

Questions for the Record for Professor Adam Mossoff
Senate Committee on the Judiciary
Subcommittee on Intellectual Property
Hearing on “The State of Patent Eligibility in America: Part I”
June 4, 2019

QUESTIONS FROM SENATOR BLUMENTHAL

1. Striking the appropriate balance between encouraging innovation and protecting consumers is a key goal of our patent system.
 - a. **What impact will broadening the subject matter that can be patented have on industry?**

As a professor, I cannot speak to the impact that reforming patent eligibility doctrine will have on a specific company, but I can discuss the studies that have shown a positive economic impact on economic growth from reliable and effective property rights.

Reliable and effective patent rights are a key factor in economic growth, when combined with stable political and legal institutions and a legal system governed by the rule of law. The United States was the first country to secure patents as property rights within stable political and legal institutions governed by the rule of law.¹ As a result, economists have found that the U.S. patent system was an essential factor in the growth of the U.S. innovation economy for the past two centuries.² It is just as important today as it was historically. For example, a startup today with a patent more than doubles its chances of securing venture capital financing and significantly increases its chances of ultimately succeeding in the marketplace compared to a startup without a patent.³

Professor Stephen Haber of Stanford University has reviewed the economic and historical evidence and finds the substantial weight of evidence supporting a finding of a “causal

¹ See Adam Mossoff, *Institutional Design Choice in Patent Systems: Private Property Rights or Regulatory Entitlements*, SO. CALIF. L. REV. (forthcoming 2019); Adam Mossoff, *Who Cares What Thomas Jefferson Thought About Patents? Reevaluating the Patent “Privilege” in Historical Context*, 92 CORNELL L. REV. 953 (2007).

² See, e.g., B. ZORINA KHAN, *THE DEMOCRATIZATION OF INVENTION: PATENTS AND COPYRIGHTS IN AMERICAN ECONOMIC DEVELOPMENT, 1790–1920*, at 9-10 (2005) (“The analysis [in this book] emphasizes the role that patents and copyrights [in the U.S.] played in the securitization of ideas through the creation of tradeable assets: intellectual property rights facilitated market exchange, a process that assigned value, helped to mobilize capital, and improved the allocation of resources. . . . Extensive markets in patent rights allowed inventors to extract returns from their activities through licensing and assigning or selling their rights.”); Naomi R. Lamoreaux, et al., *Patent Alchemy: The Market for Technology in US History*, 87 BUS. HIST. REV. 3, 4–5 (2013) (identifying the increase in venture capital investment, the rise of a secondary market in the sale of patents as assets, and the embrace of specialization via licensing business models as indicators of significant, value-maximizing economic activity promoted by patents).

³ See Joan Farre-Mensa, et al., *What Is a Patent Worth? Evidence from the U.S. Patent “Lottery”* 26–27 (USPTO Econ. Working Paper No. 2015-5, 2018), <https://ssrn.com/abstract=2704028>.

relationship between strong patents and innovation.”⁴ In fact, his study finds that “there are no wealthy countries with weak patent rights, and there are no poor countries with strong patent rights.”⁵

The U.S. has long been regarded as the world leader in securing property rights in technological innovation, granting patents for next-generation inventions and discoveries when the rest of the world hesitated. Professor Zorina Kahn, a leading economic historian, concludes that the U.S. patent system has been successful precisely because it consistently secured legal protection for the fruits of inventors’ labors.⁶ This truth is confirmed by the spread of patent laws across the world throughout the nineteenth and early twentieth centuries that were explicitly modeled on the U.S. system.⁷ This pattern of U.S. leadership in securing patents in the next wave of innovation gave birth to the biotechnology, high-tech, and mobile revolutions of the past fifty years.⁸

With this important background context in mind, the economic impact of returning patent eligibility doctrine back to its historical role in the U.S. patent system—a mere threshold inquiry or coarse filter before the more searching and stringent patentability requirements of utility, novelty, nonobviousness, and full and enabling disclosure—will be positive. The promise of reliable and effective patent rights in the fruits of their inventive labors will reestablish incentives for innovators, startups, and successful companies to make long-term R&D investments. The result will be the same technological and commercial growth that has been the hallmark of the U.S. innovation economy since the early nineteenth century.

The Supreme Court’s recently created patent eligibility doctrine—the *Alice-Mayo* framework—has created massive uncertainty for innovators and severely restricted the patent eligibility of high-tech and biopharmaceutical innovations. It has had a negative impact on both inventors and the companies working in the innovation industries that invest millions of dollars in creating the new products and services that drive economic growth, job creation and higher standards of living. Thus, it is undermining the

⁴ Stephen Haber, *Patents and the Wealth of Nations*, 23 GEO. MASON L. REV. 811, 811 (2016).

⁵ *Id.* at 815.

⁶ B. Zorina Kahn, *Trolls and Other Patent Inventions: Economic History and the Patent Controversy in the Twenty-First Century*, 21 GEO. MASON L. REV. 825, 855 (2014) (discussing the development of IP institutions in the United States and describing how “[i]ntellectual property institutions were successful in the United States largely because they ensured open access to creative individuals, decentralized decision making and extensive markets for technology, and strong legal enforcement of such rights.”); see also Adam Mossoff, *A Brief History of Software Patents (and Why They’re Valid)*, 56 ARIZ. L. REV. SYLLABUS 62, 79 (2014) (“The American patent system has succeeded because it has secured property rights in the new innovation that has come about with each new era—and it has secured the same property rights for all types of new inventions, whether in the Industrial Revolution or in the Digital Revolution.”).

⁷ See Kahn, *supra* note 6, at 855 (discussing how intellectual property rights played a prominent role in the nineteenth century in the U.S. overtaking other nations as a leader in industry and technology and led to “many countries voluntarily adopting the distinctive U.S. rules and standards”).

