172. For example, the Prohibited Considerations Clause asserts that courts cannot consider the state of the prior art when making § 101 eligibility determinations. *Id.* § 101(c)(1)(B)(iii). This language seems to prohibit the courts from making novelty or nonobviousness determinations, which require an evaluation of the applicable prior art under §§ 102 and 103, respectively. The other clauses operate similarly.

173. *Compare id.* § 101(c)(1)(B)(ii)*, with* Alice Corp. Pty. Ltd. v. CLS Bank Int'l, 573 U.S. 208, 225 (2014) (noting that adding "well-understood, routine, conventional" computer functions generally known to the industry to an otherwise abstract idea does not make it patentable).

174. *See supra* note 173 (comparing PERA restrictions to *Alice*/*Mayo* considerations).

175. *See supra* note 124 (defining "novelty" and "nonobviousness").

176. Patent Eligibility Restoration Act § 101(c)(1)(B)(iv).

The Prohibited Considerations Clause further restricts courts by mandating that, when making eligibility determinations, a court must only consider the invention itself, as a whole, rather than how the invention is produced.[177] It thus does not matter whether the process was originally formed in an inventor's mind so long as said process embodies a discrete application of the underlying abstract idea.[178] Finally, the Prohibited Considerations Clause prevents a court from construing the prior art, showing the invention itself must be independently evaluated for eligibility purposes without regard to what has been invented before it.[179] Such restrictions greatly limit a court's ability to make eligibility determinations, directly contrasting the *Alice*/*Mayo* framework under which courts exercise great discretion.

Proposed § 101's other provisions similarly restrict judicial discretion for purposes other than to prevent amalgamating patentability doctrines. Pertinently, proposed § 101(c)(2)(A) permits a court to dismiss a case on patentable subject matter grounds at any point so long as there exists no genuine issue of material fact.[180] While this clause would appear to be granting court discretion rather than limiting it, § 101(c)(2)(B) narrowly curtails what evidence a court may consider when making eligibility determinations.[181] Thus, under proposed § 101, a judge may only dismiss a case on § 101 grounds with limited discovery relevant only to eligibility determinations.[182] This provision likely comes as a compromise for stakeholders—particularly those who often appear as defendants in infringement suits—that favor the *Alice*/*Mayo* framework for allowing suits to be

177. *Id.* § 101(c)(1)(B)(i).

178. *Id.* § 101(c)(1)(B)(iii). Note there is a further requirement that processes which are substantially economic, financial, business, social, cultural, or artistic must only be practically performable with the use of a machine or manufacture. *Id.* § 101(b)(1)(B).

179. *Id.* § 101(c)(1)(B)(iii).

180. *Id.* § 101(c)(2)(A).

181. *Id.* § 101(c)(2)(B) ("With respect to a determination described in subparagraph (A), the court may consider *limited discovery* relevant *only to the eligibility* described in that subparagraph before ruling on a motion described in that subparagraph." (emphasis added)).

182. *Id.*

dismissed early during litigation.[183] Proposed § 101 thus strikes a healthy balance between the *Alice*/*Mayo* framework, under which cases were dismissed early on the pleadings at an alarming rate,[184] and protecting against frivolous lawsuits by patent trolls.[185]

3. Law Association Proposals for Patentable Subject Matter Reform Align with the Patent Eligibility Restoration Act's Goals and Language

PERA incorporates many features prevalently embodied by other proposals for patentable subject matter reform set forth by prominent legal organizations.[186] In March 2017, for example, the American Intellectual Property Law Association (AIPLA) and the Intellectual Property Owners Association (IPO) adopted a legislative proposal (AIPLA-IPO Proposal) to amend § 101.[187]

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183. *See* Google LLC, *supra* note 107, at 12–13 ("The *Alice* decision brought patent eligibility to equal footing with the other statutory requirements with respect to the potential for early disposition . . . ."). *But see* Maria R. Sinatra, Note, *Do Abstract Ideas Have the Need, the Need for Speed?: An Examination of Abstract Ideas After* Alice, 84 FORDHAM L. REV. 821, 822 (2015) ("The *Alice* standard has thus far led to the dismissal of many patents that were previously granted . . . by utilizing language traditionally indicative of analysis under other sections of the Patent Act." (footnotes omitted)).

184. From June 2014 (post-*Alice*) to February 2017, 68% of patents challenged on § 101 eligibility grounds were held invalid at the motion for judgment on the pleadings stage, and 60% were held invalid at the motion to dismiss stage. *See* Jeffrey A. Lefstin et al., *Final Report of the Berkeley Center for Law & Technology Section 101 Workshop: Addressing Patent Eligibility Challenges*, 33 BERKELEY TECH. L.J. 551, 578 tbl.2 (2018) (presenting all district court decisions on § 101-related motions both pre- and post-*Alice*). On appeal, the Federal Circuit affirmed invalidation at the motion for judgment on the pleadings stage 88% of the time and affirmed motions to dismiss on § 101 grounds 95% of the time. *Id.*

185. *See* discussion *supra* notes 123, 126 and accompanying text (defining "patent troll" and showing that those who often go against patent trolls in court are more likely to favor the *Alice*/*Mayo* framework).

186. Perhaps this is because the initial drafts of PERA were the culmination of years of conversations with prominent stakeholders. *See Tillis Introduces Landmark Legislation to Restore American Innovation*, THOM TILLIS: U.S. SENATOR FOR N.C. (Aug. 3, 2022), https://www.tillis.senate.gov/2022/8/tillis-introduces-landmark-legislation-to-restore-american-innovation [https://perma.cc/PZ33-5A47] ("This legislation . . . is the product of almost four years of consensus driven stakeholder conversations from all interested parties . . . .").

187. *See Joint AIPLA-IPO Proposal on Patent Eligibility*, AM. INTELL. PROP. L. ASS'N (May 2018), https://www.aipla.org/advocacy/legislative/joint-aipla-ipo

Though not as refined as PERA, the AIPLA-IPO Proposal similarly creates explicit and exclusive statutory definitions for ineligible subject matter.[188] Specifically regarding "abstract ideas," the AIPLA-IPO Proposal prohibits only those inventions that are performed solely in the human mind.[189] Thus, the AIPLA-IPO Proposal seems to more broadly support the patentability of software inventions by allowing discrete applications of otherwise abstract ideas to clear the § 101 threshold.[190] Similar to PERA, the AIPLA-IPO Proposal harkens back to the specific language of *Diamond v. Diehr* by emphasizing that claimed inventions be considered "as a whole."[191]

Finally, the AIPLA-IPO Proposal curtails court discretion by proposing a "sole eligibility standard" wherein a court may not consider patentability requirements outside of § 101, the manner in which the invention was made or discovered, or whether the claimed invention includes an "inventive concept."[192] Such language is clearly directed at abrogating the *Alice*/*Mayo* framework by eliminating *Alice*/*Mayo* step two and the search for an "inventive concept."[193] By confining a court's analysis in this manner, the proposal aims to prevent a court from conflating patentable subject matter with other patentability

-proposal-on-patent-eligibility [https://perma.cc/6SAG-DBSG] ("In March 2017, the AIPLA Board of Directors adopted a recommendation of the AIPLA Patentable Subject Matter Task Force, putting forth a legislative proposal to amend § 101.").

188. *Id.* (titling proposed § 101(b) "Sole Exceptions to Subject Matter Eligibility").

189. *Id.* § 101(b) ("A claimed invention is ineligible under subsection (a) *if and only if* the claimed invention *as a whole* . . . (ii) is performed solely in the human mind." (emphasis added)).

190. Notice that, like PERA, the AIPLA-IPO Proposal only purports to bar software when claimed in the abstract, but not discrete applications, such as embodiments in machines or other articles of manufacture. *See id.*; *see also* discussion *supra* notes 153–56, 159–62 and accompanying text (discussing the patenting of both "non-technological" and "technological" processes under PERA).

191. *Joint AIPLA-IPO Proposal on Patent Eligibility*, *supra* note 187, § 101(b)(a); *see also supra* notes 163–66 and accompanying text (discussing PERA's "as a whole" language and its relation to *Diamond v. Diehr*).

192. *See Joint AIPLA-IPO Proposal on Patent Eligibility*, *supra* note 187, § 101(c).

