

Getting AI Innovation Culture Right

By Adam Thierer

The most effective solution to technological problems usually lies in more innovation, not less.

Executive Summary

Public and political interest is intensifying in artificial intelligence (AI), machine learning and robotics. As these technological capabilities advance, legislative and regulatory proposals for algorithmic systems will grow alongside them. Public policy will play a crucial role in shaping the so-called “computational revolution.”

To ensure that the United States can be a global leader in advanced technology sectors, we must create a policy innovation culture that encourages and rewards the entrepreneurial spirit of the American people. The danger exists that the United States could adopt the opposite approach, locking entrepreneurs and investors in an “innovation cage” that constrains their growth opportunities.

Ultimately, policymakers must make a choice between two general policy defaults that will govern most algorithmic systems: the precautionary principle or permissionless innovation. Under the highly risk-averse precautionary principle approach, algorithmic innovations would essentially be treated as guilty until proven innocent, a legal standard generally shunned as unfair to individuals. Under the permissionless innovation approach, AI entrepreneurship is generally given a green light and treated as innocent until proven guilty, ensuring that people are mostly at liberty to create new things.

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This paper explores the dangers of adopting a highly regulatory approach and recommends continuing with the more permissionless approach to policy that helped spawn the digital revolution and made U.S. tech companies global powerhouses. Although some safeguards will be needed to minimize certain AI risks, a more flexible, bottom-up (i.e., less regulated) governance approach can address these concerns without creating overbearing, top-down (i.e., more regulated) mandates, which would hinder algorithmic innovations.

The ramifications of this policy choice are significant because AI and algorithmic systems play an important role in the United States' global competitive advantage and relative geopolitical power. With China becoming a major competitor in advanced information technology sectors and other nations racing to be at the forefront of the unfolding computational revolution, the United States must create a positive innovation culture if it hopes to prosper economically and ensure a safer, more secure technological base.

The Importance of Innovation Culture

Technological innovation has been a key driver of improvements in human well-being throughout history, producing greater economic growth, worker opportunities and societal choices.¹ Additionally, nations that have created a more positive innovation culture have enjoyed greater technological advancement than those that have not.² Key elements of this type of culture include “attitudes towards innovation, technology, exchange of knowledge, entrepreneurial activities, business, uncertainty,” and related activities.³

The foundation of a positive innovation culture is a dynamic, open economy that encourages new entry; entrepreneurialism; continuous investment; and the free movement of goods, ideas and talent.⁴ Public policy has a strong influence on these prerequisites.⁵ The most basic lesson of economic history can be simply stated: You will only get as much innovation as you allow.⁶

Whenever new technologies challenge the existing economic or societal status quo, opponents to change emerge.⁷ All too often, these anti-technological forces use public policy to erect barriers to innovation and entrepreneurialism, locking in archaic rules or systems that benefit incumbent companies and other special interests.⁸ This is the “innovation cage” problem, in which these forces lock down entrepreneurial activities by default.



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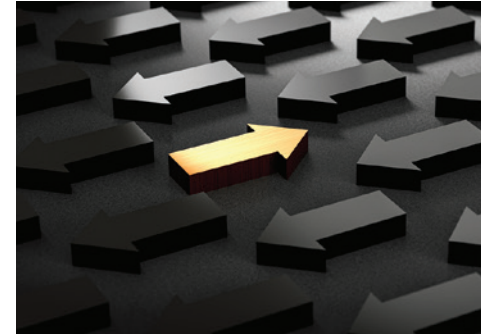
1. James Broughel and Adam Thierer, “Technological Innovation and Economic Growth: A Brief Report on the Evidence,” Mercatus Center at George Mason University, March 4, 2019. <https://www.mercatus.org/publications/entrepreneurship/technological-innovation-and-economic-growth>.
2. Deirdre N. McCloskey, *The Bourgeois Virtues: Ethics for an Age of Commerce* (University of Chicago Press, 2006).
3. Maïke Didero et al., “Differences in Innovation Culture Across Europe: A Discussion Paper,” TransForm, February 2008, p. 3. <https://www.yumpu.com/en/document/read/6683782/differences-in-innovation-culture-across-europe-transform>.
4. Joel Mokyr, *Lever of Riches: Technological Creativity and Economic Progress* (Oxford University Press, 1990).
5. Mancur Olson, Jr., “Big Bills Left on the Sidewalk: Why Some Nations are Rich, and Others Poor,” *The Journal of Economic Perspectives* 10:2 (Spring 1996), p. 19. <https://www.jstor.org/stable/2138479>.
6. Arthur Diamond, *Openness to Creative Destruction: Sustaining Innovative Dynamism* (Oxford University Press, 2019).
7. Calestous Juma, *Innovation and Its Enemies: Why People Resist New Technologies* (Oxford University Press, 2016).
8. Brink Lindsey and Steven Teles, *The Captured Economy: How the Powerful Enrich Themselves, Slow Down Growth, and Increase Inequality* (Oxford University Press, 2018).

A positive innovation culture requires that individuals have the freedom to try new things without needing bureaucratic permission at every juncture. The rise of the internet and the explosive growth of the digital economy in the past 20 years demonstrates this. Twenty-five years ago, the Clinton administration created a bold vision for internet governance that allowed the United States' information and communications technology (ICT) sectors to break out of the innovation cage that had constrained the entrepreneurial spirit and economic potential of the nation.⁹ Once unleashed, the U.S. ICT sector became "a growth powerhouse" that drove "remarkable gains, powering real economic growth and employment."¹⁰

That policy vision continues to resonate today as the United States considers how to promote and govern AI, machine learning, robotics and algorithmic systems more generally. The same principles that powered the digital revolution can now drive the computational revolution—but only if the nation gets its innovation culture right.

Unfortunately, many policymakers already appear to be heading in the wrong direction regarding important emerging technologies. For example, last year, the Biden administration released an "AI Bill of Rights" that—while not yet a formal regulatory agenda—represents a fear-based model of technology policymaking.¹¹ The effort foreshadows what could become a precautionary principle-based policy regime for AI and the computational technologies of the future. If such an approach were to become the basis of AI policy, the resulting legal standard for many algorithmic systems would become what some pro-regulatory law professors refer to as "unlawfulness by default."¹² In other words, AI entrepreneurs and their innovations would essentially be treated as guilty until proven innocent.

Concerningly, unlawfulness by default could also result in technological stagnation by default. With this issue in mind, we outline in this paper how highly precautionary policy approaches have historically created innovation cages for algorithmic entrepreneurs and investors. We discuss extensively the value of rejecting such approaches and reembracing and extending the Clinton administration's sensible innovation culture for digital technologies, which is rooted in the idea of permissionless innovation—the notion that entrepreneurs and innovations are innocent until proven guilty.¹³ Importantly, we also offer practical strategies that policymakers can consider to help the United States create the positive innovation culture needed to unlock more economic opportunities and meet the growing global competition from China and other nations in cutting-edge emerging technology sectors.



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9. "The Framework for Global Electronic Commerce," The White House, July 1997. <https://clintonwhitehouse4.archives.gov/WH/New/Commerce>.
10. Makada Henry-Nickie et al., "Trends in the Information Technology sector," Brookings, March 29, 2019. <https://www.brookings.edu/research/trends-in-the-information-technology-sector>.
11. "Blueprint for an AI Bill of Rights: Making Automated Systems Work for the American People," The White House, October 2022. <https://www.whitehouse.gov/wp-content/uploads/2022/10/Blueprint-for-an-AI-Bill-of-Rights.pdf>.
12. Gianclaudio Malgieri and Frank A. Pasquale, "From Transparency to Justification: Toward Ex Ante Accountability for AI," Brooklyn Law School Legal Studies Paper No. 712 (June 2022). https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4099657.
13. Adam Thierer, *Permissionless Innovation: The Continuing Case for Comprehensive Technological Freedom*, 2nd ed. (Mercatus Center at George Mason University, 2016).