⁸ See generally Kevin Madigan & Adam Mossoff, *Turning Gold to Lead: How Patent Eligibility Doctrine is Undermining U.S. Leadership in Innovation*, 24 GEO. MASON L. REV. 939 (2017).

longstanding comparative advantage the U.S. has historically had in the world in securing reliable and effective patent rights for all innovators.

The negative economic impact of the *Alice-Mayo* framework is even more concerning given a global economy today in which R&D investments and venture capital financing that are the lifeblood of innovation can move easily from one country to another in search of more reliable legal security in the fruits of inventive labors. Historically, it was the U.S. that became the home to innovators and R&D financing. Even with periodic upheavals in U.S. patent policy over the past two centuries, the U.S. often forged ahead when other countries hesitated in securing patents in cutting-edge discoveries and inventions, such as in biotechnology and computer software.⁹ China and European countries are now the ones forging ahead and securing reliable and effective patents in innovation that the U.S. no longer protects due to the closing of its patent system under the *Alice-Mayo* framework.¹⁰

b. What impact will broadening the subject matter that can be patented have on consumers?

The famous insight in economics that “there is no such thing as a free lunch” has only one exception: innovation.¹¹ Innovation drives economic growth by increasing the supply of new products and services made available to consumers in the marketplace, which reduces prices and increases overall social welfare. The result of innovation created through the incentives of the patent system has been an ever-increasing supply of new products and services at lower prices for consumers.

In the healthcare market, this has meant an ever-increasing supply of cutting-edge medical treatments and increasing availability of older medical treatments that are now “off patent.” For example, 95% of the essential medicines identified by the World Health Organization are all now in the public domain; thus, without health-and-safety

⁹ See Madigan & Mossoff, *supra* note 8, at 942-946 (detailing this historical approach in biotech and software).

¹⁰ See *id.* See also Elizabeth Chien-Hale, *A New Era for Software Patents in China*, LAW360 (May 25, 2017), <https://www.law360.com/articles/924934/a-new-era-for-software-patents-in-china> (“China’s opening up [of its patent system to new high-tech innovation] contrasts with the United States’ move to cut back on business method patents and software patents.”); Preetika Rana, *Your Cancer Drugs May Soon Be Discovered in China*, WALL STREET JOURNAL (Apr. 11, 2017), <https://www.wsj.com/articles/china-emerges-as-powerhouse-for-biotech-drugs-1491816607> (reporting on R&D investment shifting to China given the inability of U.S. companies to obtain patents for their biotech drugs); Jack Ellis, *China Relaxes Rules on Software Patentability – and the United States Loses More Ground*, IAM (Mar. 3, 2017), <https://www.iam-media.com/law-policy/china-relaxes-rules-software-patentability-and-united-states-loses-more-ground>. (“China’s apparent embrace of software patents stands in stark contrast to the situation in the United States, which many would see as the traditional home of the software industry.”).

¹¹ See Mark F. Schultz, *Innovation: History’s Great Free Lunch*, WIPO MAGAZINE (June 2017), https://www.wipo.int/wipo_magazine/en/2017/03/article_0003.html.

regulations or other political or legal barriers, these drugs are available for production by any company wishing to sell them in the healthcare market in any country in the world.¹²

In the high-tech market, this has meant an explosion in new products and services at a rate never before seen before, as exemplified in the mobile revolution of the past two decades. As thirteen economists, law professors, and former government officials observed in a letter submitted to Assistant Attorney General Makan Delrahim: “Several empirical studies demonstrate that the observed pattern in high-tech industries, especially in the smartphone industry, is one of constant lower quality-adjusted prices, increased entry and competition, and higher performance standards.”¹³ This has occurred in one of the most patent-intensive sectors of the economy.¹⁴

All of this economic and historical evidence creates a strong presumption that reforming patent eligibility doctrine by returning it back to its longstanding, historical statutory definition and function within the U.S. patent system would benefit consumers. They will be the beneficiaries of even more products and services, increased jobs, economic growth, and the consistent rising standard of living that Americans have enjoyed for over two hundred years.

c. Could the proposed reforms increase consumer prices? If so, in what industries or on what products?

My answers to the prior two questions establish that the answer to this question is no. This is the case for several reasons. First, the proposed reform of § 101 merely restores the statutory patent eligibility doctrine back to its historical role as “only a threshold test,” as recognized by the Supreme Court in *Bilski v. Kappos* just two years before it created the *Alice-Mayo* framework.¹⁵ The proposed reforms also eliminate the uncertainty that has come to infect patent eligibility doctrine with subjective, discretionary judicial decision-making within the judicially-created exceptions to § 101. The reforms will restore the promise of reliable and effective patent rights in the fruits of inventive labors and thereby revitalize growth in the innovation economy.

Recognizing that the reform of § 101 merely returns patent eligibility doctrine back to its longstanding historical doctrinal content and function is important because prices have not risen historically in the U.S. innovation economy as a result of patents or the role of

¹² See Steve Brachmann & Gene Quinn, *95 percent of WHO’s essential medicines are off-patent*, IPWATCHDOG (Sep. 12, 2016), <https://www.ipwatchdog.com/2016/09/12/essential-medicines-off-patent/id=72542/>.

¹³ Letter to Assistant Attorney Gen. Makan Delrahim (Feb. 13, 2018), on file at <https://cpip.gmu.edu/wp-content/uploads/sites/31/2018/02/Letter-to-DOJ-Supporting-Evidence-Based-Approach-to-Antitrust-Enforcement-of-IP.pdf>.

¹⁴ See Alexander Galetovic, Stephen Haber, & Lew Zaretzki, *An Estimate of the Average Cumulative Royalty Yield in the World Mobile Phone Industry: Theory, Measurement and Results*, 42 TELECOMM. POL’Y 263 (2018), <https://www.sciencedirect.com/science/article/pii/S0308596117302240>; Alexander Galetovic, Stephen Haber, & Ross Levine, *An Empirical Examination of Patent Hold Up*, 11 J. COMP. L. & ECON. 549 (2015), <https://academic.oup.com/jcle/article/11/3/549/800066>.