193. *See supra* notes 91–93 and accompanying text (discussing the factors a court may consider when searching for an "inventive concept" under *Alice*/*Mayo*).

requirements.[194] Thus, though the AIPLA-IPO Proposal operates slightly differently than PERA, it aims to fix the same issues by explicitly defining categories of ineligible subject matter to better support software inventions, limiting court discretion, and preventing courts from conflating other patentability requirements with subject matter eligibility. Each proposal grounds itself by statutorily embodying the underlying policy goals of prominent Supreme Court precedents, such as deterring preemption and allowing discrete applications of otherwise abstract ideas to clear the minimum § 101 requirements.[195]

Other professional bar organizations have likewise pushed for § 101 eligibility reform. The ABA established its proposed legislative resolution (ABA Proposal) in a 2017 comment letter to the USPTO.[196] The ABA Proposal largely focuses on the Supreme Court's concern with preempting legitimate innovation by granting broad patents directed to ineligible subject matter.[197] As such, rather than statutorily defining ineligible subject matter, the ABA Proposal states that a patent claim may only be denied on § 101 grounds if "the scope of the exclusive rights under such a claim would preempt the use by others of all practical applications of a law of nature, natural phenomena, or abstract idea."[198] The ABA Proposal thus does not focus on categories of ineligible subject matter, but rather on the preemptive effect an invention may have over fundamental "building blocks of human ingenuity."[199]

Despite this different primary focus, the actual means to realize the ABA Proposal's goals are akin to the AIPLA-IPO

194. *See supra* Part II.A.2 (showing how PERA similarly restricts court discretion by explicitly clarifying that other patentability requirements are wholly separate from the subject matter eligibility analysis).

195. *See* Diamond v. Diehr, 450 U.S. 175, 188 (1981) ("While a scientific truth, or the mathematical expression of it, is not a patentable invention, a novel and useful structure created with the aid of knowledge of scientific truth may be." (quoting Mackay Radio & Tel. Co. v. Radio Corp. of Am., 306 U.S. 86, 94 (1939))).

196. *See* Am. Bar Ass'n Section of Intell. Prop. L., Supplemental Comment Letter on Notice of Roundtables and Request for Comments Related to Patent Subject Matter Eligibility (Mar. 28, 2017) [hereinafter ABA Proposal], https://patentdocs.typepad.com/files/letter-5.pdf [https://perma.cc/Y5AT-43AS].

197. *Id.* at 2 ("At its core, preemption is the driving force behind the Court's jurisprudence.").

198. *Id.* at 3.

199. Alice Corp. Pty. Ltd. v. CLS Bank Int'l, 573 U.S. 208, 217 (2014).

Proposal and PERA. That is, the ABA Proposal still largely limits a court's discretion to make preemption findings, stating that "patent eligibility shall not be negated when a *practical application*" of an otherwise ineligible category is at issue.[200] Thus, though the exact definition of an "abstract idea" is not categorically defined and is instead left to the courts, the ABA Proposal instructs courts that only abstract ideas themselves are unpatentable rather than practical applications of such ideas. Such a clause supports eligibility for computer-implemented inventions as it allows an inventor to patent the application of otherwise abstract ideas to a computer or other device. The ABA Proposal further limits court discretion by qualifying that "each and every" patent claim be considered "as a whole," again alluding to the language of *Diamond v. Diehr*.[201]

Finally, as with PERA and the AIPLA-IPO Proposal, the ABA Proposal states that a court making eligibility determinations under § 101 may not consider other patentability requirements, nor whether the claim recites an "inventive concept" in part or as a whole.[202] Such language directly abrogates the *Alice*/*Mayo* framework by eliminating the search for an inventive concept and by constraining the considerations a court may appraise when making eligibility determinations. Under the ABA Proposal, § 101 determinations are considered entirely apart from other patentability requirements, evidenced not only by the strict prohibition against considering §§ 102, 103, and 112,[203] but also by mandating an invention need only be "useful" to meet § 101's requirements rather than "new *and* useful."[204]

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200. ABA Proposal, *supra* note 196, at 3 (emphasis added).

201. *Id.* at 4; *see also supra* note 164 and accompanying text (discussing the language of *Diamond v. Diehr*).

202. *See* ABA Proposal, *supra* note 196, at 4 ("Eligibility under this section 101 shall not be negated based on considerations of patentability as defined in Sections 102, 103 and 112, including whether the claims in whole or in part define an *inventive concept*." (emphasis added)).

203. *Id.*

204. *Id.* at 3 (extending patent protection to "[w]hoever invents or discovers any useful process, . . . or any useful improvement thereof . . . ."). Note that this is the same language used by PERA in its proposed § 101(a). *See supra* note 167 (comparing PERA § 101(a) to the current language of the Patent Act).

B. ALTERING THE PATENTABLE SUBJECT MATTER JURISPRUDENCE WOULD POSITIVELY BENEFIT COMPUTER-IMPLEMENTED INVENTIONS

The *Alice*/*Mayo* framework is inconsistently applied by district court judges across the country and within the Federal Circuit itself.[205] While each proposal offers unique solutions, all three eliminate in part or in full the *Alice*/*Mayo* framework while simultaneously educing and statutorily embodying policy rationales from prior Supreme Court precedents. This is done by distinguishing § 101 eligibility determinations from other patentability requirements, limiting court discretion when making eligibility determinations by clarifying what a court may consider and how a court must apply such considerations, and by enumerating categories of ineligible subject matter.[206] Each of these proposed changes could have a dramatic impact on how computer-implemented inventions are considered before the USPTO and the federal courts.

1. Legislative Proposals Prevent Amalgamating Patentability Requirements

Many of the proposals' discretionary limitations are focused on isolating patentable subject matter considerations from other patentability issues. For example, PERA, the AIPLA-IPO Proposal, and the ABA Proposal all explicitly prevent a court from considering any requirement which stems from another section of the Patent Act.[207] Thus, proposals for a reformed § 101 all

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205. *See* Cory N. Owan, Comment, *Don't Abstract Machine Learning Patents*, 61 JURIMETRICS J. 245, 252 (2021) ("The inconsistency between different judges' applications of the abstract idea and the inconsistency between their own methodologies indicates that the abstract idea needs to be more clearly defined."); *Tillis, Coons Introduce Landmark Legislation*, *supra* note 129 ("As of 2021, all 12 judges of the United States Court of Appeals for the Federal Circuit have lamented the state of the law.").

206. *See generally supra* Part II.A (discussing various proposals for subject matter eligibility reform as well as common trends between them).

207. *See* Patent Eligibility Restoration Act of 2023, S. 2140, 118th Cong. § 101(c)(1)(B)(iv) (2023) ("[E]ligibility shall be determined . . . without regard to . . . any other consideration in section 102, 103, or 112."); ABA Proposal, *supra* note 196, at 4 ("Eligibility under this section 101 shall not be negated based on considerations of patentability as defined in Sections 102, 103, or 112 . . . ."); *Joint AIPLA-IPO Proposal on Patent Eligibility*, *supra* note 187 ("The eligibility of a claimed invention . . . shall be determined without regard to the requirements or conditions of sections 102, 103, and 112 of this title.").

focus on reestablishing § 101 as a distinct requirement apart from novelty, nonobviousness, or other patentability requirements. This would allow inventions embodying practical applications of "abstract ideas" under the *Alice*/*Mayo* framework to proceed to the merits of other patentability considerations, rather than amalgamate all patentability requirements under § 101 at the motion to dismiss stage.[208]

Note that restricting judicial discretion to make eligibility determinations would not open the floodgates to patent trolls and frivolous patents, as the Patent Act holds many other protective backstops.[209] Rather, such a change would merely require a judge or patent examiner to make an eligibility decision based solely on § 101 grounds before weeding out frivolous patents by applying the Patent Act's other statutory bars. Should a court's discretion be limited to require consideration of § 101 subject matter eligibility in isolation, the immediate impact would be a heightened difficulty for alleged infringers in litigation proceedings to dismiss cases involving software or computer-implemented inventions on the pleadings.

In addition to expressly preventing courts from considering patentability requirements outside of § 101 itself, each proposal abrogates the *Alice*/*Mayo* framework in part or in full by limiting a court's ability to make eligibility determinations.[210] More specifically, each proposal contains clauses which would prevent a court from proceeding to *Alice*/*Mayo* step two, wherein a court considers the elements of the patent claim to determine whether

208. While § 101 is not the only basis for invalidating patent claims at the motion to dismiss stage, eligibility under § 101 is ultimately a question of law which largely does not turn on subsidiary findings of fact to the same degree as novelty or nonobviousness. *See* Aatrix Software, Inc. v. Green Shades Software, Inc., 882 F.3d 1121, 1128 (Fed. Cir. 2018) ("[T]he ultimate determination of eligibility under § 101 is a question of law . . . ."); Paul R. Gugliuzza, *The Procedure of Patent Eligibility*, 97 TEX. L. REV. 571, 575–76 (2019) (noting that judgment on the pleadings is "simply not available for other validity doctrines such as novelty and nonobviousness, which are widely recognized to turn on questions of fact and therefore cannot be resolved until summary judgment at the earliest and often must wait until trial").

209. Just because a patent recites eligible subject matter does not necessarily mean the patent is valid. Other requirements of patentability must also be met. *See, e.g.*, 35 U.S.C. §§ 102, 103, 112 (establishing patentability requirements outside of subject matter eligibility).