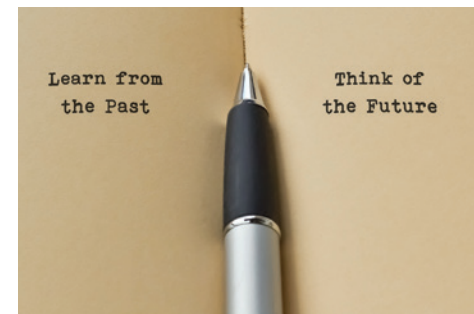
A Brief History of the United States' Disastrous Analog-Era Policy Regime

For most of the past century, a convoluted thicket of federal, state and local regulations controlled activity in the ICT sector. The laws and regulations governing the technologies of the analog era (i.e., newspapers, magazines, wireline telephony, broadcasting and cable) were intended to support “the public interest,” but all too often failed to do so.¹⁴ These governing mechanisms included operating licenses, line-of-business restrictions, price controls, rate-of-return regulations, technical device/equipment regulations and various quality-of-service or access requirements.¹⁵ In the mid-1990s, however, U.S. policymakers adopted a series of bipartisan reforms and policy statements that largely rejected the nation’s analog-era regulatory regime and that signaled a new direction for the governance of ICT.¹⁶

It is important to understand why experts came to view the policies of the era as a failure so that the United States does not repeat the mistakes of the past when considering the governance of new technologies like AI and robotics. In short, analog-era regulatory policies created a rigid innovation cage that severely constrained entrepreneurial activities and competition. Although the United States’ old communications and media regulatory system stopped short of the full-blown nationalization pursued by other countries, the alternative that policymakers created was not much better for innovators or consumers.¹⁷ The result of this complex web of regulations was less ICT innovation, fewer choices and higher prices for lackluster service.¹⁸ In that regulatory environment, “innovation” was often defined as a longer cord or different color on the telephone handset provided by the phone monopoly. No one could shop around for better options because none existed. In most instances, it was illegal to compete, and new services were treated as guilty until proven innocent under a precautionary, principle-based regime that valued stability over market dynamism.

The way in which the public interest was defined shifted with the political winds to suit the whims of those in power—both in government and in industry—at any given time. The “public interest” was also regularly invoked as a rationale for censorship and a way to evade the First Amendment.¹⁹ Policymakers created a chaotic legal standard for speech, which held that something written in a newspaper or book enjoyed robust First Amendment protection while the uttering of the same words on a broadcast television or radio station would result in the revocation of an operator’s license.²⁰ Federal Communications Commission (FCC) regulators

New policies should prevent the United States from repeating our mistakes.



The analog-era regulatory policies created a rigid innovation cage that severely constrained entrepreneurial activities and competition.

14. Randolph J. May, “The Public Interest Standard: Is It Too Indeterminate to Be Constitutional?,” *Federal Communications Law Journal* 53 (May 2001), pp. 427-468. <https://www.repository.law.indiana.edu/fclj/vol53/iss3/3>.
15. Ithiel de Sola Pool, *Technologies of Freedom* (Harvard University Press, 1983).
16. Ryan Hagemann, “We Don’t Need Government to Regulate the Internet,” *Real Clear Policy*, March 16, 2018. https://www.realclearpolicy.com/articles/2018/03/16/we_dont_need_government_to_regulate_the_internet_110552.html.
17. Adam Thierer, “Unnatural Monopoly: Critical Moments in the Development of the Bell System Monopoly,” *Cato Journal* 14:2 (Fall 1994), pp. 267-285. www.cato.org/sites/cato.org/files/serials/files/cato-journal/1994/11/cj14n2-6.pdf.
18. Ibid.
19. Brent Skorup, “Censored,” *Discourse*, Jan. 19, 2023. <https://www.discoursemagazine.com/ideas/2023/01/19/censored>.
20. Adam Thierer, “Why Regulate Broadcasting: Toward a Consistent First Amendment Standard for the Information Age,” *CommLaw Conspectus* 15:2 (2007), pp. 431-482. <https://scholarship.law.edu/commlaw/vol15/iss2/6>.

also used the agency's open-ended public interest authority to influence media companies through what came to be known as "regulation by raised eyebrow," or "regulatory threats that cajole industry members into slight modifications" of their programming.²¹

It seemed abundantly clear that the public interest standard had little to do with what the public actually wanted—more competition, more choices and more diverse content.²² Instead, public interest regulation protected large telecommunications and media companies from new rivals and the need to innovate.²³ Lawmakers and regulators repeatedly erected barriers to new types of competition and technological change.²⁴

In the 1950s, for example, misguided FCC policies prevented the emergence of DuMont, an aspiring nationwide television network.²⁵ Regulators took steps to constrain spectrum allocation and steer licenses away from national or regional TV networks, often in the name of encouraging more media "localism."²⁶ Unfortunately, those efforts greatly limited the emergence of competitors like DuMont, who could not satisfy the FCC's rigged preferences.²⁷ Consumers would have to wait another 30 years before Rupert Murdoch would launch Fox as a fourth national network in the mid-1980s, and even that effort was resisted initially by some policymakers.²⁸ Similarly, the advent of cable and satellite television was initially met with regulatory roadblocks as broadcasters lobbied for continued protection from competition.²⁹ In addition, as recently as the mid-2000s, terrestrial radio broadcasters lobbied heavily to stop satellite radio operators from launching competing services on the grounds that it might undermine media localism.³⁰ Thankfully, that anticompetitive protectionist effort failed.

Having created monopolies through misguided regulations, policymakers also took some steps to control them through many additional layers of convoluted rules that sought to limit the market power or ownership rights of many firms.³¹ Regulation thus became a self-perpetuating cycle as more and more rules were added over time to address problems created by earlier misguided mandates and illogical interventions.³² As a result, regulatory accumulation became a chronic problem in the ICT sector, and it remains so today for traditional telecom and media services.

Regulatory Accumulation: A Chronic Problem



As a result of the layers of rules and mandates, regulatory accumulation became a chronic problem in the ICT sector, and it remains so today for traditional telecom and media services.

21. Thomas Streeter, *Selling the Air: A Critique of the Policy of Commercial Broadcasting in the United States* (The University of Chicago Press, 1996), p. 189.
22. Adam Thierer, "Is the Public Served by the Public Interest Standard?," *The Freeman* 46:9 (September 1996), pp. 618-620. <https://fee.org/articles/is-the-public-served-by-the-public-interest-standard>.
23. Peter Huber, *Law and Disorder in Cyberspace: Abolish the FCC and the Common Law Rule the Telecom* (Oxford University Press, 1997).
24. Adam Thierer and Brent Skorup, "A History of Cronyism and Capture in the Information Technology Sector," *Journal of Technology Law & Policy* 18:2 (2013), pp. 131-196. <https://scholarship.law.ufl.edu/jtlp/vol18/iss2/2>.
25. David Weinstein, *The Forgotten Network: DuMont and the Birth of American Television* (Temple University Press, 2006).
26. Ibid.
27. Ibid.
28. Daniel M. Kimmel, *The Fourth Network: How Fox Broke the Rules and Reinvented Television* (Ivan R. Dee, 2004), pp. 9-13.
29. Thomas W. Hazlett and Matt L. Spitzer, *Public Policy toward Cable Television: The Economics of Rate Controls* (MIT Press, 1997).
30. Sarah McBride, "Satellite Radio's New Local Content Riles Broadcasters," *The Wall Street Journal*, July 25, 2005. <https://www.wsj.com/articles/SB112225495906094590>.
31. Adam Thierer and Brent Skorup, "Video Marketplace Regulation: A Primer on the History of Television Regulation and Current Legislative Proposals," Mercatus Center at George Mason University, April 29, 2014. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2432177.
32. Raymond Gifford, "The Continuing Case for Serious Communications Law Reform," Mercatus Center at George Mason University, Nov. 9, 2011. <https://www.mercatus.org/research/working-papers/continuing-case-serious-communications-law-reform>.