¹⁵ *Bilski v. Kappos*, 561 U.S. 593, 602 (2010).

patent eligibility doctrine as “only a threshold test.”¹⁶ In fact, the exact opposite has occurred: prices have dramatically dropped over the decades as new products and services increase economic efficiencies, maximize production, and create a virtuous cycle in which yesterday’s luxury goods become tomorrow’s staple commodities, such as automobiles, airplanes, phones, computers, MRI scans, diagnostic treatments, etc. Americans have higher standards of living and pay quality-controlled lower prices for more goods and services than ever before in history. All of this was made possible by the U.S. patent system, which has made possible a promise of reliable and effective property rights in the fruits of inventive labors. It is for this reason that James Madison recognized that the “public good” produced by patents and copyrights “coincides ... with the claims of individuals.”¹⁷

Second, and related to the first point, no empirical or economic study has proven that innovation has increased or prices have reduced as a result of the *Alice-Mayo* framework. There have been assertions that this has occurred by some commentators and policy organizations, but these have been merely conclusory assertions without any support from economic or statistical studies. Thus, it is not possible to prove the negative that prices will not increase if the *Alice-Mayo* framework is abrogated. With that said, the overwhelming weight of economic and historical evidence confirms the inference that prices will not rise: prior to the Supreme Court’s creation of the *Alice-Mayo* framework, consumer prices did not rise as a result of the innovations incentivized and secured by the U.S. patent system in which patent eligibility doctrine was “only a threshold test.”¹⁸

¹⁶ *Bilski v. Kappos*, 561 U.S. 593, 602 (2010).

¹⁷ THE FEDERALIST No. 43 (James Madison).

¹⁸ *Bilski v. Kappos*, 561 U.S. 593, 602 (2010).

**Questions for the Record for Adam Mossoff
From Senator Mazie K. Hirono**

- 1. Last year, Judge Alan Lourie and Judge Pauline Newman of the Federal Circuit issued a concurring opinion to the court’s denial of *en banc* rehearing in *Berkheimer v. HP Inc.*, in which they stated that “the law needs clarification by higher authority, perhaps by Congress, to work its way out of what so many in the innovation field consider are § 101 problems.”**

Do you agree with Judges Lourie and Newman? Does § 101 require a Congressional fix or should we let the courts continue to work things out?

I agree with Judges Lourie and Newman, as the Supreme Court has refused to reconsider the *Alice-Mayo* framework. It has also refused to consider imposing some procedural or substantive limits on the discretionary decision-making by lower courts. This has continued to infect the patent system with tremendous uncertainty about what is or is not a patent-eligible invention or discovery. The data on the rates of invalidation of patents by courts and of rejection of patent applications by the USPTO is also striking.

Courts continue to rely on § 101 in applying the *Alice-Mayo* framework in many more decisions than historically, and the invalidation rates under § 101 are also inordinately high compared to historical practices. Between July 2014 and June 2018, courts issued 692 decisions in which judges applied the *Alice-Mayo* framework to assess the validity of a patent.¹ The overall invalidation rate was 65.8%. The Federal Circuit’s invalidation rate was 87.5%. At the Patent Trial & Appeal Board (PTAB), the invalidation rate under the *Alice-Mayo* framework for business method patents is even higher—an astounding 97.9% of patents invalidated in final decisions.

The high rates of invalidation combined with the ongoing arbitrariness of the judicial decisions, as detailed at length by stakeholders in the innovation economy, has sown uncertainty for innovators, especially in the high-tech and biopharmaceutical sectors of the U.S. innovation economy. This is significant, because this means that the U.S. is no longer fostering the inventions that drive its innovation economy in the twenty-first century. Even more important, it is ceding ground to innovation to countries like China.²

The solution is for Congress to amend the patent statutes that it is authorized under the Constitution to enact in creating the U.S. patent system.³ It is not unusual for Congress to do this, as it has had to abrogate Supreme Court decisions and correct doctrinal requirements in

¹ Data from Robert R. Sachs. For questions, Mr. Sachs may be reached at rsachs@patentevaluations.com.

² See Kevin Madigan & Adam Mossoff, *Turning Gold to Lead: How Patent Eligibility Doctrine is Undermining U.S. Leadership in Innovation*, 24 GEO. MASON L. REV. 939 (2017).

³ See U.S. Const. art. I, § 8, cl. 8 (“The Congress shall have Power To . . . 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.”).

the patent statutes many times in the past two hundred years.⁴ Congress' enactment of § 103 in the 1952 Patent Act is a model for Congress to reform § 101 today.⁵ Section 103 was enacted in response to the exact same problems in nonobviousness doctrine that innovators face today under patent eligibility doctrine: a 1941 Supreme Court decision created a highly restrictive test for nonobviousness resulting in extensive invalidation of patents. In 1949, Justice Robert Jackson observed that in its zeal to address a concern about improperly granted patents, the Court had gone too far such "that the only patent that is valid is one which this Court has not been able to get its hands on."⁶

As with the enactment of § 103 in 1952, Congress should reform § 101 today. Courts have proven unable or unwilling to cabin in the arbitrary decision-making that is resulting in the invalidation of patents on cutting-edge innovations at historically unprecedented rates. Thus, Congress should abrogate the *Alice-Mayo* framework and reestablish patent eligibility doctrine as "only a threshold test" among the several statutory patentability requirements.⁷ Section 101 is not meant to be applied in an overly restrictive manner in invalidating all types of innovation long secured by the U.S. patent system, as is happening today under the *Alice-Mayo* framework. Congress should exercise its authority delegated to it under the Constitution to create the patent system by reforming its patent statutes to ensure proper judicial interpretation and application of these laws. The proposed draft legislative language from Senators Tillis and Coons achieves this goal.