210. *See* Patent Eligibility Restoration Act § 101(c) (setting eligibility standards); ABA Proposal, *supra* note 196, at 3–4 (same); *Joint AIPLA-IPO Proposal on Patent Eligibility*, *supra* note 187, § 101(c) (same).

it recites an "inventive concept" sufficient to transform the nature of the claim into a patent-eligible application.[211] Each proposal largely does so because, as discussed above, *Alice*/*Mayo* step two amalgamates patentable subject matter, novelty, and nonobviousness considerations into a single uncertain test.[212] By preventing the search for an "inventive concept,"[213] disregarding the manner in which a claimed invention was made,[214] or preventing a court from considering whether a patent claim element is "known, conventional, routine, or naturally occurring,"[215] each proposal further solidifies patentable subject matter as a distinct requirement. Under this rationale, a computer-implemented invention would only be directed to unpatentable subject matter if the inventor is attempting to patent an idea itself absent a discrete implementation, or the inventor merely says, "apply it with a computer."[216] Such frivolous patents would be weeded out by the USPTO or handled decisively in federal court, while other patents could proceed to other patentability questions.

Further, each proposal either specifically enumerates categories of ineligible subject matter or spells out the relevant considerations a court may contemplate under § 101, such that the judicially created exceptions would be eliminated in part or in

211. *See* Patent Eligibility Restoration Act § 101(c)(1)(B)(ii) ("[E]ligibility shall be determined . . . without regard to . . . whether a claim element is known, conventional, routine, or naturally occurring."); ABA Proposal, *supra* note 196, at 4 ("Eligibility under this section 101 shall not be negated based on . . . whether the claims in whole or in part define an inventive concept."); *Joint AIPLA-IPO Proposal on Patent Eligibility*, *supra* note 187, § 101(c)(iii) ("The eligibility of a claimed invention . . . shall be determined without regard to . . . whether the claimed invention includes an inventive concept.").

212. *See* Taylor, *supra* note 31, at 188 ("The Supreme Court, however, has been interpreting § 101 creatively, as if it were the only barrier to patentability, and in the process conflating eligibility in § 101 with the concepts of novelty and non-obviousness from §§ 102 and 103.").

213. *See* quotations cited *supra* note 211 (pointing out specific text in each proposal aimed at dismantling the search for an "inventive concept").

214. *See, e.g.*, Patent Eligibility Restoration Act § 101(c)(1)(B)(i) ("[E]ligibility shall be determined . . . without regard to . . . the manner in which the claimed invention was made.").

215. *Id.* § 101(c)(1)(B)(ii).

216. Alice Corp. Pty. Ltd. v. CLS Bank Int'l, 573 U.S. 208, 221 (2014) (explaining that "[s]tating an abstract idea while adding the words 'apply it with a computer'" would be insufficient for subject matter eligibility).

full.[217] This change would mark a great departure from historical precedent[218] and would largely restrict a court's ability to make eligibility determinations. Comments from the intellectual property community, however, show that such a massive change in precedent may be a long time coming.[219]

2. Legislative Proposals Sacrifice Judicial Flexibility for Statutory Concreteness

Turning back to the domestic Patent Act, modern § 101 states very little about patentable subject matter requirements.[220] With little guidance and a great deal of court discretion, patent owners currently face uncertainty before the courts.[221] By enumerating per se categories of ineligible subject matter, and by specifically excluding a court from construing eligibility beyond those terms, defending a patent on § 101 grounds in federal court becomes much more predictable.[222] Further, the proposals which specifically incorporate computer-implemented inventions into their definitions and/or exceptions to

217. *See* Patent Eligibility Restoration Act § 101(b)(1) ("[A] person may not obtain a patent for any of the following, if claimed as such . . . ."); *Joint AIPLA-IPO Proposal on Patent Eligibility*, *supra* note 187, § 101(b) ("A claimed invention is ineligible under subsection (a) *if and only if* the claimed invention *as a whole* . . . (ii) is performed solely in the human mind." (emphasis added)); ABA Proposal, *supra* note 196, at 3–4 (setting eligibility standards).

218. *See supra* Part I.A–B (showing that, in the United States, categories of ineligible subject matter have historically been prescribed by judges rather than by Congress).

219. *See, e.g.*, The Coal. for 21st Century Pat. Reform, *supra* note 31, at 2 ("Under the current state of the law, eligibility findings by courts have become unpredictable . . . ."); Am. Intell. Prop. L. Ass'n, *supra* note 125, at 2 ("The [Supreme] Court's distortion of patent eligibility has endangered the patentability of important and, in some cases, critical innovations.").

220. *See supra* notes 44–45 and accompanying text (setting forth and deconstructing the current text of § 101).

221. *See supra* Part I.C.2 (discussing the uncertainties surrounding the patentable subject matter doctrine in federal court proceedings).

222. *See The State of Patent Eligibility in America: Part III: Hearing Before the S. Subcomm. on Intell. Prop. of the S. Comm. on the Judiciary*, 116th Cong. (2019) [hereinafter *Patent Eligibility Hearings Part III*] (statement of Manny Schecter, Chief Patent Counsel, IBM) (stating that expressly abrogating the judicially created exceptions to eligibility "accomplishes the key objectives of patent eligibility reform, including the primary goals of improving clarity and predictability in the law").

the ineligible subject matter categories promote increased consistency when applying § 101 to such inventions.[223]

Though Congress has never defined categories of ineligible subject matter,[224] doing so would return § 101 to being the minor hurdle it had always been prior to *Alice*/*Mayo*. Altering this paradigm would not allow vague and frivolous patents to crowd out other inventors, as an inventor defending a patent in court or before the USPTO would still have to meet the other patentability requirements, which more specifically look at the breadth and originality of the proposed claims rather than the classification of the underlying subject matter.[225] Rather, computer-implemented inventions would simply proceed to other patentability issues, such as novelty or nonobviousness, as opposed to being categorically barred in the early stages of prosecution or litigation.

Some commentators, however, criticize the proposals for wrongfully encouraging predictability at too great a cost to flexibility.[226] According to this line of reasoning, limiting court discretion and statutorily defining categories of ineligible subject matter deprives the courts and the USPTO of the flexibility required to face new challenges and adapt to emerging technologies.[227] This argument is misplaced as, for the most part, the

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223. For example, PERA specifically addresses non-technological processes by clarifying that discrete embodiments in machines or articles of manufacture are patentable if such embodiments are the only practical way to perform the process. Patent Eligibility Restoration Act of 2023, S. 2140, 118th Cong. § 101(b)(1)(B) (2023) (excluding an otherwise non-eligible process when that "process cannot practically be performed without the use of a machine or manufacture"). Further, PERA § 101(b)(1) contains multiple provisions which prohibit patenting software and other technological processes "as such." *Id.* § 101(b)(1)(A), (b)(1)(C)(i). Thus, though certain categories of subject matter are barred "as such," discrete applications are patent-eligible under PERA, and a court cannot make an invalidity finding on such a basis. *Id.*

224. *See supra* Part I.A (discussing the text and history of § 101 and the judicially created exceptions to subject matter eligibility).

225. *See supra* note 124 (describing other patentability requirements that, unlike patentable subject matter issues, require a thorough evaluation of the prior art to ensure the claimed invention is not encompassed by the innovations that preceded it).

226. *See, e.g.*, Nguyen, *supra* note 77, at 1637, 1658 (critiquing legislative solutions as the means to clarify subject matter eligibility requirements).

227. *See id.* at 1637 ("Patent law, because it involves continuously evolving technologies and scientific advancements, requires dynamic and nuanced

proposals merely prohibit analyzing patentability requirements outside of § 101.[228] As such, after considering § 101, a court is free to use whichever devices it has available to make further decisions regarding a patent's validity. To the extent each proposal limits discretion when making eligibility determinations or specifically enumerates categories of ineligible subject matter, courts may still engage in traditional statutory analysis to reach legal conclusions. The proposals merely define *what* the relevant considerations are, rather than *how* to make them.

The various proposals thus do not preordain the outcomes of individual cases, nor do they unduly restrict a court's ability to make eligibility determinations. Rather, they guide a court's analysis as other sections of the Patent Act already do.[229] Additionally, such arguments misinterpret the role of Congress in the patent system. The Constitution extends the power to establish and regulate patent rights to Congress rather than the courts.[230] As such, affirmative congressional actions which discretely define patent rights at the cost of judicially created categories of ineligible subject matter should be encouraged rather than stifled as they more readily encapsulate Congress's patent power.

III. ERROR, PATENT NOT FOUND: THE UNSTABLE FOOTING OF DOMESTIC SOFTWARE PATENTS IN A GLOBAL ECONOMY

The above Parts highlighted the unpredictable and unworkable nature of the *Alice*/*Mayo* framework, as well as analyzed a selection of legislative proposals aimed at dismantling it. To this point the analysis has largely operated within the bounds of the national Patent Act. Analyzing foreign patent systems, however, offers crucial insights into the comparative strength of the

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common law development, not a legislative override that could leave the patent statute in as much chaos as before.").

228. *See supra* Part II.B.1 (showing how each legislative proposal distinguishes § 101 considerations from other patentability requirements).

229. For example, a court considering whether an invention is "novel" under § 102 is faced with a largely mechanical statute that guides the considerations a court must make. 35 U.S.C. § 102. However, there is still room to interpret the specific meaning of certain clauses and phrases such that court discretion is not altogether eradicated.