The FCC currently ranks first among independent regulatory agencies in terms of rules promulgated, outpacing the Securities and Exchange Commission and Nuclear Regulatory Commission, among others.³³

It is hard for law to restrain markets and innovation forever, however, and beginning in the 1970s and continuing into the 1980s, small cracks began to appear in the old regulatory edifice.³⁴ Once cable television and wireless networks became feasible and then increasingly popular, incumbent operators and regulators could not contain them entirely; they could only slow their advance.³⁵

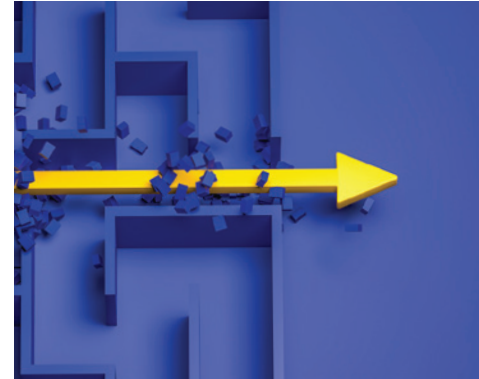
During that same period, a more significant technological storm was gathering that the FCC and other policymakers had even less ability to constrain: the data and computing revolutions. Whereas cable, satellite and wireless innovators were cursed to be “born in regulatory captivity” (i.e., they were immediately confronted with the existing thicket of regulations and agencies), the data and computing sectors were largely “born free” of any preexisting sectoral rules or regulators.³⁶ Instead, common law rules and general consumer protection laws and agencies covered these technologies.

Being “born free” constituted a major strategic advantage because it gave entrepreneurs in those new sectors greater breathing room to innovate without prior restraint. In the 1970s and 80s, for example, innovators like Steve Jobs of Apple and Bill Gates of Microsoft did not need to seek out prior approval, such as a license or other operating permit, to launch a new line of computers or software programs. They just did it because they were free to do so—and that is still the case for most computing and online services today. In other words, these digital innovators were not stuck in the captivity of an innovation cage; they enjoyed the freedom to innovate that accompanies an open, dynamic innovation culture.

Once entrepreneurs and consumers experienced the benefits of market-based innovation, the new technological era of permissionless innovation was underway. Policy actions were still needed, however, to ensure a new pro-freedom innovation culture could take hold.

The United States’ Internet Policy Default: Free to Innovate

By the mid-1990s, most industry analysts and many policymakers were raising questions about the failures of the traditional regulatory regime.³⁷ These experts came to view the old regulatory system with greater suspicion once its costs became evident. With technological change happening faster in unregulated sectors, lawmakers grew increasingly open to policy changes, and they worked in



Once cable television and wireless networks became feasible and then increasingly popular, incumbent operators and regulators could not contain them entirely; they could only slow their advance.

33. Clyde Wayne Crews, Jr., *Ten Thousand Commandments: An Annual Snapshot of the Federal Regulatory State: 2022 Edition* (Competitive Enterprise Institute, 2022), pp. 61-62. https://cei.org/wp-content/uploads/2022/10/10000_Commandments_2022.pdf.
34. Ithiel de Sola Pool, *Technologies without Boundaries* (Harvard University Press, 1990).
35. Jonathan Emord, *Freedom, Technology and the First Amendment* (San Francisco: Pacific Research Institute, 1991).
36. Adam Thierer, “What 20 Years of Internet Law Teaches Us about Innovation Policy,” *The Federalist Society*, May 12, 2016. <https://fedsoc.org/commentary/blog-posts/what-20-years-of-internet-law-teaches-us-about-innovation-policy>.
37. Thomas G. Krattenmaker and Lucas A. Powe, Jr., *Regulating Broadcast Programming* (The MIT Press, 1994).

a bipartisan way to improve U.S. innovation culture for the better. Three crucial things happened during this period that would set the United States on a course to dominate global ICT markets over the next quarter century.

First, the Clinton administration opened the internet to commercialization and private use.³⁸ Previously, only government agencies, university researchers and a handful of other large organizations were allowed to use the Net—and strictly for noncommercial purposes.³⁹ Once the Net was opened to everyone, a trickle of digital activity quickly turned into a flood of online speech and commerce.⁴⁰ The online revolution was underway.

Second, Congress passed, and President Bill Clinton signed into law, the Telecommunications Act of 1996, which did not seek to pigeonhole the internet into the old regulatory system.⁴¹ Instead, the Telecom Act largely ignored the internet, barely mentioning it in the text of the law.⁴² There was an important exception, however. The Telecom Act included a provision that today has become quite controversial: Section 230.⁴³ That provision immunized online intermediaries from liability for the content and communications posted by others on their networks, thus allowing online speech and commerce to flow freely.⁴⁴ This immunity kept online operators free from the constant threat of onerous lawsuits and it was the lynchpin of the explosive growth of digital platforms that followed.⁴⁵ While some critics today say the provision was too generous, in reality, Section 230 is likely responsible for more economic growth than any provision of law Congress has enacted over the past half century.⁴⁶ It has been a remarkable engine for innovation and helped U.S. firms become global powerhouses, attracting global venture capital and talent to our shores in the process.⁴⁷

The final major policy development of importance occurred in July 1997 when the Clinton administration published its *Framework for Global Electronic Commerce*.⁴⁸ It established a market-oriented policy vision for the digital economy that created a positive innovation culture in which online speech and commerce could blossom. The *Framework* came at a time when there was still a lot of uncertainty about digital technology. Some skeptics then viewed the internet as a fad that would pass.

Three Policy Changes that Improved the U.S. Innovation Culture

1



Internet is opened to all

2



1996 Act limits content lawsuits

3



Positive innovation culture is established

38. Shane Greenstein, *How the Internet Became Commercial: Innovation, Privatization, and the Birth of a New Network* (Princeton University Press, Oct. 20, 2015).

39. Ibid.

40. David Henry et al., *The Emerging Digital Economy II* (U.S. Department of Commerce, June 1999). https://www.commerce.gov/sites/default/files/migrated/reports/ede2report_0.pdf.

41. Telecommunications Act of 1996, Pub. LA. No. 104-104, 110 Stat.

42. Ibid.

43. David Morar and Chris Riley, "A guide for conceptualizing the debate over Section 230," Brookings, April 9, 2021. <https://www.brookings.edu/techstream/a-guide-for-conceptualizing-the-debate-over-section-230>; Shoshana Weissmann, "Online Content Policy: What Legislative Proposals Aiming to Rein in 'Big Tech' Need to Grapple With," *Western New England University Law Review* 44:1 (2022), pp. 35-49. <https://digitalcommons.law.wne.edu/lawreview/vol44/iss1/3>.

44. 47 U.S. Code § 230.

45. David Post, "A Bit of Internet History, or How Two Members of Congress Helped Create a Trillion or So Dollars of Value," *The Washington Post*, Aug. 27, 2015, <https://www.washingtonpost.com/news/voxxh-conspiracy/wp/2015/08/27/a-bit-of-internet-history-or-how-two-members-of-congress-helped-create-a-trillion-or-so-dollars-of-value>.

46. Ethan Wham, "An Economic Case for Section 230," DisCo, Sept. 6, 2019. <https://www.project-disco.org/innovation/090619-an-economic-case-for-section-230>; Erik Brynjolfsson and Avinash Collis, "How should we measure the digital economy?," Brookings, Jan. 21, 2020. <https://www.brookings.edu/research/how-should-we-measure-the-digital-economy>.

47. Adam Thierer, "The Greatest of All Internet Laws Turns 15," *Forbes*, May 8, 2011. <http://www.forbes.com/sites/adamthierer/2011/05/08/the-greatest-of-all-internet-laws-turns-15>.

48. "The Framework for Global Electronic Commerce." <https://clintonwhitehouse4.archives.gov/WH/New/Commerce>.