2. **The Federal Circuit rejected a "technological arts test" in its *en banc* *Bilski* opinion. It explained that "the terms 'technological arts' and 'technology' are both ambiguous and ever-changing." The draft legislation includes the requirement that an invention be in a "field of technology."**
 - a. **Do you consider this a clear, understood term? If so, what does it mean for an invention to be in a "field of technology"?**

The term "field of technology" is not a term of art in patent law that has an established or well-understood meaning to lawyers or inventors. The concern is that this phrase would be construed by courts to limit patents only to technological products, such as computer chips or drugs, which would represent a fundamental change in how the U.S. patent system has secured all types of innovations since 1790. Based on a detailed study of the first patents issued to inventors in the U.S. between 1790 and 1836,⁸ it is clear that "early Americans did not think that the patent system secured only 'technology' in the narrowest sense of this term, i.e., machines or a particular physical transformation of material objects."⁹ In the first several decades of the U.S. patent system, Congress and judges decidedly broke with the English

⁴ See Adam Mossoff, *Statutes, Common-Law Rights, and the Mistaken Classification of Patents as Public Rights*, 104 IOWA L. REV. (2019) (forthcoming), available at <https://ssrn.com/abstract=3289338>, at 24 (identifying past examples of Congress abrogating judicially-created patent doctrines, including the prohibition on functional claiming, the prohibition on "new use" patents, and the "flash of creative genius" test).

⁵ See Patent Act of 1952, Pub. L. No. 82-593, § 103, 66 Stat. 792, 798.

⁶ *Jungersen v. Ostby & Barton Co.*, 335 U.S. 560, 572 (1949) (Jackson, J., dissenting).

⁷ *Bilski v. Kappos*, 561 U.S. 593, 602 (2010).

⁸ See Michael Risch, *America's First Patents*, 64 FLORIDA L. REV. 1279 (2012).

⁹ Adam Mossoff, *Why History Matters in the Patentable Subject Matter Debate*, 64 FLORIDA L. REV. F. 23, 25 (2012).

patent system in permitting the patenting of *processes* in the U.S., including issuing many patents on business methods.¹⁰ Thus, it would be unclear if adopting a new statutory phrase like “field of technology” meant Congress was changing this longstanding practice of securing processes that were not tied to any particular technological or mechanical object.

Since “field of technology” is a neologism in U.S. patent law, its adoption in § 101 would require judicial interpretation of the meaning of this new phrase. Given the absence of established precedent in either statutes or case law, this would be a continuing source of uncertainty for innovators. Thus, innovators would be placed in the same position as they currently exist under the unpredictable application of the *Alice-Mayo* framework.

Moreover, given the lack of statutory or judicial precedents to guide a court’s interpretation of “field of technology,” a judge today would feel largely unconstrained in interpreting this term. Thus, for instance, a judge would be legally justified in interpreting with an extremely narrow scope of application, such as applying only to technological or material products. As a result, the Supreme Court could use “field of technology” to achieve the exact same highly restricted patent-eligibility test for inventions and discoveries that it has created with the *Alice-Mayo* framework under the judicially-created exceptions to § 101.

This is not mere conjecture, as stakeholders in the innovation economy recently experienced this exact problem when the Supreme Court was required to interpret the new phrase “otherwise available to the public” that was added to § 102 by the America Invents Act of 2011 (AIA).¹¹ This phrase was newly adopted in patent law in 2011, and it created uncertainties for innovators as to its meaning and application in determining the novelty of an invention within the patent system. The Supreme Court was called upon to exercise its judicial function in construing this new phrase in *Helsinn Healthcare v. Teva Pharmaceuticals* in January 2019.¹² Many stakeholders in the innovation economy believe the *Helsinn* decision represents a significant restriction on their ability to invest in and develop new products and services for consumers in the marketplace.¹³ For example, Hans Sauer, Deputy General Counsel and Vice-President of IP for the Biotechnology Industry Organization, said that “the AIA would never have gathered enough stakeholder support to pass” if the Supreme Court’s interpretation of this new phrase in *Helsinn* was what “had been intended” when Congress enacted the AIA.¹⁴ (Mr. Sauer is a witness for the hearings held on § 101 reform as well.) If Congress adds the “field of technology” neologism to § 101, then it risks creating the same uncertainty and potential for judicial mischief created by similar neologisms that were inserted into § 102 by the AIA in 2011.

¹⁰ See Risch, *supra* note 8, at 1294-1297 & 1320-1324.

¹¹ Leahy-Smith America Invents Act, Pub. L. 112–129, § 102, 125 Stat. 284, 285-286 (2011).

¹² See *Helsinn Healthcare S.A. v. Teva Pharmaceuticals USA, Inc.*, 139 S. Ct. 628 (2019).

¹³ See Eileen McDermott, *Industry Insiders: Opinions Mixed in Aftermath of Supreme Court Holding in Helsinn*, IPWATCHDOG (Jan. 23, 2019) (quoting Hans Sauer, Deputy General Counsel and Vice-President

¹⁴ *Id.*

b. The European Union, China, and many other countries include some sort of “technology” requirement in their patent eligibility statutes. What can we learn from their experiences?

I am aware generally of the technological application test applied by the European Patent Office (EPO) in the context of patents on computer software programs, but I do not know the specific details sufficiently well enough to comment as a patent law specialist on how it might translate to the U.S. patent system. I defer to industry stakeholders with more direct experience in filing patent applications at the EPO and in litigating their patents in European courts to comment on their experiences with the application of this legal requirement to their inventions and discoveries.

c. Is a claim that describes a method for hedging against the financial risk of price fluctuations—like the one at issue in the *Bilski* case—in a “field of technology”? What if the claim requires performing the method on a computer?