230. *See* U.S. CONST. art. I, § 8, cl. 8 ("The Congress shall have Power . . . [t]o promote the Progress of Science and useful Arts, by securing for limited Times to Authors and Inventors the exclusive Right to their respective Writings and Discoveries.").

domestic patent system in relation to others. Thus, to improve the domestic patent system, this Part examines how other IP5 countries[231] with strong patent systems handle eligibility restrictions for software and computer-implemented inventions. Namely, rather than developing eligibility restrictions through the common law, as is done in the United States, foreign IP5 jurisdictions typically statutorily define categories of ineligible subject matter, incorporate software and computer-implemented inventions explicitly into their respective patent statutes, and clarify patentable subject matter as a distinct requirement apart from other patentability considerations. This Part applies these global themes to both current and proposed domestic policies to suggest that legislative revision would promote predictability before the USPTO and federal courts, as well as better align the United States' patent practice with other IP5 members.

A. GLOBAL TRENDS IN SUBJECT MATTER ELIGIBILITY FAVOR PREDICTABILITY

Both the USPTO's patent eligibility jurisprudence study and PERA were conceived with a steady eye on the global playing field to align domestic patent law with global standards.[232] A primary focus of the USPTO's study was to ascertain, among other issues, how foreign jurisdictions with strong technology sectors handled patenting computer-related inventions.[233] As a result, the USPTO solicited comments which largely demonstrated that foreign jurisdictions treat software and other computer-implemented inventions differently, and more predictably,

231. Launched in 2007, the "IP5" is a forum for the world's five largest patent offices "to exchange views and identify opportunities for cooperation with regard to common challenges." *IP5*, U.S. PAT. & TRADEMARK OFF. (Feb. 10, 2021), https://www.uspto.gov/ip-policy/patent-policy/ip5 [https://perma.cc/26NN-F4N4]. The five members are the USPTO, the European Patent Office (EPO), the Japan Patent Office, the Korean Intellectual Property Office, and the State Intellectual Property Office of the People's Republic of China. *Id.*

232. *See, e.g.*, Patent Eligibility Jurisprudence Study, 86 Fed. Reg. 36257, 36259 (July 9, 2021) ("Please explain how your experiences with the application of subject matter eligibility requirements in other jurisdictions, including China, Japan, Korea, and Europe, differ from your experiences in the United States.").

233. *Id.* (asking commenters to explain how subject matter eligibility requirements are applied to computer-related inventions both domestically and abroad).

than the United States does.[234] As software itself has grown in importance over the last twenty years, several foreign jurisdictions have centered patent system reform campaigns on prioritizing patent protection for such inventions.[235] Rather than adapt the patent system to modern technologies on the forefront of innovation, the United States has instead made patenting such inventions more difficult.[236]

1. Statutory Categories of Ineligible Subject Matter and Software's "As Such" Bar to Patentability

Many jurisdictions, including Europe, Japan, and China, statutorily define categories of patent-ineligible subject matter with limited exceptions.[237] Many of the categories parallel the United States' judicially created categories, such as China's prohibition of "scientific discoveries" (akin to laws of nature) and "rules and methods for intellectual activities" (akin to abstract

234. *See infra* Part III.B.1 (discussing the discrepancies between global trends and the domestic patentable subject matter jurisprudence).

235. *See, e.g.*, Yuqing Feng et al., *China May Lift Curbs on Software Patents: SIPO Proposed Revisions to Examination Guidelines*, WOLTERS KLUWER: KLUWER PAT. BLOG (Dec. 1, 2016), http://patentblog.kluweriplaw.com/2016/12/01/china-may-lift-curbs-on-software-patents-sipo-proposed-revisions-to-examination-guidelines [https://perma.cc/HQ2R-Y88R] ("[T]he change and development in technologies can no longer be ignored, and eventually becomes a goal of the Chinese government to enhance patent protection related to the new economy and technologies, and results in change of the long standing standards for patent eligibility of software and business methods.").

236. *See Patent Eligibility Hearings Part II*, *supra* note 12 ("China, Europe, Korea, among others, continue to grant patents for inventions the U.S. has deemed ineligible, ensuring that innovative companies and inventors that operate and patent in those jurisdictions have a competitive edge in global innovation.").

237. *See* Convention on the Grant of European Patents (European Patent Convention), art. 52(2), Oct. 5, 1973, 1065 U.N.T.S. 199 [hereinafter European Patent Convention] ("The following in particular shall not be regarded as inventions . . . ."); Tokkyō Jitsuyō Shin'an Shinsa Kijun [Examination Guidelines for Patents and Utility Models], pt. III, ch. 1, art. 2.1, para. 4 (Japan) ("When a claimed invention is considered as any of (i) to (v) shown below, the claimed invention is not deemed to utilize the laws of nature, and thus, is not considered as a statutory 'invention' . . . ."); Zhōnghuá Rénmín Gònghéguó Zhuānlì Fǎ (中華人民共和國專利法) [Patent Law of the People's Republic of China] (promulgated by the Standing Comm. Nat'l People's Cong., Oct. 17, 2020, effective June 1, 2021), art. 25 (China) ("Patent rights shall not be granted for any of the following . . . .").

ideas).[238] Several of the categories further support a jurisdiction's given public policy choices, such as China's proscription of "methods for the diagnosis or treatment of diseases" or Europe's bar on "aesthetic creations."[239] Ultimately, enumerating categories of ineligible subject matter serves as a strong starting point for determining the eligibility of a claimed invention.

Turning to software specifically, a facial scan of each jurisdictions' categories of ineligible subject matter would make it seem that software inventions are per se barred from patentability. It would seem this way because they *are*—at least to the extent an inventor is attempting to patent software "as such."[240] Contrary to what this language seems to imply, this "as such" bar simply means that software *itself* cannot be patented, but discrete *applications* of software which comply with a country's other patentability requirements can be.[241]

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238. Zhōnghuá Rénmín Gònghéguó Zhuānlì Fǎ (中華人民共和國專利法) [Patent Law of the People's Republic of China] (promulgated by the Standing Comm. Nat'l People's Cong., Oct. 17, 2020, effective June 1, 2021), art. 25 (China); *see also* Jennifer Che et al., *Patent Eligibility for Software in China*, CHINA PAT. STRATEGY (Apr. 4, 2022), https://chinapatentstrategy.com/patent-eligibility-for-software-in-china [https://perma.cc/Z5KH-7CAV] ("Article 25 is similar to the judicially made law in the US stating that laws of nature, natural phenomena, products of nature, and abstract ideas (such as rules and methods for mental activity) are not patent eligible.").

239. *See* Zhōnghuá Rénmín Gònghéguó Zhuānlì Fǎ (中華人民共和國專利法) [Patent Law of the People's Republic of China] (promulgated by the Standing Comm. Nat'l People's Cong., Oct. 17, 2020, effective June 1, 2021), art. 25 (China); European Patent Convention, *supra* note 237, art. 52(2)(b).

240. *See* European Patent Convention, *supra* note 237, art. 52(2)(c), (3) (categorically barring "programs for computers" if patented "as such"); *Can Computer Software Be Patented in China?*, CHINA NAT'L INTELL. PROP. ADMIN. (Nov. 18, 2014), https://english.cnipa.gov.cn/art/2014/11/18/art_1358_80515.html [https://perma.cc/D6ZB-FS98] ("Computer programs *as such* cannot be patented . . . ." (emphasis added)).

241. *See, e.g.*, Tokkyō Jitsuyō Shin'an Shinsa Kijun [Examination Guidelines for Patents and Utility Models], pt. III, ch. 1, art. 2.2, para. 1 (Japan) ("Those utilizing the laws of nature as a whole and being considered as a 'creation of a technical idea utilizing the laws of nature' . . . constitute a statutory 'invention' without being examined from a viewpoint of computer software, even though they utilize computer software."); European Patent Convention, *supra* note 237, art. 52(3) ("[P]aragraph 2 shall exclude patentability of the subject-matter or activities referred to in that provision only to the extent to which a European patent application or European patent relates to such subject-matter or activities as such."); *Can Computer Software Be Patented in China?*, *supra* note 240 ("An invention containing a computer program may be

Using China as an example, one of the first questions when applying the Chinese Patent Law to software inventions is whether the invention sought to be patented is prohibited for constituting "rules and methods for intellectual activities."[242] This ineligible category does not apply to a patent claim if the "claim describes a technical means that utilizes laws of nature to address a technical problem, and obtains a technical effect that fits the laws of the nature."[243] Thus, even if a computer program is barred "as such" for constituting a rule or method for intellectual activities, software and computer-implemented inventions may be patented in China if they meet other statutory conditions.[244]

Other foreign jurisdictions operate similarly. The European Patent Convention (EPC), for example, states that "programs for computers" are not patentable inventions.[245] EPC Article 52(3), however, pertinently states that the enumerated categories of ineligible subject matter shall only exclude the patentability of subject matter "to which a European patent application or European patent relates to such subject-matter or activities *as such*."[246] Thus, "programs for computers" may be patent-eligible so long as they are not claimed "as such" and other EPC

patentable if the combination of software and hardware as a whole can really improve prior art, bring about technical results and constitute a complete technical solution.").