In 1998, for example, a Nobel Prize-winning economist infamously predicted that the internet’s impact on the global economy would be “no greater than the fax machine’s.”⁴⁹

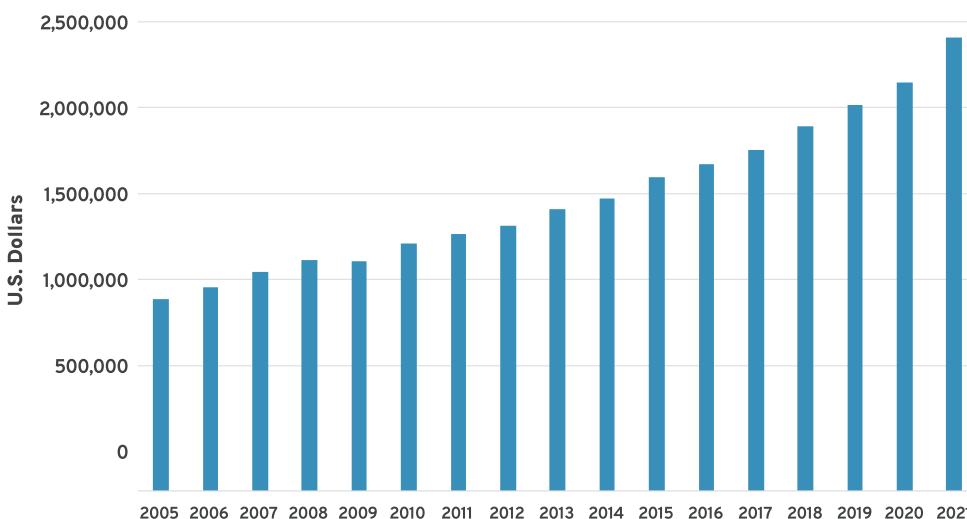
Luckily, the Clinton administration made a bet on the future, believing that the Net and digital commerce represented a great innovation opportunity for the United States. When launching the *Framework*, President Bill Clinton boldly declared that, “[the internet’s] potential is nothing short of revolutionary,” predicting that, “[i]n just a few years, it will generate hundreds of billions of dollars in goods and services.”⁵⁰ Clinton’s optimism was vindicated as electronic commerce exploded and digital innovation became the foundation of significant economic growth and new jobs. According to the Bureau of Economic Analysis, in 2021, “the U.S. digital economy accounted for \$3.70 trillion of gross output, \$2.41 trillion of value added (translating to 10.3 percent of U.S. gross domestic product (GDP)), \$1.24 trillion of compensation, and 8.0 million jobs.”⁵¹ Figure 1 demonstrates this impressive economic output. U.S. tech innovators flourished thanks to the *Framework*’s positive vision and policies like Section 230, which allowed U.S. ICT firms to become globally dominant in their respective fields.⁵² More importantly, this policy vision led to a cornucopia of new communications and content options for the public, enabling a move from a world of information scarcity to one of information abundance.⁵³

The Bet that Paid Off

According to the Bureau of Economic Analysis, in 2021, the U.S. digital economy accounted for:

- **\$3.70 trillion**
of gross output
- **\$2.41 trillion**
of value added (translating to 10.3 percent of U.S. GDP)
- **\$1.24 trillion**
of compensation
- **8.0 million**
jobs

Figure 1: U.S. Digital Economy Value Added (2005-2021)



Source: “Digital Economy,” Bureau of Economic Analysis, Jan. 12, 2023. <https://www.bea.gov/data/special-topics/digital-economy>.

49. David Emery, “Did Paul Krugman Say the Internet’s Effect on the World Economy Would Be ‘No Greater Than the Fax Machine’s’?” *Snopes*, June 7, 2018. <https://www.snopes.com/fact-check/paul-krugman-internets-effect-economy>.

50. “Remarks by the President in Announcement of Electronic Commerce Initiative,” The White House, July 1, 1997. <https://clintonwhitehouse4.archives.gov/WH/News/Commerce/remarks.html>.

51. “New and Revised Statistics of the U.S. Digital Economy, 2005–2021,” Bureau of Economic Analysis, last accessed Jan. 9, 2023. <https://www.bea.gov/data/special-topics/digital-economy>.

52. Adam Thierer, “Embracing a Culture of Permissionless Innovation,” Cato Institute, Nov. 17, 2014. <https://www.cato.org/publications/cato-online-forum/embracing-culture-permissionless-innovation>.

53. Adam Thierer, “Goodbye Lemons: How the Internet Revolutionized the Used-Car Market,” *Discourse*, Jan. 7, 2022. <https://www.discoursemagazine.com/economics/2022/01/07/goodbye-lemons-how-the-internet-revolutionized-the-used-car-market>.

The United States can replicate that success and spur the next great technological revolution by encouraging the development of AI, machine learning and robotics. To do so and to lead the computational revolution, U.S. policymakers must reembrace the policy vision that drove the digital revolution. *The Framework for Global Electronic Commerce* contained five key principles that can drive technology policy today:

1. “The private sector should lead,” and “[t]he Internet should develop as a market driven arena not a regulated industry.” Instead of imposing preemptive constraints, the better approach is to “encourage industry self-regulation and private sector leadership where possible.”
2. Governments “should refrain from imposing new and unnecessary regulations, bureaucratic procedures,” or other undue burdens on digital interactions.
3. “Where governmental involvement is needed, its aim should be to support and enforce a predictable, minimalist, consistent and simple legal environment for commerce.”
4. “Governments should recognize the unique qualities of the Internet” and appreciate “its decentralized nature and [...] tradition of bottom-up governance.”
5. “Electronic commerce on the Internet should be facilitated on a global basis” and “the legal framework supporting commercial transactions should be consistent and predictable.”⁵⁴

These principles can guide AI and help give rise to a computational revolution that U.S.-based companies are well situated to lead. While competition from European and Chinese rivals has intensified, innovators operating there face serious threats from overbearing regulators and politicians looking to control new technologies.⁵⁵ This gives the United States an opening to be a global leader in an important new technological sector.

How Policy Defaults Influence Innovation Culture

This comparison between analog era and digital era governance approaches makes it clear that policy defaults—the regulatory standard that innovator’s confront before releasing new products—have a crucial bearing on the type of innovation culture and the growth potential a country can hope to enjoy. Again, we will only achieve as much innovation as we allow to begin with. Therefore, as U.S. policymakers begin considering formal policy frameworks for newer digital technologies like AI and robotics, it is important to understand the lessons of history and the crucial connection between regulatory defaults and innovation culture.

To lead the computational revolution, U.S. policymakers must reembrace the policy vision that drove the digital revolution.

Five key principles that can drive technology policy today.

54. “The Framework for Global Electronic Commerce.” <https://clintonwhitehouse4.archives.gov/WH/New/Commerce>.

55. Adam Thierer, “A global clash of visions: The future of AI policy,” *The Hill*, May 4, 2021. <https://thehill.com/opinion/technology/551562-a-global-clash-of-visions-the-future-of-ai-policy>.

Technological revolutions are born from innovation cultures that reward risk-taking; investment; and the free movement of people, products, capital and ideas.⁵⁶ Every restriction that limits those things—or that even creates confusion and uncertainty about them—will undermine a nation’s innovation culture and its prospects for prosperity. If the United States is to lead the computational revolution and repeat its success in the digital revolution, it is essential that policymakers revisit and reembrace the original principles and policies.

Importantly, *policy for emerging technologies must not be fear-based or built on a premise of worst-case thinking about the future.* Technology critics tend to look at new AI innovations and see only potential problems, all of which they want to preemptively address before new algorithmic technologies are encouraged. This can be thought of as “regulation by hypothesis,” or policymaking by worst-case hypotheticals without any regard to the opportunity cost of proposed regulatory restrictions.⁵⁷

Concerns about emerging technologies like AI should be taken seriously, of course, but it is equally important that humans be able to flourish and enjoy the fruits of innovation. There is a compelling interest in ensuring that innovations are developed and made widely available to society. Technological critics often casually assume that important innovations will just magically come about, and they jump ahead to ponder all the ways they believe we will need to control the future. However, there is no need to worry about the future if inventors cannot even create it first.

The danger exists that policy for algorithmic systems could be formulated in such a way that innovations are treated as guilty until proven innocent—i.e., a precautionary principle approach to policy—resulting in many important AI applications never getting off the drawing board. If regulatory impediments block or slow the creation of life-enriching, and even life-saving, AI innovations, that would leave society less well-off and give rise to different types of societal risks.⁵⁸

Another technology policy priority is to avoid replicating the regulatory mistakes of the past. We know what does not work because we have a full century of well-documented failures to learn from, and we know what does work thanks to the recent successes the United States has enjoyed using a very different policy approach for the internet and ecommerce. Put simply, the United States must reject the precautionary principle-based thinking and policies of the old analog era and instead reembrace the permissionless innovation vision of the digital era.



Concerns about emerging technologies like AI should be taken seriously, but it is equally important that humans be able to flourish and enjoy the fruits of innovation.