This is an excellent question, as it highlights the ambiguity in the new phrase “field of technology” in the proposed language in reforming § 101. Both the business method for hedging financial risk and the computer program that implemented it that was challenged in *Bilski* was a “process” as this term has long been construed and applied in the patent system from the first patent statute enacted by Congress in 1790. As I explained in my prior answer to Question 1(a), one of the unique features of the U.S. patent system was the decision by Congress and courts to secure new, useful, and nonobvious *processes* in the patent system.¹⁵ This was essential to the successful role of the patent system in promoting explosive growth in the U.S. innovation economy for the past two centuries. Of course, the business method in *Bilski* was neither novel nor nonobvious, and thus it likely should not have been patented under the statutory patentability requirements of novelty (§ 102) and nonobviousness (§ 103).

According to longstanding patent eligibility doctrine in U.S. patent law in which this was only a course filter, it was improper for the courts to evaluate the patentability of the business method in *Bilski* in the way that it did under § 101. The exact same question of whether this business method is patent eligible would be presented again to the U.S. Patent & Trademark Office (USPTO) and to the courts if Congress adds the phrase “field of technology” to § 101 in modifying the specific statutory categories of patent-eligible inventions or discoveries. Thus, unfortunately, the USPTO and the courts would again be making the same improper inquiries in following their constitutional mandate to apply the statutory language adopted by Congress if “field of technology” is added to § 101.

d. What changes to the draft, if any, do you recommend to make the “field of technology” requirement more clear?

The phrase “field of technology” should be replaced with the term “art.” The term “art” is a much clearer and more determinate for at least two reasons. First, it comports with the constitutional delegation of power to Congress in the Patent & Copyright Clause to “promote the Progress in . . . the useful *Arts*.” Thus, this would explicitly delimit the patent statute

¹⁵ See *supra* notes 8-10, and accompanying text.

enacted by Congress to its express authorization in the 1787 Constitution to create a patent system.

Second, and related to the first point, the term “art” has longstanding use in U.S. patent law reaching back to the first Patent Act of 1790, which originally used the term in the predecessor statutes to § 101 (and were subsequently recodified by Congress with no substantive changes in 1793, 1836, 1870, and lastly in 1952). In fact, the term “art” was originally in the predecessor statutes to § 101 as a category of patent-eligible inventions or discoveries, and was replaced only with the term “process” in 1952.

The reason why “process” replaced “art” in 1952 militates in favor of its usage in the proposed revision to § 101 today. Art has two meanings in patent law. First, it means a general field of inventive or creative endeavor, such as software engineering, mechanical engineering, finance, husbandry, etc. This is the sense in which “art” is often used today in patent law, such as in the longstanding procedural mandate that the patentability requirements under § 102, § 103, and § 112 are applied according to the knowledge of the “person having ordinary skill in the art.” Second, art means a particular application of knowledge—a process of doing something within a field of endeavor. This is the sense of “art” that is synonymous with the term “process” as a specific category of a patent-eligible invention or discovery in §101 within a broader art.

The current sentence in the draft language for § 101 uses “field of technology” to refer to both of these senses of “art.” It is intended to cover both a generalized process and a field of endeavor. Both senses have longstanding usage in the patent statutes, case law, and regulations in the U.S. patent system for over two hundred years. Thus, “art” is far better than “field of technology,” which is ambiguous about which of these two senses is being used and raises a legitimate interpretative question about whether Congress intended to change the U.S. patent system to no longer secure business methods, computer software programs, and other invented or discovered processes that have long been essential to the success of the U.S. patent system as a driver of its innovation economy. Congress should avoid creating unnecessary ambiguities in the patent statutes, such as what happened in the AIA in 2011 that lead to the *Helsinn* decision. The best way to avoid this problem in this case is to replace “field of technology” with the “art,” as “art” has a longstanding and settled use in U.S. patent reaching back to the first Patent Act of 1790 and to the Constitution itself.

3. Sen. Tillis and Sen. Coons have made clear that genes as they exist in the human body would not be patent eligible under their proposal.

Are there other things that Congress should make clear are not patent eligible? There are already statutes that prevent patents on tax strategies and human organisms. Are there other categories that should be excluded?

Congress should avoid technology-specific provisions in the patent statutes, whether in specifying either denials or grants of protections. The reason is that this contradicts an essential institutional feature of the U.S. patent system that has made it possible to function so well in promoting and securing the innovations that have driven the revolutions of the past two centuries—the Industrial Revolution, the Digital Revolution, the PC Revolution, the

Biotech Revolution, and the Mobile Revolution. The originally unique characteristic of the U.S. patent system is that it is a property rights system.¹⁶ This has meant that the U.S. patent system is a *technology neutral platform* with the same substantive and procedural legal rules for obtaining, licensing, and enforcing property rights in inventions regardless of the nature of either the inventions or inventors. Just as the legal property rules for obtaining a fee simple in land are the same whether one is an investor, a developer, or homeowner, the legal patent rules for obtaining a patent are the same whether one is an inventor working in a garage, in a startup, or in the R&D department of a large, multinational corporation. Economists have recognized that this has been an important feature of the success of the U.S. patent system in promoting the unforeseeable innovations of the next technological and economic revolutions. Professor Zorina Khan has famously described the U.S. patent system as achieving the “democratization of invention” in its U.S. patent system.¹⁷ This has meant securing rights through neutral legal doctrines and legal institutions constrained by the rule of law versus granting rights purely as matters of public policy and through discretionary decision-making processes in the political organs of the government

While there have been some exceptions, such as the exclusion of patents on tax methods in the AIA of 2011, Congress should refrain from continuing this practice. Balkinization of legal protections or exclusions from these protections will undermine the certainty in reliable and effective property rights, as innovators will no longer be secure in knowing whether the R&D investments they are making today will be protectable in the patent system ten or twenty years later, when the fruits of their inventive labors are becoming a reality in real-world innovations.