242. Zhōnghuá Rénmín Gònghéguó Zhuānlì Fǎ (**中華人民共和國專利法**) [Patent Law of the People's Republic of China] (promulgated by the Standing Comm. Nat'l People's Cong., Oct. 17, 2020, effective June 1, 2021), art. 25 (China).

243. *See* Liaoteng Wang et al., *A Comparative Look at Patent Subject Matter Eligibility Standards: China Versus the United States*, IPWATCHDOG (June 12, 2020), https://ipwatchdog.com/2020/06/12/comparative-look-patent-subject-matter-eligibility-standards-china-versus-united-states/id=122339 [https://perma.cc/JM26-UA5A] (translating and applying February 2020 guidance from the China National Intellectual Property Association amending China's Guidelines for Patent Examination).

244. *Id.*; *see also* Che et al., *supra* note 238 ("Importantly, even if the claim has an algorithm or certain 'business-like' steps, the examiner will determine whether these 'patent ineligible' features are closely tied to the technical problem such that as a whole the claimed invention still solves a technical problem using technical means to achieve a technical effect.").

245. *See* European Patent Convention, *supra* note 237, art. 52(2)(c) ("The following in particular shall not be regarded as inventions . . . schemes, rules and methods for performing mental acts, playing games or doing business, and *programs for computers*."(emphasis added)).

246. *Id.* art. 52(3) (emphasis added).

requirements are met.[247] This demonstrates that, in addition to explicitly defining patent-ineligible subject matter, other IP5 members, such as China and Europe, carve out further specific exceptions for software and computer-implemented inventions.[248] Such explicit definitions promote predictability when filing patent applications for software and computer-implemented inventions by making clear the various subject matter bars to patentability.[249]

2. Circumnavigating the "As Such" Bar Through Technical Applications of Software

In addition to prescribing categories of ineligible subject matter, other IP5 jurisdictions largely base subject matter eligibility determinations along technicality and/or physicality dimensions to get around the "as such" bar.[250] In Europe, for example, the Technical Board of Appeal of the EPO has established that a "technical contribution" to an otherwise excluded category of subject matter, such as software, may be patentable.[251] While the landmark EPO *Hitachi* case shows that this "technical contribution" approach has fallen out of favor,[252] the EPO in that

247. *See infra* Part III.A.2 (discussing European standards for determining whether the "as such" bar has been circumnavigated).

248. *See supra* notes 237–41 (citing exceptions from foreign statutes directed to computer-implemented inventions).

249. *See supra* notes 110–12 and accompanying text (describing the Madigan & Mossoff study, which found several patent applications denied in the United States on § 101 eligibility grounds were granted by the EPO and/or China); *Patent Eligibility Hearings Part III*, *supra* note 222 (statement of Laurie Self, Senior Vice President and Counsel, Government Affairs, Qualcomm) ("[I]t's harder to obtain patents on computer software in the United States than it is in Europe or China, even though innovative algorithms are essential security features of technologies like artificial intelligence, smart cities, smart homes, and secure networks.").

250. *See supra* notes 241–44 (incorporating technicality requirements in foreign patent statutes).

251. *See* Case T-208/84, *In re* Vicom Sys. Inc., ECLI:EP:BA:1986:T020884 .19860715, ¶ 16 (July 15, 1986) ("Decisive is what technical contribution the invention as defined in the claim when considered as a whole makes to the known art.").

252. The EPO notes in *Hitachi* that the "technical contribution" approach should be rejected as it required an analysis of the prior art to determine what exactly was "contributed," thereby improperly conflating patentable subject matter with issues of novelty and "inventive step" (the EPO's nonobviousness equivalent). *See* Case T-258/03, *In re* Hitachi, Ltd., ECLI:EP:BA:2004:T025803

case construed the essential term "invention" under EPC Article 52(1) as "subject matter having *technical* character."[253] Thus, the presence of technical components may be sufficient to render software processes patentable.[254] Therefore, though software as such in Europe is unpatentable,[255] functionally embedding software inside a physical device potentially gets around the patentable subject matter issue.[256]

A potential problem with this approach is that it might facilitate preemption. That is, patents which do little more than plug an otherwise abstract idea into a processor or memory disc would potentially get around the subject matter eligibility issue, thereby preventing the legitimate use of the idea by future inventors.[257] Even if this were the case, *Hitachi* shows that there

.20040421, ¶ 3.3 (Apr. 21, 2004) ("Determining the technical contribution an invention achieves with respect to the prior art is therefore more appropriate for the purpose of examining novelty and inventive step than for deciding on possible exclusion under Article 52(2) and (3).").

253. *Id.* ¶ 4.7 (emphasis added) ("[I]n general, a method involving technical means is an invention within the meaning of Article 52(1) EPC."). Note that individual countries within Europe have also adopted the *Hitachi* approach by looking to whether a given patent provides a technical solution to a technical problem. *See, e.g.*, Matthieu Dhenne, *"*Thales*" and "*Bull*" Decisions: The French Supreme Court and the Patentability of Computer-Implemented Inventions*, WOLTERS KLUWER: KLUWER PAT. BLOG (Feb. 7, 2023), https://patentblog.kluweriplaw.com/2023/02/07/thales-and-bull-decisions-the-french-supreme-court-and-the-patentability-of-computer-implemented-inventions [https://perma.cc/W8XL-GGFP] (noting that the French Supreme Court followed the *Hitachi* approach used by the EPO in two recent cases involving computer-implemented inventions).

254. *See* Nick Reeve, *Down to Business*, 2 J. INTELL. PROP. L. & PRAC. 445, 448 (2007) ("[T]he presence of computer hardware in a claim to a business method, providing a technical character, would now be sufficient to overcome the business method objection, regardless of technical contribution.").

255. *See supra* notes 245–46 (providing the statutory basis for the EPO's "as such" bar).

256. *See* Kelvin W. Willoughby, *How Much Does Technology Really Matter in Patent Law? A Comparative Analysis of Doctrines of Appropriate Patentable Subject Matter in American and European Patent Law*, 18 FED. CIR. BAR J. 63, 98 (2008) ("[T]he EPO's case law has held that if the software is functionally embedded inside something that will hurt you if you drop it on your foot, then it may be deemed as 'technical' and hence patentable.").

257. Recent EPO case law, however, seems more skeptical of patents which merely utilize "normal" physical interactions in the operation of a computer as the basis for its "technical effect." *See, e.g.*, PAUL ENGLAND, A PRACTITIONER'S GUIDE TO EUROPEAN PATENT LAW 248 (2d ed. 2022) ("A computer program is thus only patentable if, when running on a computer or loaded into a computer,

are four discrete elements in Europe which must be satisfied to obtain a patent.[258] Consequently, frivolous patents which merely recite some technical elements would likely be weeded out by the EPO's other patentability requirements, but they would not be prohibited merely because the subject matter itself is considered inherently unpatentable.[259]

Japan operates similarly, defining an "invention" as "the highly advanced creation of *technical ideas* utilizing the laws of nature."[260] Though the language is different, requiring an invention to "utilize the laws of nature" essentially means that it must tie back to a discrete embodiment, as mere abstract ideas that solely exist in the inventor's mind utilize no laws of nature.[261] The Chinese Patent Law uses similar language by stating that a software claim must describe a "technical means that utilizes laws of nature to address a technical problem" to be patentable.[262] This is why software as such is unpatentable in Japan and China, just as in Europe, but computer-implemented inventions which utilize laws of nature—meaning the software is tied to some distinct embodiment—are patent-eligible.[263]

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it brings about, or is capable of bringing about, a technical effect which goes beyond the 'normal' physical interactions between the program (software) and the computer (hardware) on which it is run.").

258. The claimed subject matter must (1) be an invention ("subject-matter having technical character"), and such invention must be (2) new, (3) inventive, and (4) industrially applicable. *See* Case T-258/03, *In re* Hitachi, Ltd., ECLI:EP:BA:2004:T025803.20040421, ¶ 3.1 (Apr. 21, 2004). The EPO's analysis of what constitutes an "invention" embodies § 101 of the domestic Patent Act, whereas the other three requirements regarding what an invention must "be" under the EPC correlate, if there is a correlation, with other sections of the domestic Patent Act.

259. *See* Reeve, *supra* note 254, at 449 ("However, in most business method patent applications, the implementation of the business method on a computer is usually secondary to the method itself and provides nothing in the way of a technical solution to a technical problem. Such claims are therefore typically found obvious and unpatentable.").

260. Tokkyo-hō [Patent Act], Law No. 121 of 1959, art. 2, para. 1 (Japan) (emphasis added). South Korea uses identical language, defining an "invention" as "the highly advanced creation of technical ideas utilizing laws of nature." Teugheobeob [Patent Act] art. 2, para. 1 (S. Kor.).