56. Adam Thierer, “Innovation and the Trouble with the Precautionary Principle,” American Institute for Economic Research, Apr. 20, 2020. <https://www.aier.org/article/innovation-and-the-trouble-with-the-precautionary-principle>.

57. Eric J. Pan, “The SEC’s Rules Are Getting Unreal,” *The Wall Street Journal*, Oct. 31, 2022. <https://www.wsj.com/articles/sec-securities-exchange-commission-investment-swing-reporting-requirements-cybersecurity-11667246912>.

58. Orly Lobel, “The Law of AI for Good,” *San Diego Legal Studies Paper* No. 23-001 (Jan. 26, 2023). https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4338862.

The Two Great Lessons of Analog-Era Tech Policy

The history of the United States’ analog-era policy regime offers two crucial lessons for technological governance more generally:

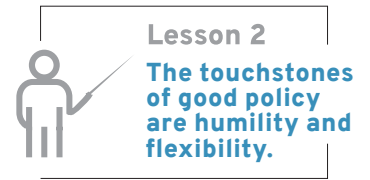
1. First, **no matter how well intentioned any rules may be, preemptive prior restraints on innovative activities will generate many different costs and unintended consequences.** Just because someone claims that something is “in the public interest” does not automatically mean it is. Real-world results matter more than good intentions.
2. Second, we cannot pursue **better market-driven ways to address important policy goals** when heavy-handed regulation makes them difficult or impossible. The touchstones of good policy are humility and flexibility.

Consider how both lessons were evident in the past—but also largely ignored—in the context of wireless spectrum and universal service policy.

- **Spectrum policy:** In the 1950s and 60s, an economist who proposed property rights and auctions to better allocate wireless spectrum was laughed out of the room at a 1959 FCC hearing.⁵⁹ At the time, it was thought to be in the public interest to assign spectrum through a top-down licensing regime that tightly limited the use and sale of any wireless service. In essence, it was an inflexible “zoning” regime for spectrum use. While it is impossible to know exactly how much earlier robust, nationwide wireless markets might have developed had policymakers heeded economists’ advice to tap the power of market incentives, it is likely that the opportunity costs of this policy miscalculation were significant. Investments in alternative communications and media platforms, services and devices were delayed for decades until the FCC liberalized spectrum markets and used auctions to allocate wireless services in the 1990s.

To appreciate the true costs of this decision, imagine if the FCC would have possessed authority over the computer sector during the 1950s and used its authority to dictate that only vacuum tube mainframes were “in the public interest” and would, therefore, be federally licensed and regulated. Transistorized computers and the personal computer revolution would have likely been delayed significantly had such a regulatory regime been in place because massive mainframes were thought to be the only machines capable of serious computational tasks.

- **Universal telephone service:** Another example of good intentions gone wrong involves universal service. Ensuring that the public was connected to basic telephone service was a worthy policy goal over the last century, but it did not need to be limited by inflexible, highly inefficient, top-down regulatory mandates and controls. Instead, policymakers could have opted to “voucherize” universal service assistance, allowing consumers to shop around for telecom and media



59. Thomas W. Hazlett, “The Wireless Craze, the Unlimited Bandwidth Myth, the Spectrum Auction Faux Pas, and the Punchline to Ronald Coase’s ‘Big Joke’: An Essay on Airwave Allocation Policy,” *Harvard Journal of Law & Technology* 14:2 (Spring 2001), p. 343. <http://jolt.law.harvard.edu/articles/pdf/v14/14HarvJLTech335.pdf>.

service alternatives using a means-tested government voucher.⁶⁰ Unfortunately, instead of passing out pro-competitive vouchers to generate pro-competitive incentives, governments passed out local monopolies and then demanded that those firms always offer the community basic service.

Imagine if, in the name of ensuring that every community had low-cost food, the first grocery store or restaurant in town had to serve everyone the same (price-controlled) food in exchange for protection from any potential competitors that followed. That would be a highly inefficient way to pursue such goals, yet it was the law of the land for almost a full century for telecommunications in the United States. Things could have worked differently with vouchers. Just as policymakers long ago adopted food stamps to give people the flexibility to buy the food they wanted from the store they wanted, policymakers could have similarly used means-tested “phone stamps” to let households shop around for their communications or media needs. Unfortunately, even now, America is still struggling to find efficient ways to provide broadband access to underserved individuals when pro-competitive solutions could be implemented.⁶¹

The common themes in both of these examples were mandates over markets; top-down regulatory decision-making over bottom-up, consumer-driven processes; and policy rigidity over flexible experimentation. These policy choices restricted entrepreneurialism, competition and consumer choice in myriad ways. In short, they created a suboptimal innovation culture that had to be abandoned to unlock the full potential of the U.S. ICT sector.

The United States turned an important corner when policymakers moved away from that regime to close the 20th century and embraced a fresh approach for computing, data services and the digital economy. The defining feature of the new approach was an embrace of permissionless innovation, and a corresponding rejection of the precautionary principle as the default for ICT policy.

Generally speaking, flexible, bottom-up, consumer-driven governance beats technocratic, top-down regulation. The United States did not need a grandiose regulatory plan or over-arching bureaucracy to guide the development and growth of the internet. In fact, digital entrepreneurialism and online innovation flourished precisely because the U.S. did *not* adopt such mandates or technocratic agencies.⁶² Had the United States created a Federal Computer Commission or a National Internet Agency, the resulting red tape burdens would have left us no better off than Europe, where mountains of paperwork compliance requirements resulted in a staggering loss of competitive advantage.⁶³ It is difficult to name any leading global information technology companies based in Europe because heavy-handed

ANALOG-ERA TECH POLICY LESSONS KEY TAKEAWAY

The common themes in the spectrum policy and universal telephone service examples were mandates over markets. They created a suboptimal innovation culture that had to be abandoned to unlock the full potential of the U.S. ICT sector.

60. Adam Thierer, “Universal Service: The Fairy Tale Continues,” *The Wall Street Journal*, Jan. 20, 1995.

61. Jonathan Cannon, “Broadband Buildout Stymied by Bureaucracy,” R Street Institute, June 8, 2022. <https://www.rstreet.org/2022/06/08/broadband-buildout-stymied-by-bureaucracy>.

62. Peter Huber, *Law and Disorder in Cyberspace: Abolish the FCC and the Common Law Rule the Telecom* (Oxford University Press, 1997), p. 9.

63. Adam Thierer, “Why is the US following the EU’s lead on artificial intelligence regulation?,” *The Hill*, July 21, 2022. <https://thehill.com/opinion/technology/3569151-why-is-the-us-following-the-eus-lead-on-artificial-intelligence-regulation>.

regulations and overlapping bureaucracies kneecapped digital entrepreneurs and forced many European innovators and investors to jump the Atlantic and launch their ideas here instead.⁶⁴

Critics will claim that many unforeseen privacy and security problems developed due to the rise of the internet and digital networks. That is true, and we are still devising solutions to many of those issues. But we should not fool ourselves into believing we could have solved all of these problems preemptively through regulatory mandates—at least not without fundamentally stunting the development of digital technologies the same way telecom and media innovation and competition were stifled in the previous century by overbearing regulatory mandates.

We should work through challenges as they come at us, but the right policy default for the internet and for AI continues to be “innovation allowed.” Entrepreneurs and their creations must be treated as innocent until proven guilty. **Table 1** illustrates how this approach to innovation policy contrasts with the precautionary principle-oriented vision of technological governance.

Table 1: Innovation Policy Conflict of Visions

Precautionary Principle (“Innovation Cage”)	Permissionless Innovation (“Innovation Culture”)
Innovation is guilty until proven innocent	Innovation is innocent until proven guilty
Wisdom applied via top-down planning and regulation	Wisdom applied via bottom-up, consumer-centric trial and error
Equilibrium and stability are the primary goals	Experimentation and resiliency are the primary goals
Progress must be guided; perhaps limited	Progress should be freewheeling and open-ended
Fear of risk and uncertainty	Embrace of risk and uncertainty
Safety through anticipatory regulation	Safety through iterative, flexible governance
Ex-ante (preemptive) solutions	Ex-post (responsive) solutions

When problems arise, there exist many *ex-post* (responsive) flexible governance remedies including various common law solutions (torts, class actions, contract law, etc). And there are many regulations already, including the recall authority possessed by many regulatory agencies as well as various federal and state consumer protection policies.⁶⁵ To reiterate what the *Framework for Global Electronic Commerce* properly recommended, “where governmental involvement is needed, its aim should be to support and enforce a predictable, minimalist, consistent and simple legal environment for commerce.”