4. I have heard complaints that courts do not consistently enforce Section 112 with respect to claims for inventions in the high tech space.

a. Are these valid complaints?

It is conventional wisdom today among some companies in the high-tech sector, as well as among some policy organizations and some academics, that the patent system is fundamentally “broken” and is stifling innovation. Their complaints are far reaching and touch on all aspects of the patent system: patents should not issue at all for computer software innovations, patent claims are too broad, patent specifications do not properly disclose or enable, patents permit strategic behavior with threats of injunctions, etc.

Assessing whether one of these complaints—the failure of disclosures in computer software patents—first requires setting the institutional context for how the patent system functions as a property rights system. In any legal system in which hundreds of thousands of new property rights are created each year and millions of property rights are in existence, there will be some mistakes in the institutions that issue and secure these property rights and there will be some bad actors. People are not infallible, and people run the USPTO and the courts. Thus,

¹⁶ See Adam Mossoff, *Institutional Design Choice in Patent Systems: Private Property Rights or Regulatory Entitlements*, SO. CALIF. L. REV. (forthcoming 2019).

¹⁷ See B. ZORINA KHAN, *THE DEMOCRATIZATION OF INVENTION: PATENTS AND COPYRIGHTS IN AMERICAN ECONOMIC DEVELOPMENT, 1790–1920* (2005). In contrast to British patent law, “U.S. doctrines emphatically repudiated the notion that the rights of patentees were subject to the arbitrary dictates of government.” *Id.* at 51.

the question is not whether there are some examples of invalid patents or bad actors, but whether there is a proven *systemic problem* that requires systemic revision or reform in the patent statutes. For example, advocates for reform of § 101 have identified statistics and have made comparative assessments evidencing a systemic problem in patent eligibility doctrine.

The problem with the complaints about the failure of disclosures in computer software patents is that it is unclear what is the baseline for determining what would be a proper disclosure for computer software patents. There are many confounding variables that complicate any such claim. For example, comparing computer software patent disclosures to other patented inventions is not valid, because each type of “art” is different in terms of how it can and should be disclosed to someone with skill in that art, whether—water balloon filling devices, a molecule that is active against a disease, a diagnostic treatment method, an electrical battery for an automobile engine, the digital transmission technology for smartphones, etc., etc. Also, computer software patents are relatively new, but other patented inventions have existed for decades if not over a hundred years, such as electrical circuits, and thus there is now long-settled practices for how to both claim and describe these older arts in patents, whereas when these were cutting-edge new innovations, the patents were less clear at those times given the novelty of the science and technology.

Thus, it is not clear or at least it has not been definitively proven that either the USPTO or the courts are unable to use the existing disclosure doctrines in § 112—written disclosure, enablement, and clear and distinct claiming—to effectively police problematic patents or the strategic actors who may exploit them in the high-tech industry.

b. Do the proposed changes to Section 112 adequately address those complaints and limit the scope of claims to what was actually invented?

The proposed changes to § 112 are not justified and create additional problems for innovators. If there are concerns about lack of proper disclosures in specifications or generic and overbroad claims to computer software programs or business methods, then there is no legal or empirical evidence that such concerns cannot be properly addressed by the existing patentability requirements of written disclosure, enablement, or clear and distinct claiming in § 112. If the specifications or claims are as bad as they are generally characterized by some critics of patents on high-tech innovations, they can be addressed under the current law.

If their concerns cannot be addressed by the existing patentability doctrines in § 112, then this suggests that this complaint is more rhetoric or policy-results driven, such as the widespread belief among some companies and policy activists that there should not be any patents on computer software programs at all. If the concern is truly about ensuring the proper operation of the patent system in promoting innovation, then the focus should be on ensuring that courts and the PTAB enforce existing doctrines. Any specific problems can and ought to be addressed by the proper institutions who can address this concern.

This is why reform of § 101 is necessary, because the courts have proven unable or unwilling to fix the problem they have created for innovators. This does not require revising § 112(f) and sweeping within its restrictions the innovators in the biotech and pharmaceutical sectors that will find their patents substantially narrowed and devalued as a result.

c. Are you concerned that the proposed changes will make it too easy for competitors to design around patent claims that use functional language?

The proposed revisions to § 112(f) expand the scope of the interpretative limitations imposed on claims to any inventions or discoveries that have a functional element in them. Currently, the interpretative restrictions in § 112(f) in construing a claim according to the embodiments and descriptions in the specification is limited to only combination, means-plus-function claims, but the proposed revision would eliminate these two phrases and apply this interpretative restriction to any claims with any functional element in it. This would sweep within the restrictions of § 112(f) many more patent claims, especially claims for newly discovered methods of treatment discovered in the biopharmaceutical sector. This would severely narrow and restrict the scope of protections afforded to these life-saving discoveries of diagnostic methods by limiting them to the current known means disclosed in the specification at the time of the discover of the process. This would undermine the essential quid pro quo in the biopharmaceutical and life sciences sector, as innovators would not receive the proper protection for their processes to even recoup their massive R&D expenditures in exchange for the public disclosure of these processes. The response would be an even greater shift toward trade secret protection or, given the diminished incentives for innovation, reduced discoveries and inventions in new medical treatment methods. In either case, or if both predictions occur, the end result is that the progress of the useful arts in the biopharmaceutical and life sciences sector of the innovation economy will suffer.

5. **There is an intense debate going on right now about what to do about the high cost of prescription drugs. One concern is that pharmaceutical companies are gaming the patent system by extending their patent terms through additional patents on minor changes to their drugs. My understanding is that the doctrine of obviousness-type double patenting is designed to prevent this very thing.**

The Federal Circuit has explained that obviousness-type double patenting “is grounded in the text of the Patent Act” and specifically cited Section 101 for support.

Would the proposed changes to Section 101 and the additional provision abrogating cases establishing judicial exceptions to Section 101 do away with the doctrine of obviousness-type double patenting? If so, should the doctrine of obvious-type double patenting be codified?