261. Tokkyo-hō [Patent Act], Law No. 121 of 1959, art. 2, para. 1 (Japan).

262. *See* Wang et al., *supra* note 243.

263. *See* Tokkyō Jitsuyō Shin'an Shinsa Kijun [Examination Guidelines for Patents and Utility Models], pt. III, ch. 1, art. 2.2, para. 1 (Japan) ("Those utilizing the laws of nature as a whole and being considered as a 'creation of a

While IP5 jurisdictions largely present "technicality" as a baseline requirement for software and computer-implemented patents, many contemplate extending patent eligibility to the equivalent of the United States' non-technological "business methods."[264] However, such jurisdictions still stress the importance of "technicality" when construing business methods.[265] The EPC incorporates methods for "playing games or doing business" under the "as such" bar, showing business methods have the potential to be patentable if the method has a "technical character."[266] In China, "business rules or methods" are only patentable if they contain a technical feature.[267] Japan similarly applies its aforementioned technicality requirement, while further stating that inventions relating to a "method for doing business" shall be more strictly construed.[268] Thus, to hamper the preemptive effect of "non-technological" business methods, prominent IP5 members emphasize that software inventions which merely implement an abstract business method without a sufficient technical hook would not be patent-eligible.

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technical idea utilizing the laws of nature' . . . constitute a statutory 'invention' without being examined from a viewpoint of computer software, even though they utilize computer software.").

264. *See supra* note 153 and accompanying text (defining and discussing business method patents).

265. As shown below, this "technical" construction for "non-technological" business methods is directly comparable to PERA's handling of "non-technological" business methods. *See* discussion *infra* Part III.B.2 (comparing PERA and other domestic proposals to global trends).

266. *See* Case T-258/03, *In re* Hitachi, Ltd., ECLI:EP:BA:2004:T025803 .20040421, ¶ IX (Apr. 21, 2004) ("Since, in accordance with the case law, an apparatus might be patentable even if it processed business-related information, a corresponding method involving *technical features* could not be excluded from patentability under Article 52(2) EPC." (emphasis added)).

267. *See* Wang et al., *supra* note 243 ("If a claim concerns an abstract algorithm or pure business rules and methods, and does not contain any technical feature, then it's a claim falling under Article 25.1(2) rules and methods for intellectual activities, and thus not patent-eligible.").

268. *See* Tokkyō Jitsuyō Shin'an Shinsa Kijun [Examination Guidelines for Patents and Utility Models], pt. III, ch. 1, art. 2.2, para. 2 (Japan) ("For inventions relating to a method for doing business . . . since there are cases in which the claimed invention a part of which utilizes a computer software is determined as not utilizing the laws of nature when considered as a whole, whether they are 'creation of a technical idea utilizing the laws of nature' shall be *carefully examined* . . . ." (emphasis added)).

3. Unmistakably Distinguishing Subject Matter Eligibility Issues from Other Requirements

Other IP5 jurisdictions promote further clarity by ensuring patentable subject matter considerations are distinguishable from other patentability requirements. Some foreign jurisdictions accomplish this by, again, explicitly defining categories of ineligible subject matter.[269] Clarifying the categories of subject matter which are or are not patentable means there is less room for judicial interpretation to mistakenly consolidate patentability requirements. Japan, for example, distinctly separates clauses related to subject matter eligibility from other requirements.[270] This approach signals to the courts that subject matter eligibility is a requirement distinct from novelty or nonobviousness, among other requirements.

Many jurisdictions expressly handle the patentable subject matter issue as a threshold inquiry. In Europe, though patentable subject matter is just one of four core requirements for obtaining a patent,[271] EPO case law has instructed that the patentable subject matter issue must be resolved first—and thus, the claimed subject matter must be considered patentable—before a court may consider prior art or other patentability requirements.[272] In this manner, the EPO largely limits judicial discretion when making eligibility considerations to the specific invention described in the patent itself without respect to outside evidence. Such an approach looks more to the specific invention's prospective preemptive impact rather than what came before it.

Jurisdictions such as Japan and Europe are better able to separate subject matter eligibility questions from other patent requirements as, in such jurisdictions, the patentable subject

269. *See* sources cited *supra* note 237 (citing provisions of various IP5 members' patent statutes which specifically delineate categories of patent-ineligible subject matter).

270. *See, e.g.*, Tokkyō Jitsuyō Shin'an Shinsa Kijun [Examination Guidelines for Patents and Utility Models], pt. III, ch. 1, art. 2.2, para. 1 (Japan) (devoting an entire section to determining whether software and computer-implemented inventions are patentable).

271. *See supra* note 258 (introducing EPO patentability requirements briefly).

272. *See* Case T-258/03, *In re* Hitachi, Ltd., ECLI:EP:BA:2004:T025803 .20040421, ¶ 3.1 (Apr. 21, 2004) ("The verification that claimed subject-matter is an invention within the meaning of Article 52(1) EPC is in principle a prerequisite for the examination with respect to novelty, inventive step and industrial application . . . .").

matter question is whether the claimed subject matter is a statutory "invention" at all.[273] If the claimed subject matter is inherently unpatentable, then it is not considered an "invention." Thus, other patentability doctrines cannot apply, as such requirements are "defined only for inventions."[274] By first requiring a court to find that the claimed subject matter is an "invention," the patentable subject matter inquiry is isolated as a discrete prerequisite to be met before addressing other requirements. As other patentability doctrines are only defined for "inventions," the considerations underlying those doctrines, such as construing the prior art, are also typically outside a court's patentable subject matter construction.[275]

B. APPLYING INTERNATIONAL PATENT ELIGIBILITY TRENDS TO THE DOMESTIC PATENTABLE SUBJECT MATTER DOCTRINE

The *Alice*/*Mayo* framework continues to garner criticism from both domestic commentators and foreign intellectual property associations alike. Some national associations representing attorneys and inventors from IP5 members expressed their dissatisfaction with the domestic patentable subject matter jurisprudence by providing input to the USPTO's aforementioned patent eligibility jurisprudence study.[276] Keeping in mind general global trends in subject matter eligibility, there are many important differences between how other IP5 jurisdictions handle eligibility considerations compared to the United States. The

273. *Id.*; *see also* Tokkyō Jitsuyō Shin'an Shinsa Kijun [Examination Guidelines for Patents and Utility Models], pt. III, ch. 1, art. 2(Japan) (stating that if a claimed invention falls under one of the statutorily enumerated categories of ineligible subject matter, then it is "not considered as a statutory 'invention'").

274. Case T-258/03, *In re* Hitachi, Ltd., ECLI:EP:BA:2004:T025803 .20040421, ¶ 3.1 (Apr. 21, 2004).

275. The EPO in *Hitachi* stated that "it should be possible to determine whether subject-matter is excluded under Article 52(2) [European Patent Convention] without any knowledge of the state of the art (*including common general knowledge*)." *Id.* (emphasis added). Thus, the claimed subject matter must be eligible on its face without regard to ulterior sources.

276. *See, e.g.*, Japan Pat. Att'ys Ass'n, Comment Letter on Patent Eligibility Jurisprudence Study 3–4 (Sept. 7, 2021), https://www.regulations.gov/comment/PTO-P-2021-0032-0050 [https://perma.cc/VCS6-QPHC] ("[T]he approach adopted in Japan enables more consistent determinations on patent eligibility than the approach adopted in the United States . . . . [W]e hope that the United States will coordinate (harmonize) its patent system with those of other countries more actively.").

remainder of this Section presents a comparative analysis of foreign patent systems in relation to both current and proposed domestic policies to show that, while the United States currently finds itself out of harmony with other major patent systems, proposals such as PERA better synchronize domestic and foreign practices.

1. The Current Domestic Jurisprudence Fails to Clarify Subject Matter Eligibility

The largest difference, and perhaps the most important, is that § 101 of the United States' Patent Act says virtually nothing about subject matter eligibility considerations.[277] In contrast, most other IP5 members not only more expansively define what constitutes an "invention" up front,[278] but also provide exhaustive lists of unpatentable subject matter.[279] Further, other IP5 jurisdictions more specifically address software in their patent statutes, showing such jurisdictions have better prioritized supporting computer-implemented inventions.[280] Finally, by directing the eligibility issue to whether the claimed subject matter is a statutory "invention," and by making such a finding a necessary prerequisite for considering other patentability requirements, foreign jurisdictions expressly distinguish subject matter eligibility questions from other patentability requirements.[281]

These differences are due in large part to how the United States develops subject matter eligibility restrictions through common law rather than by statute. While there may be some advantages to a common law approach, such as allowing courts to adapt eligibility restrictions to changing problems more

277. *See supra* Part I.A (dissecting the sparse language of § 101 and the philosophical origins of the statute).

278. *See supra* note 241 (providing foreign statutory definitions for "invention"); *see also supra* notes 272–75 and accompanying text (discussing the importance of being a statutory "invention" in other countries).