We should work through challenges as they come at us, but the right policy default for the internet and for AI continues to be “innovation allowed.” Entrepreneurs and their creations must be treated as innocent until proven guilty.

64. Josh Withrow, “Don’t stifle U.S. tech innovation with Europe’s rules,” *Detroit News*, Oct. 9, 2022. <https://www.rstreet.org/2022/10/09/withrow-dont-stifle-u-s-tech-innovation-with-europes-rules-opinion>; Wayne T. Brough, “The EU’s Internet Power Play,” *Inside Sources*, Feb. 27, 2020. <https://www.insidesources.com/the-eus-internet-power-play>.

65. “Torts of the Future II: Addressing the Liability and Regulatory Implications of Emerging Technologies,” U.S. Chamber Institute for Legal Reform, April 2008. <https://instituteforlegalreform.com/wp-content/uploads/2020/10/tortsofthefuturepaperweb.pdf>.

Biden’s AI “Bill of Rights”—The Beginning of Burdensome Regulations?

The policy choices we make now will help determine which innovation culture the United States creates for AI and algorithmic innovations. The question is whether policymakers will reembrace the permissionless innovation vision that powered digital technologies and online services or revert to the permission-slip-oriented regulatory model of the analog era.

Some scholars note that evidence suggests, “we are moving away from permissionless innovation and toward the precautionary principle.”⁶⁶ Indeed, the Biden administration and many in Congress appear ready to reverse course and abandon the highly successful policy legacy of the permissionless innovation era.⁶⁷ While the Obama and Trump administrations generally embraced the Clinton administration’s market-driven vision for ICT, many policymakers are currently floating more aggressive regulatory approaches for both existing digital platforms as well as new algorithmic systems.⁶⁸

In October 2022, the White House released a “Blueprint for an AI Bill of Rights” (*AI Blueprint*) and an accompanying list of “Key Actions to Advance Tech Accountability and Protect the Rights of the American Public” (*Key Actions*).⁶⁹ This is part of a growing effort by the Biden administration to craft a broad-based governance framework for algorithmic systems.

While some of the recommendations in the *AI Blueprint* and corresponding *Key Actions* document are quite amorphous and aspirational, several could be burdensome in practice and represent a major setback for U.S. efforts to be a leader in global AI competition. With China and other countries attempting to catch up to the United States on the algorithmic technology front, the United States must implement smart policy that supports innovation and avoids a burdensome new regulatory regime.⁷⁰

Importantly, however, the 73-page *AI Blueprint* begins with a disclaimer that the document “is non-binding and does not constitute U.S. government policy” and also “does not require compliance with the principles described herein.”⁷¹ Thus, what follows in the document is merely a set of aspirational principles or suggested best practices, which is welcome news. If these best practices were to remain in the realm of “soft law”—i.e., unbinding and informal norms and standards—they might not be as constraining or burdensome in practice. The *AI Blueprint* dodges the question of whether these principles might be converted into formal policies, but



With China and other countries attempting to catch up to the United States on the algorithmic technology front, the United States must implement smart policy that supports innovation and avoids a burdensome new regulatory regime.

66. Eli Lehrer and M. Anthony Mills, “Fixing Science Policy,” *National Affairs* (Fall 2019). <https://www.nationalaffairs.com/publications/detail/fixing-science-policy>.

67. Adam Thierer, “President Biden Wants America to Become Europe on Tech Regulation,” R Street Institute, Jan. 12, 2023. <https://www.rstreet.org/2023/01/12/president-biden-wants-america-to-become-europe-on-tech-regulation>.

68. Adam Thierer, “U.S. Artificial Intelligence Governance in the Obama–Trump Years,” *IEEE Transactions on Technology and Society* 2:4 (December 2021). <https://ieeexplore.ieee.org/document/9541130>; Neil Chilson and Adam Thierer, “The Coming Onslaught of ‘Algorithmic Fairness’ Regulations,” Regulatory Transparency Project, Nov. 2, 2022. <https://rtp.fedsoc.org/paper/the-coming-onslaught-of-algorithmic-fairness-regulations>.

69. “Blueprint for an AI Bill of Rights: Making Automated Systems Work for the American People.” <https://www.whitehouse.gov/wp-content/uploads/2022/10/Blueprint-for-an-AI-Bill-of-Rights.pdf>; “Fact Sheet: Biden-Harris Administration Announces Key Actions to Advance Tech Accountability and Protect the Rights of the American Public,” The White House, Oct. 4, 2022. <https://www.whitehouse.gov/ostp/news-updates/2022/10/04/fact-sheet-biden-harris-administration-announces-key-actions-to-advance-tech-accountability-and-protect-the-rights-of-the-american-public>.

70. Thierer, “A Global Clash of Visions: The Future of AI Policy.” <https://thehill.com/opinion/technology/551562-a-global-clash-of-visions-the-future-of-ai-policy>.

71. “Blueprint for an AI Bill of Rights: Making Automated Systems Work for the American People,” p. 2. <https://www.whitehouse.gov/wp-content/uploads/2022/10/Blueprint-for-an-AI-Bill-of-Rights.pdf>.

an earlier Biden administration sketch of “a Bill of Rights for an AI-Powered World” suggested the need for “new laws and regulations to fill gaps,” and that “states might choose to adopt similar practices.”⁷²

With that framing in mind, the *AI Blueprint* opens by claiming that algorithmic systems are “unsafe, ineffective, or biased”; “deeply harmful”; “threaten the rights of the American public”; and “are used to limit our opportunities and prevent our access to critical resources or services.”⁷³ The *AI Blueprint* continues in this vein, repeatedly stressing possible dangers over potential opportunities.⁷⁴

It is certainly true that AI systems have their share of faults and potential dangers, just as every new technology poses certain risks. Some of these risks are real; others are hypothetical. Nevertheless, the *AI Blueprint* mostly stresses worst-case possibilities.

This is an issue because fear-driven policymaking undermines innovation culture. Living in constant fear of worst-case scenarios—and premising public policy on them—means that best-case scenarios will never come about.⁷⁵ This, in turn, denies the public many potential benefits of technologies that may be delayed or kept off the market. Instead, the United States needs a more flexible governance vision for AI that rejects fear-based policymaking as its starting point. And we can look to the Clinton-era internet principles for a more positive innovation culture vision of algorithmic governance.

Both the Biden administration’s *AI Blueprint* and the Clinton administration’s *Framework* contain five core principles, but those principles diverge considerably.⁷⁶ The Biden *AI Blueprint* focuses on affirmative obligations and constraints for AI innovators, whereas the Clinton *Framework* focuses on entrepreneurial freedoms.⁷⁷

Consider the *AI Blueprint*’s first principle: “You should be protected from unsafe or ineffective systems.”⁷⁸ Although that initial premise is reasonable, the *AI Blueprint* goes on to advise, “[a]utomated systems should not be designed with an intent or reasonably foreseeable possibility of endangering your safety or the safety of your community. They should be designed to proactively protect you from harms stemming from unintended, yet foreseeable, uses or impacts of automated systems.” Going further, the *AI Blueprint* suggests several other obligations for AI developers regarding this principle:

- “The public should be consulted in the design, implementation, deployment, acquisition, and maintenance phases of automated system development, with emphasis on early-stage consultation before a system is introduced or a large change implemented.”
- “Systems should undergo extensive testing before deployment.”

Fear-driven policymaking undermines innovation culture.



Living in constant fear of worst-case scenarios—and premising public policy on them—means that best-case scenarios will never come about and the public will be denied of many potential benefits.

72. Eric Lander and Alondra Nelson, “Americans Need a Bill of Rights for an AI-Powered World,” *Wired*, Oct. 8, 2021. <https://www.wired.com/story/opinion-bill-of-rights-artificial-intelligence>.