There is no relationship between patent eligibility doctrine in § 101 and the double patenting doctrine, and thus there is no concern that reform of the former will have any effect whatsoever on the latter. In *Abbvie Inc. v. Mathilda and Terence Kennedy Institute of Rheumatology Trust*, the Federal Circuit cited the phrase “a patent” in § 101 as a general statutory foundation for the longstanding judicial prohibition against double patenting, i.e., one may not receive more than one patent for the same invention.¹⁸ This is entirely distinct both in law and policy from the other language in § 101 that sets forth the statutory categories of patent-eligible inventions and discoveries in § 101—machine, manufacture,

¹⁸ *Abbvie Inc. v. Mathilda and Terence Kennedy Institute of Rheumatology Trust*, 764 F.3d 1366, 1372 (Fed. Cir. 2014),

process, and composition of matter. Even more important, the law and policy of double patenting, regardless of whether it is rooted in the mandate that an inventor receive “a patent” in § 101, is entirely distinct from the judicially-created doctrine that patents cannot issue on laws of nature, abstract ideas, or physical phenomena. In sum, congressional reform of § 101 to eliminate the arbitrariness in application and invalidation of legitimate innovation under the *Alice-Mayo* framework under patent-eligibility doctrine will have no impact at all on the entirely distinct and separate legal doctrine of the prohibition on double patenting.

As far as I’m aware, there are no statistical reports or studies confirming the same problems with the prohibition on double patenting as there now exist for the patent eligibility doctrine under the *Alice-Mayo* framework. There is much rhetoric, such as the allegation of “evergreening,” about alleged double patenting of inventions, but the reality is that follow-on innovation is an important function of the patent system in promoting inventions that drive the U.S. innovation economy. Most great innovators—Samuel Morse, Thomas Edison, Nikola Tesla, and many others—received patents for their follow-on inventions in new processes and products they created on the basis of their initial innovations in the telegraph, electrical generators, electrical distribution systems, lightbulbs, etc. This is why the patent statutes expressly permit the patenting of a “new use” invention in § 100(b).¹⁹ This was added to the Patent Act in 1952 by Congress given its recognition that follow-on innovation in new processes is a key part of the innovation that the patent system promotes. Thus, there is no need to codify the prohibition on double patenting given any alleged difficulties in applying this current doctrine in the patent system. A legislative act is justified by the need to abrogate mistaken judicial interpretations of the patent statutes or to provide more certainty in the many judicial doctrines in the patent system, and neither of these conditions exist with respect to the prohibition on double patenting.

6. In its *Oil States* decision, the Supreme Court explicitly avoided answering the question of whether a patent is property for purposes of the Due Process Clause or the Takings Clause.

What are the Due Process and Takings implications of changing Section 101 and applying it retroactively to already-issued patents?

Patents are property rights.²⁰ As property rights, courts have long secured patents under the Due Process and Takings Clauses since the early nineteenth century.²¹ There is no modern

¹⁹ See 35 U.S.C. § 100(b) (defining the term “process” as used in § 101 to include “a new use of a known process, machine, manufacture, composition of matter, or material”).

²⁰ See 35 U.S.C. § 261 (“patents shall have the attributes of personal property”); *Hovey v. Henry*, 12 F. Cas. 603, 604 (C.C.D. Mass. 1846) (No. 6,742) (“An inventor holds a property in his invention by as good a title as the farmer holds his farm and flock.”); *Davoll v. Brown*, 7 F. Cas. 197, 199 (C.C.D. Mass. 1845) (No. 3,662) (“[A] liberal construction is to be given to a patent, . . . [as] only in this way can we protect intellectual property, the labors of the mind, productions and interests as much a man’s own, and as much the fruit of his honest industry, as the wheat he cultivates, or the flocks he rears.”); see also Adam Mossoff, *Institutional Design Choice in Patent Systems: Private Property Rights or Regulatory Entitlements*, SO. CALIF. L. REV. (forthcoming 2019) (identifying how the U.S. patent system has been a private law system that secures property rights to inventors); Adam Mossoff, *Who Cares What Thomas Jefferson Thought About Patents? Reevaluating the Patent “Privilege” in Historical Context*, 92 CORNELL L. REV. 953 (2007) (detailing how U.S. patents are civil rights in property that were justified by natural rights theory).

Supreme Court case that has applied the Takings Clause to patents, but the Supreme Court recognized in 1999 that patents are property rights under the Due Process Clause.²² Given the overwhelming weight of historical case law applying the Takings Clause to patents, the Supreme Court would reach the same conclusion today in a Takings Clause case.

Under the Takings Clause, the Constitution secures property rights against extreme acts by the government that eliminate or limit property interests in ways that conflict with the reasonable expectations of owners given existing, inherent limitations in their titles. The judicial interpretation of the patent statutes that results in a restriction of patent owners' rights is a limitation built into the title received by inventors in the grant of title in a patent. This is a reasonable expectation based in longstanding judicial practices in the Anglo-American legal system in which courts interpret statutes or alter common law doctrines that restrict or otherwise negatively affect property rights.

There are too many examples in the U.S. patent system to enumerate in my answer here, and thus one well-known example will suffice. In 1829 in *Pennock v. Dialogue*,²³ the Supreme Court interpreted various provisions in the 1793 Patent Act setting forth the legal requirements for receiving a valid patent, concluding that any public use of an invention prior to filing a patent application is grounds for invalidating a patent granted for this invention, regardless of whether the invention is novel, useful, and properly disclosed in the patent.²⁴ The *Pennock* rule against public use of inventions applied retroactively. Congress later codified what became known as the statutory bar against "public use,"²⁵ although Congress also modified the *Pennock* rule in creating a "grace period" in permitting public disclosure of patents in a specified period before filing a patent application (one year).²⁶

A judicial interpretation of a patent statute constitutes an unconstitutional taking of the property rights in a patent if the elimination or limitation of patent rights in the court decision is so extreme that it goes beyond these reasonable expectations or understandings of patent owners as to the limits in their titles. In this case, the question becomes whether the change in patent eligibility law wrought by the *Alice-Mayo* framework was such an extreme break from historical practices and understandings that it violates the reasonable, settled expectations of patent owners in their property. There is certainly evidence and legal reasons for believing that this has occurred.