279. *See supra* note 237 (citing provisions of various IP5 members' patent statutes which specifically delineate categories of patent-ineligible subject matter).

280. *See supra* note 241 (citing provisions that discuss software and computer-implemented inventions specifically).

281. *See supra* notes 272–75 and accompanying text (discussing the importance of being a statutory "invention" in other countries).

readily than a legislature could,[282] such an approach does not support the predictability that patent systems require. The *Alice*/*Mayo* framework represents the epitome of common law developments making the patent system less predictable. A system based on rewarding inventors for the time and expenses invested must be certain if the system is to have any merit at all. The modern patent statute does little to guide inventors and attorneys alike as to how the USPTO or a court will apply the patentable subject matter doctrine, and nowhere are software or computer-implemented inventions specifically mentioned.[283]

One way that foreign jurisdictions have addressed software inherently being an "abstract idea" is by making software patents ineligible "as such."[284] By looking for a discrete application of software rather than allowing software to be patented in a vacuum, preemptive "abstract ideas" remain unpatentable without conflicting with the patentability of software or other computer-implemented inventions. Though § 101, or any other portion of the Patent Act, contains no similar express principle, such an approach would be comparable to Supreme Court precedent which has become unfavorable following *Alice*/*Mayo*. The machine-or-transformation test, for example, though not perfect, got at the same idea that an abstract idea must be embodied within a specific machine or apparatus.[285] Further, both the handling of software "as such" and the original policy rationales underlying the machine-or-transformation test aim to avert the preemptive effect of abstract ideas on future innovation.[286]

Portions of the *Alice*/*Mayo* framework also borrow doctrinally from this idea. At step two, a court searches for an "inventive concept" sufficient to transform an otherwise ineligible

282. *See* Nguyen, *supra* note 77, at 1662 ("A judicial refinement of the patent-eligibility test also acknowledges that because the inventions and technology that patents cover are ever evolving, judicial interpretations of the patent statute must be as well.").

283. *See generally* 35 U.S.C. § 101 (containing no specific mention of ineligible categories or computer-implemented inventions).

284. *See, e.g.*, *supra* note 240 (showing software is ineligible "as such" in many foreign jurisdictions).

285. *See supra* notes 61–62 and accompanying text (setting forth the machine-or-transformation test).

286. *See* discussion *supra* note 161 (discussing the Supreme Court's focus on preemption when first creating, and later rejecting, the machine-or-transformation test).

abstract idea into a patent-eligible application.[287] While the *Alice*/*Mayo* framework conflates patentability requirements in a way other countries do not, part of the search for an "inventive concept" entails looking for discrete applications of an abstract idea.[288] One potential difference regarding current domestic requirements is that the mere implementation of an abstract idea on a computer is insufficient to confer eligibility under the *Alice*/*Mayo* framework.[289] Other countries might more readily deem such subject matter eligible, subject to other patentability requirements,[290] as even the mere implementation of software on a computer would not be the patenting of software "as such."[291]

A final significant way the domestic patent system differs from other IP5 members is how the Patent Act handles the term "invention." Under domestic law, "invention" has little to no statutory meaning as an independent term.[292] By contrast, in major foreign jurisdictions such as Japan and Europe, the requirement that the claimed subject matter constitute an "invention" is a

287. *See* Alice Corp. Pty. Ltd. v. CLS Bank Int'l, 573 U.S. 208, 221 (2014) (describing step two of the *Alice*/*Mayo* framework).

288. *Id.*

289. *Id.* (explaining that "[s]tating an abstract idea while adding the words 'apply it with a computer'" would be insufficient for patentable subject matter concerns).

290. Again, in foreign jurisdictions, just because a patent recites eligible subject matter does not mean that the patent itself would (or should) be granted. *See, e.g.*, *supra* note 258 (describing core patentability requirements in Europe, with subject matter eligibility being a gateway requirement). The subject matter eligibility issue is merely handled as a threshold requirement before analyzing more substantive bars to patentability that consider outside evidence and construe the prior art. *Id.* The important point being that subject matter eligibility does not inherently equate to patent issuance.

291. *See* European Patent Convention, *supra* note 237, art. 52(3) (explaining categories of ineligible subject matter shall only exclude a patent if "the European patent relates to such subject-matter or activities as such"); Tokkyō Jitsuyō Shin'an Shinsa Kijun [Examination Guidelines for Patents and Utility Models], pt. III, ch. 1, art. 2.2, para. 1 (Japan) (explaining even the mere implementation of software on a computer is patentable if certain requirements are met); *Can Computer Software Be Patented in China?*, *supra* note 240 (explaining computers embodying software may be patentable if they bring about technical results, constitute a complete technical solution, and satisfy other patentability requirements, such as improving upon the prior art).

292. Notably, the United States Patent Act defines the term "invention" as "invention or discovery." 35 U.S.C. § 100(a). The Patent Act gives no further definition, nor does it define "discovery."

necessary prerequisite before proceeding to other patentability questions.[293] Thus, by embedding the patentable subject matter question into a preliminary finding of "invention," such jurisdictions qualify eligibility restrictions apart from other patentability requirements with more precision than is done domestically. While § 101 may likewise be considered a threshold requirement in the United States, evidenced by its common assertion in motions to dismiss, § 101 amalgamates patentability restrictions such that the underlying bases for ineligibility determinations are unclear.[294] By contrast, other jurisdictions treat subject matter eligibility as a gateway function, only moving to other patentability questions should that initial threshold be met.[295] In this manner, it is clear in foreign jurisdictions that subject matter prohibited on eligibility grounds are barred because such subject matter is not, and never will be, considered an "invention" under the relevant statute.

2. The Patent Eligibility Restoration Act and Other Domestic Proposals Better Align with Global Standards

In comparison to the modern patentable subject matter jurisprudence, PERA, as well as other legislative proposals discussed previously,[296] more readily harmonizes with global trends. It does so by enumerating categories of ineligible subject matter, more specifically addressing software and computer-implemented inventions, and distinctly separating questions of subject matter eligibility from other patentability requirements.[297] As discussed above, these are all characteristics of strong foreign patent systems, and are all things that the current domestic jurisprudence lacks.

Portions of PERA are very similar to other IP5 members' patent statutes. Like those jurisdictions, PERA only limits the patentability of categorically excluded subject matter if the

293. *See supra* notes 272–75 and accompanying text (discussing the importance of being a statutory "invention" in other jurisdictions).

294. *See supra* Part II.A.2 (explaining how § 101 incorrectly conflates issues of subject matter eligibility with other patentability requirements).

295. *See supra* notes 272–75 and accompanying text (discussing how other patentability issues, such as novelty or nonobviousness, may only be considered after a finding of "invention" is made).

296. *See supra* Part II.A (discussing legislative proposals to alter the patentable subject matter jurisprudence).

297. *See supra* Part II.A.1–2 (discussing PERA specifically).

patent attempts to claim ineligible subject matter "as such."[298] PERA further provides specific provisions which encapsulate technological software and computer-implemented inventions under the "as such" bar.[299] Thus it would seem all manner of software processes are technically per se excluded by PERA, just as in many foreign jurisdictions,[300] but discrete applications of such processes are still patentable. The ABA Proposal operates similarly by considering claims "as a whole" to determine whether the claimed subject matter is a practical application of an otherwise ineligible category.[301] In this regard, PERA and the ABA Proposal better align the United States with global trends by statutorily defining ineligible subject matter apart from other patentability requirements, and by merely treating software unpatentable "as such." Explicitly considering emerging technologies would better enable the domestic patent system to face modern challenges.

Further, like other IP5 jurisdictions, PERA expressly contemplates patenting non-technological processes[302] in some circumstances "if the process cannot practically be performed without the use of a machine or manufacture."[303] In this manner, PERA seems to handle computer-implemented business methods similarly to foreign jurisdictions, wherein such processes are only patentable if they meet the jurisdictions' technicality requirements.[304] The requirement that the non-technological process be only practically performable on a machine or

298. *See* Patent Eligibility Restoration Act of 2023, S. 2140, 118th Cong. § 101(b)(1) (2023).

299. *See id.* § 101(b)(1)(A), (b)(1)(C)(i) (excluding mathematical formulas and mental processes from patentability).

300. *See supra* note 240 (showing that software is ineligible "as such" in many foreign jurisdictions).

301. *See* ABA Proposal, *supra* note 196 ("Patent eligibility under this section shall not be negated when a practical application of a law of nature, natural phenomenon, or abstract idea is the subject matter of the claims upon consideration of those claims as a whole . . . .").

302. Note that IP5 jurisdictions do not refer to such processes as "non-technological" because such jurisdictions have express technicality requirements. *See* discussion *supra* Part III.A.2 (discussing technicality requirements); *see also* discussion *supra* note 150 and accompanying text (discussing "non-technological" processes).