73. “Blueprint for an AI Bill of Rights: Making Automated Systems Work for the American People.” <https://www.whitehouse.gov/wp-content/uploads/2022/10/Blueprint-for-an-AI-Bill-of-Rights.pdf>.

74. *Ibid.*

75. Thierer, *Permissionless Innovation*.

76. “The Framework for Global Electronic Commerce.” <https://clintonwhitehouse4.archives.gov/WH/New/Commerce>; “Blueprint for an AI Bill of Rights: Making Automated Systems Work for the American People.” <https://www.whitehouse.gov/wp-content/uploads/2022/10/Blueprint-for-an-AI-Bill-of-Rights.pdf>.

77. *Ibid.*

78. “Blueprint for an AI Bill of Rights: Making Automated Systems Work for the American People,” p. 15. <https://www.whitehouse.gov/wp-content/uploads/2022/10/Blueprint-for-an-AI-Bill-of-Rights.pdf>.

- “Before deployment, and in a proactive and ongoing manner, potential risks of the automated system should be identified and mitigated.”
- “In some cases, it may be appropriate for an independent ethics review to be conducted before deployment.”

Although these best practices are not inherently objectionable, if they were to be translated into regulatory requirements improperly, they could give rise to a more convoluted process for algorithmic design based on highly subjective and potentially unforeseeable potential future risks.

Other principles found in the report seek to limit data collection and create broad, open-ended requirements for algorithmic innovators to create opt-out or complaint procedures. Another of the five major principles relates to avoiding algorithmic discrimination, and the document suggests that this “should include proactive equity assessments as part of the system design” as well as a formal algorithmic impact assessment. Algorithmic audits and impact assessments have become increasingly popular in the field of AI governance, with many academics and others suggesting that they could be a useful tool for evaluating algorithmic design and functionality in a search for various risks.⁷⁹

Congressional lawmakers are floating many new laws to regulate AI in a top-down fashion.⁸⁰ The Algorithmic Accountability Act of 2022 would require that any large company that “deploys any augmented critical decision process” must undertake algorithmic impact assessments “to eliminate or mitigate, in a timely manner, any impact made by an augmented critical decision process that demonstrates a likely material negative impact that has legal or similarly significant effects on a consumer’s life.”⁸¹ The law mandates that firms file those audits with the Federal Trade Commission and creates a new Bureau of Technology within the agency to oversee the process. Legislators have proposed many other laws to regulate algorithms in an attempt to address broader social issues, such as hate speech, conspiracy theories and child safety, including the “Protecting Americans from Dangerous Algorithms Act.” Many academics have already promoted formal regulatory ideas and agencies like an “FDA for Algorithms,” a National Algorithmic Technology Safety Administration, or an AI Control Council, among other ideas.⁸²

Other academics have suggested modeling algorithmic audits and permitting procedures after the National Environmental Policy Act (NEPA), a 1970 law that requires formal environmental impact statements for major federal actions “significantly affecting the quality of the human environment.”⁸³ Many states have adopted similar regulatory requirements.

BIDEN’S AI “BILL OF RIGHTS” KEY TAKEAWAY

Although these best practices are not inherently objectionable, if they were to be translated into regulatory requirements improperly, they could give rise to a more convoluted process for algorithmic design based on highly subjective and potentially unforeseeable potential future risks.

79. Dillon Reisman et al., “Algorithmic Impact Assessments: A Practical Framework for Public Agency Accountability,” AI Now, April 2018. <https://ainowinstitute.org/aiareport2018.pdf>; Emanuel Moss et al., “Assembling Accountability: Algorithmic Impact Assessment for the Public Interest,” Data & Society, 2021. <https://datasociety.net/library/assembling-accountability-algorithmic-impact-assessment-for-the-public-interest>.

80. Chilson and Thierer. <https://rtp.fedsoc.org/paper/the-coming-onslaught-of-algorithmic-fairness-regulations>.

81. H.R.6580, “Algorithmic Accountability Act of 2022,” 117th Congress (2021-2022).

82. Andrew Tutt, “An FDA for Algorithms,” *Administrative Law Review* 69:1 (2017). https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2747994; Anton Korinek, “Why we need a new agency to regulate advanced artificial intelligence: Lessons on AI control from the Facebook Files,” Brookings, Dec. 8, 2021. <https://www.brookings.edu/research/why-we-need-a-new-agency-to-regulate-advanced-artificial-intelligence-lessons-on-ai-control-from-the-facebook-files>.

83. Moss et al. <https://datasociety.net/library/assembling-accountability-algorithmic-impact-assessment-for-the-public-interest>; Andrew D. Selbst, “An Institutional View Of Algorithmic Impact Assessments,” *Harvard Journal of Law & Technology* 35:1 (Fall 2021), pp. 117-191. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3867634.

NEPA is a troubling model for algorithmic audits because it is now widely acknowledged that the law slows progress on important societal goals and projects. Analysts have found that NEPA assessments, which were initially just a few pages long, today average more than 600 pages and include appendices that average over 1,000 pages.⁸⁴ These assessments now also take an average of 4.5 years to complete, and some take much longer.⁸⁵ This process has held up or even derailed many important infrastructure projects and clean energy initiatives. One NEPA expert notes that the law has also become highly politicized and “seems easily captured by small groups with strongly held opinions” who stand ready to block almost all progress on important projects, adding, “[b]ecause it adds cost and uncertainty to any new major project, NEPA is effectively a bias towards the status quo.”⁸⁶ *The Atlantic* notes that, “many people within the environmentalist movement are undermining the nation’s emissions goals in the name of localism and community input.”⁸⁷

If NEPA becomes a model for mandated algorithmic audits, AI innovation would similarly grind to a halt in the face of lengthy delays, formidable paperwork burdens and considerable compliance costs. Opponents of different forms of AI innovation would use the mandatory auditing process to slow or block important algorithmic advances, all in the name of “democratic input” that would not likely be all that democratic in reality. Instead, a small number of vociferous regulatory advocates and special interests would simply use the process to constantly veto new ideas and products.

To reiterate, as abstract best practices, many of the *AI Blueprint’s* recommendations are unobjectionable, including the notion that AI developers should regularly evaluate their algorithms for negative impacts. Using occasional voluntary audits might be one way of carrying out this objective. However, if the *AI Blueprint’s* principles come to inspire the passage of new laws like the Algorithmic Accountability Act, or if they encourage federal regulatory agencies to aggressively regulate under amorphous existing authority, or even if they encourage states to impose a patchwork of algorithmic mandates, the resulting regulatory system would open AI innovators to massive ex-ante compliance costs or ex-post liability threats.

If such principles were imposed through a top-down, technocratic system, the United States would be walking down the path that the European Union (EU) has already charted with its regulatory regime for the data-driven economy, which decimated its information technology sector.⁸⁸ The EU is now preparing to expand that regime through a new Artificial Intelligence Act, which creates a new European Artificial Intelligence Board that will enforce a complex system of algorithmic “conformity assessments” and impose steep fines for violations. Compliance costs will likely devastate small and medium sized enterprises and limit AI innovation



If such principles were imposed through a top-down, technocratic system, the United States would be walking down the path that the EU has already charted with its regulatory regime for the data-driven economy, which decimated its information technology sector.

84. Eli Dourado, “Why are we so slow today?,” The Center for Growth and Opportunity, Mar. 12, 2020. <https://www.thecgo.org/benchmark/why-are-we-so-slow-today>.

85. Ibid.

86. Brian Potter, “How NEPA works,” *Construction Physics*, Aug. 19, 2022. <https://constructionphysics.substack.com/p/how-nepa-works>.

87. Jerusalem Demsas, “Not Everyone Should Have a Say,” *The Atlantic*, Oct. 19, 2022. <https://www.theatlantic.com/ideas/archive/2022/10/environmentalists-nimby-permitting-reform-nepa/671775>.