As detailed in my answer to the first question, the *Alice-Mayo* framework has led to a vast increase in the use of patent eligibility doctrine in patent cases that goes far beyond historical practices in the use of this doctrine as "only a threshold test."²⁷ Between July 2014 and June

²¹ See Adam Mossoff, *Patents as Constitutional Private Property: The Historical Protection of Patents under the Takings Clause*, 87 B.U. L. REV. 689, 700-711 (2007) (detailing historical cases).

²² See *Florida Prepaid Postsecondary Educ. Expense Bd. v. College Sav. Bank*, 527 U.S. 627, 641-642 (1999).

²³ See *Pennock v. Dialogue*, 27 U.S. (2 Pet.) 1 (1829).

²⁴ See *id.* at 23-24 (holding that "that the first inventor cannot acquire a good title to a patent; if he suffers the thing invented to go into public use, or to be publicly sold for use, before he makes application for a patent").

²⁵ See Patent Act of 1836, ch. 357, § 7, 5 Stat. 117, 119-120 (repealed 1861).

²⁶ Before the AIA of 2011, the statutory bar against public use was codified in 35 U.S.C. § 102(b) (2000) (providing that an inventor forfeits his right to a patent if he permits the invention to be publicly disclosed more than a year before filing his patent application).

²⁷ *Bilski v. Kappos*, 561 U.S. 593, 602 (2010).

2018, courts issued 692 decisions in which judges substantively applied the *Alice-Mayo* framework to assess the validity of a patent.²⁸ The overall invalidation rate was 65.8%. The Federal Circuit’s invalidation rate was 87.5%. At the Patent Trial & Appeal Board (PTAB), the invalidation rate under the *Alice-Mayo* framework for business method patents is even higher—an astounding 97.9% of patents invalidated in final decisions.

Moreover, as stakeholders in the innovation industries have attested, the *Alice-Mayo* framework is infected with indeterminacy. It has led to extensive uncertainty about what is and is not a patent eligible invention or discovery. Even lawyers and commentators who do not think legislative reform is necessary concede that the doctrine is “a mess.”²⁹

It is beyond dispute that, in creating the *Alice-Mayo* framework, the Supreme Court has radically altered the historical understanding and application of a fundamental legal doctrine in the U.S. patent system, upending the reasonable expectations of inventors and patent owners in the security of their titles. In fact, there is an important parallel between the Supreme Court’s creation of the *Alice-Mayo* framework in patent eligibility doctrine and the Federal Circuit’s efforts in the 1990s to restrict or eliminate the judicially-created patent infringement doctrine of equivalents. In the 1990s, the Federal Circuit made several changes to the doctrine of equivalents that effectively eviscerated this infringement doctrine for patent owners in enforcing their patents in court. The Supreme Court responded by granting cert petitions in 1997 in *Warner-Jenkinson Co., Inc. v. Hilton Davis Chemical Co.* and in 2002 in *Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co.*, and in both cases the Supreme Court reversed the Federal Circuit’s changes to the doctrine of equivalents.³⁰

Notably and of relevance to understanding the takings concern today under the *Alice-Mayo* framework, the Supreme Court expressed its clear displeasure with the Federal Circuit in its 2002 decision in *Festo*, stating that the Federal Circuit had “ignored the guidance of *Warner-Jenkinson*, which instructed that courts must be cautious before adopting changes that disrupt the settled expectations of the inventing community.”³¹ The *Festo* Court stated that when it comes to “settled law” in the patent system, such as with the two-hundred-year-old infringement doctrine of equivalents, the “responsibility for changing [it] rests with Congress.”³²

Even more important, the *Festo* Court concluded its admonition of the Federal Circuit in terms that resonate with concerns that the Federal Circuit was violating the constitutional rights of patent owners under the Takings Clause: “Fundamental alterations in these rules risk destroying the legitimate expectations of inventors in their property.”³³

²⁸ Data from Robert R. Sachs. For questions, Mr. Sachs may be reached at rsachs@patentevaluations.com.

²⁹ See Thom R. Tillis & Chris Coons, *What We Learned At Patent Reform Hearings* (June 24, 2019), <https://www.tillis.senate.gov/2019/6/tillis-and-coons-what-we-learned-at-patent-reform-hearings> (quoting testimony from a witness generally supportive of the *Alice-Mayo* framework).

³⁰ See *Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co., Ltd.*, 535 U.S. 722 (2002); *Warner-Jenkinson Co., Inc. v. Hilton Davis Chemical Co.*, 520 U.S. 17 (1997).

³¹ *Festo Corp.*, 535 U.S. at 739.

³² *Id.*

³³ *Id.*

What the Federal Circuit was attempting to do in the 1990s to the judicial infringement doctrine of equivalents, the Supreme Court later did between 2010 and 2014 in creating the *Alice-Mayo* framework. The Supreme Court has radically altered patent eligibility doctrine in a way that has “destroy[ed] the legitimate expectations of inventors in their property.”³⁴ This is a violation of the constitutional protections afforded to patent owners under the Takings Clause and Due Process Clause. The only difference between today and the *Festo* Court’s decision in 2002 is that there is no further court to reverse the Supreme Court’s *Alice-Mayo* framework that has been applied to patent owners since 2014. Thus, Congress must solve this problem and reform § 101 by abrogating the *Alice-Mayo* framework and returning patent eligibility doctrine back to a more certain foundation in the express language of § 101 itself.

³⁴ *Id.*