303. Patent Eligibility Restoration Act § 101(b)(1)(B)(ii).

304. *See* discussion *supra* Part III.A.2 (discussing the relationship between jurisdictional technicality requirements and business methods).

manufacture directly parallels such requirements as it constrains the preemptive effect of computer-implemented business method patents which could otherwise be performed in one's mind. Such language prevents a prospective patentee from merely stating "apply it with a computer"—a technique which the Supreme Court has made clear should not confer patent rights, particularly when non-technological business methods are at issue.[305] This approach expressly aligns with current EPO practices, under which certain "normal" physical interactions, such as technical features which always apply when the instructions of a program are executed on a computer, are excluded from the patentable subject matter analysis.[306]

Finally, PERA, the AIPLA-IPO Proposal, and the ABA Proposal all more concretely clarify § 101 subject matter eligibility as a distinct patentability requirement. While it is a missed opportunity that none of the proposals fully utilize the "invention" distinction used in jurisdictions such as Japan and Europe,[307] each proposal is rather explicit in stating other patentability doctrines outside § 101 should not be considered.[308] In accordance with global trends, such a change would revert § 101 into being a threshold inquiry analyzed separately before other patentability requirements are considered. By distinctly separating patentability requirements, domestic proposals are structured more similarly to other IP5 members' patent systems.

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305. Alice Corp. Pty. Ltd. v. CLS Bank Int'l, 573 U.S. 208, 209 (2014) (explaining that "[s]tating an abstract idea while adding the words 'apply it with a computer'" would be insufficient for patentable subject matter concerns).

306. *See* ENGLAND, *supra* note 257 ("However, [EPO cases] exclude[] certain 'normal' physical interactions from consideration. These are those technical features that commonly apply when the instructions of software are executed on a computer . . . .").

307. *See supra* notes 272–75 and accompanying text (discussing the importance of the term "invention" in determining subject matter eligibility in Europe and Japan). The "invention" distinction is conceptually preferable because it distinguishes eligible and ineligible subject matter. Some subject matter is excluded from patentability because it does not, nor ever will, give rise to a statutory "invention." Additionally, this distinction further emphasizes § 101 as a threshold question apart from other patent requirements.

308. *See* explanatory parentheticals *supra* note 207.

C. RECALIBRATING THE DOMESTIC JURISPRUDENCE THROUGH LESSONS LEARNED FROM DOMESTIC LEGISLATIVE PROPOSALS AND GLOBAL TRENDS

The United States has a patentable subject matter issue. Rather than base eligibility determinations along predictable lines, the United States instead utilizes ever-changing common law requirements that blur patentability requirements rather than clearly define them. Legislative proposals and global trends offer tremendous insight into how to better support American innovation. First, Congress should statutorily define categories of patent-ineligible subject matter such that judicial discretion is limited to not extend beyond explicit bounds. Second, due to software's importance and prevalence in today's economy,[309] the Patent Act should specifically consider software and computer-implemented inventions. Finally, the Patent Act should clarify that patentable subject matter determinations are a distinct requirement apart from, and without consideration of, other patentability requirements. Such changes would align the United States' patent system with global standards while simultaneously increasing predictability before the USPTO and federal courts.

First, the Patent Act should specifically enumerate categories of ineligible subject matter and limit a court's discretion to make eligibility determinations beyond those defined. Judicially created categories are amorphous, unworkable, and ultimately not essential considering the remainder of the Patent Act.[310] By moving away from common law development in this area, the standards for eligibility will be clearer and more easily applied.[311] Such a change also aligns with other IP5 members, who

309. *See supra* notes 3–7 and accompanying text (discussing the importance of software and computer-implemented inventions in the modern economy).

310. *See The State of Patent Eligibility in America: Part I: Hearing Before the S. Subcomm. on Intell. Prop. of the S. Comm. on the Judiciary*, 116th Cong. (2019) (statement of Robert Armitage, Consultant, IP Strategy and Policy, McLean) ("Given that the patent statute has longstanding, fully effective, and statutorily explicit standards for *proportionality* and *inventiveness* . . . the Supreme Court's non-statutory, judicially imposed add-ons to the statute can hardly be thought of as essential for any policy reason.").

311. *See* Efthimios Parasidis, *A Uniform Framework for Patent Eligibility*, 85 TUL. L. REV. 323, 404–05 (2010) ("To the extent current patent doctrine produces unintended or ill-suited consequences, Congress can amend the patent statute so as to further the public policy goals underlying the constitutional mandate.").

explicitly enumerate ineligible subject matter categories.[312] Additionally, by limiting court discretion to the mere application of the statute to the invention at hand, a prospective inventor can more easily discern whether their invention would be patentable.

Second, the Patent Act should specifically address software and computer-implemented inventions. One approach, as used by other IP5 members and proposed by PERA, is to eliminate patentability for software "as such," but to allow patents on discrete applications of software.[313] PERA further divided this analysis depending on the type of process sought to be patented, as non-technological processes remain patent-eligible if they are solely capable of being performed through the use of a machine or manufacture, and a judge's evaluation of other processes is constrained by statutory considerations.[314] As it stands, software is often patented as a "process" under § 101. Specifically defining what types of software inventions are patentable, as Japan has done,[315] would promote consistency, simplify the application process, and incentivize inventors in computer-related fields to publish their inventions through the USPTO rather than hold onto them as proprietary trade secrets.[316] Defining software subject matter eligibility would also limit a court's ability to hold such patents invalid on patentable subject matter grounds, further promoting predictability, consistency, and uniformity.

Finally, the Patent Act should make it abundantly clear that the patentable subject matter analysis, along with its many considerations, is a doctrine distinct from other patentability

312. *See supra* notes 237–39 (discussing subject matter which is categorically barred in foreign jurisdictions).

313. *See supra* note 240 (showing that software is ineligible matter "as such" in many foreign jurisdictions).

314. Patent Eligibility Restoration Act of 2023, S. 2140, 118th Cong. § 101(b)(1)(A), (b)(1)(B)(ii), (b)(1)(C)(i) (2023) (defining categories of subject matter which are ineligible "as such," as well as a statutory exception for non-technological processes).

315. *See supra* note 263 (applying Japan's technicality requirement to software inventions).

316. *Patent Eligibility Hearings Part III*, *supra* note 222 (statement of Nicolas Dupont, CEO and Executive Chairman, Cyborg Inc.) ("Enumerating software as a statutory category would not only simplify the patent application process and strengthen relevant intellectual property protections, but also signal to the world that the United States will defend the rights of its technology inventors, both to domestic and foreign threats.").

requirements. One major complaint with the current *Alice*/*Mayo* framework is that it wrongfully conflates subject matter eligibility issues with requirements embodied by other portions of the Patent Act, leading to inconsistent applications of § 101.[317] A PERA approach would correct this by limiting a court's discretion to make considerations outside of § 101.[318] Alternatively, the Patent Act could follow Japan or Europe's approach, wherein the subject matter eligibility determination goes to whether the claimed subject matter constitutes a statutory "invention" at all, and a court only applies other patentability doctrines upon a finding that the claimed subject matter is, in fact, an invention.[319] Either outcome would increase predictability as an inventor will know which metrics their patent will be evaluated by. While this may cause fewer infringement cases to be dismissed early in litigation, § 101 eligibility should not draw from other portions of the Patent Act for the sake of judicial efficiency.

CONCLUSION

Software innovation is paramount to the development of modern society and will only continue to grow in importance as emerging technologies such as quantum computing, artificial intelligence, and automation become increasingly prevalent. The United States' patent system currently stands to hinder the innovation of software and computer-implemented inventions more than it stands to help it, as the common law development of the patentable subject matter doctrine has enshrouded the patent system in a cloud of unpredictability. To right the course, and better align the United States with global trends, Congress should take action to modify § 101. Specifically, Congress should amend the Patent Act to explicitly define categories of ineligible subject matter, provide specific clauses directed to the

317. *See* Am. Bar Ass'n Section of Intell. Prop. L., *supra* note 26, at 3 ("[T]he gateway function of patent eligibility has been transformed into a patentability test better left to the other statutory provisions that specifically address patentability, like sections 102, 103, and 112 of the patent statute.").

318. Patent Eligibility Restoration Act § 101(c)(1)(B)(iv) (stating eligibility determinations must be made without regard to any consideration in §§ 102, 103, or 112).

319. *See supra* notes 272–75 and accompanying text (clarifying subject matter eligibility as a distinct requirement in Japan and Europe by first requiring a court to determine if the patent claim at issue is a statutory "invention" before proceeding to other patentability requirements).

patentability of software and computer-implemented inventions, and statutorily prevent courts from making eligibility determinations based on patentability requirements outside of the four corners of § 101 itself. The Patent Eligibility Restoration Act accomplishes many of these goals and has already been introduced in the Senate.[320] These changes would promote a more consistent approach and ensure that the United States retains its powerful position at the center of the global technology market.

320. *See S. 2140 – Patent Eligibility Restoration Act of 2023*, CONGRESS.GOV, https://www.congress.gov/bill/118th-congress/senate-bill/2140 [https://perma.cc/SEK2-RVUQ] (tracking the legislative history of PERA).