88. Nicolas Petit and David Teece, “Europe Should Embrace Digital Change, Not Strangle It,” *Financial Times*, Nov. 1, 2020. <https://www.ft.com/content/2e33a29f-b619-4623-82af-2ad352bba898>.

across the continent.⁸⁹ The European Commission itself estimates that the mandate to set up the quality management systems required by the law will cost roughly \$193,000-\$330,000 upfront plus \$71,400 in yearly maintenance cost.⁹⁰

Toward Agile Governance for AI

It remains to be seen where the Biden administration, Congress and the states will take AI policy from here and how much those efforts may diverge from the permissionless innovation vision that has undergirded U.S. innovation and growth over the past quarter century. If President Joe Biden’s “Bill of Rights” instead becomes a bill of regulations, it will be a major setback to U.S. efforts to innovate and compete globally in the algorithmic economy of the future. Even in the absence of federal action, U.S. algorithmic innovators could also be squeezed between the worst of what the European Union seeks to impose on global firms and the looming patchwork of convoluted algorithmic regulations that are emerging at the state and local levels nationwide.⁹¹

Polymakers should once again work in a bipartisan fashion to spur another U.S.-led technological revolution by ensuring that algorithmic technologies are “born free” and that creative minds are given a green light to launch new ideas and products without onerous prior restraints. Polymakers and innovators need to work together to find flexible, iterative, bottom-up governance solutions over time. This sort of governance approach envisions many different actors and mechanisms playing a role in ensuring a well-functioning system, often outside of traditional political or regulatory systems.

“Soft Law”

Many types of so-called “soft-law” solutions can fill governance gaps for algorithmic systems.⁹² Soft law is a catch-all term for the many informal, iterative, experimental and collaborative solutions that are becoming increasingly common governance mechanisms for complex and fast-moving emerging technology sectors.⁹³

Soft-law governance mechanisms differ from hard law in that they lack the same degree of enforceability.⁹⁴ The list of soft-law approaches is constantly evolving, but includes multi-stakeholder processes; experimental “sandboxes”; industry best practices or codes of conduct; technical standards; private certifications; agency workshops and guidance documents; informal negotiations; and education and awareness-building efforts. Many countries like Japan, Singapore and South Korea are pursuing more flexible and decentralized governance approaches for AI that are



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89. Adam Thierer, “Why the Future of AI Will Not Be Invented in Europe,” *Technology Liberation Front*, Aug. 1, 2022. <https://techliberation.com/2022/08/01/why-the-future-of-ai-will-not-be-invented-in-europe>.

90. “Study supporting the impact assessment of AI regulation,” European Commission, April 21, 2021, p. 12. <https://digital-strategy.ec.europa.eu/en/library/study-supporting-impact-assessment-ai-regulation>.

91. Chilson and Thierer. <https://rtp.fedsoc.org/paper/the-coming-onslaught-of-algorithmic-fairness-regulations>.

92. Adam Thierer, “Governing Emerging Technology in an Age of Policy Fragmentation and Disequilibrium,” American Enterprise Institute, April 2022. <https://platforms.aei.org/can-the-knowledge-gap-between-regulators-and-innovators-be-narrowed>.

93. Ryan Hagemann et al., “Soft Law for Hard Problems: The Governance of Emerging Technologies in an Uncertain Future,” *Colorado Technology Law Journal* 17 (Feb. 5, 2018). https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3118539.

94. Gary E. Marchant and Brad Allenby, “Soft law: New tools for governing emerging technologies,” *Bulletin of the Atomic Scientists* 73:2 (Feb. 15, 2017), p. 108. <https://www.tandfonline.com/doi/abs/10.1080/00963402.2017.1288447>.

mostly nonregulatory in character.⁹⁵ Multi-stakeholder processes are a particularly important type of soft law, and they have been used extensively over the past quarter century to address a variety of internet-era technology developments.⁹⁶

Private Standards and Best Practices

Professional bodies and standards-setting organizations also play an important role in shaping best practices for AI. Organizations such as the Association of Computing Machinery, the Institute of Electrical and Electronics Engineers, the International Organization for Standardization and UL (formerly known as Underwriters Laboratory) have all developed ethical guidelines and standards to ensure “safety-by-design” (which incorporates privacy, safety and antidiscrimination guidelines).⁹⁷

Many major trade associations and individual companies have been formulating governance frameworks and ethical guidelines for AI development and use. For example, among large trade associations, the U.S. Chamber of Commerce, the Business Roundtable, the BSA | The Software Alliance, ACT (The App Association) and the Consumer Technology Association have all recently released major AI best-practice guidelines.⁹⁸ Many large tech companies have also adopted guidelines for ethical AI practices, including IBM, Intel, Google, Microsoft, Salesforce, SAP and Sony, among others. There is remarkable consistency among these corporate statements in terms of the best practices and ethical guidelines they endorse. Each trade association or corporate set of guidelines align closely with a core set of “ethics by design” values.

These more bottom-up and agile governance approaches go a long way toward helping to promote a culture of responsibility among leading AI innovators, and they represent a better way of balancing safety and innovation for complex, rapidly evolving computational and computing technologies like AI. To foster a positive innovation culture, the United States’ goal should be to build on these soft law governance mechanisms and supplement them with voluntary certification and auditing regimes to enhance AI ethical practices. This can be done in a more flexible and voluntary way to avoid onerous, precautionary, principle-oriented regulatory mandates.

Ongoing Multi-Stakeholder Efforts

The government should still have a role, but it should squarely focus on helping convene different stakeholders to work toward consensus best practices on an



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95. Hodan Omaar, “Comments to the International Trade Administration on AI Export Competitiveness,” Information Technology & Innovation Foundation, Oct. 17, 2022, pp. 3-5. <https://itif.org/publications/2022/10/17/comments-to-ita-on-ai-export-competitiveness>.
96. Thierer, “Soft Law in ICT Sectors: Four Case Studies.” https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3777490.
97. Jeanna Matthews, “Request for Information to the Update of the National Artificial Intelligence Research and Development Strategic Plan: Responses,” Association of Computing Machinery, March 4, 2022. <https://www.ai.gov/rfi/2022/87-FR-5876/NAIRDSP-RFI-2022-Eisgrau-ACM.pdf>; “ACM Code of Ethics and Professional Conduct,” Association for Computing Machinery, 2018. <https://www.acm.org/code-of-ethics>; “Ethically Aligned Design: A Vision for Prioritizing Human Well-Being with Autonomous and Intelligent Systems,” The IEEE Global Initiative on Ethics of Autonomous and Intelligent Systems, 2017. https://standards.ieee.org/wp-content/uploads/import/documents/other/ead_v2.pdf; “Artificial intelligence,” ISO, 2017. <https://www.iso.org/committee/6794475.html>; “Presenting the Standard for Safety for the Evaluation of Autonomous Vehicles and Other Products,” Standards & Engagement, March 15, 2022. <https://ul.org/UL4600>.
98. “U.S. Chamber Releases Artificial Intelligence Principles,” U.S. Chamber of Commerce, Sept. 23, 2019. <https://www.uschamber.com/technology/us-chamber-releases-artificial-intelligence-principles>; “Artificial Intelligence,” Business Roundtable, last accessed Nov. 7, 2022. <https://www.businessroundtable.org/policy-perspectives/technology/ai>; “BSA Releases Framework to Confront Bias in Artificial Intelligence and Calls for Legislation,” BSA The Software Alliance, June 8, 2021. <https://www.bsa.org/news-events/news/bsa-releases-framework-to-confront-bias-in-artificial-intelligence-and-calls-for-legislation>; “ACT | The App Association’s Policy Principles for Artificial Intelligence,” ACT, Aug. 19, 2021. <https://www.nist.gov/document/act-app-associations-policy-principles-artificial-intelligence-online-submission>; “Artificial Intelligence,” Consumer Technology Association, last accessed Nov. 7, 2022. <https://www.cta.tech/Topics/Artificial-Intelligence>.

ongoing basis.⁹⁹ The National Institute of Standards and Technology (NIST) is already taking these steps. It has developed an *AI Risk Management Framework*, which already addresses many of the concerns raised in the Biden Blueprint, but in a more flexible and less fear-based fashion.¹⁰⁰

This NIST project, which builds on a previous multi-stakeholder effort on cybersecurity risk, is meant to help AI developers better understand how to identify and address various types of potential algorithmic risk.¹⁰¹ NIST notes that this voluntary *Framework* “is designed to be responsive to new risks as they emerge” instead of attempting to itemize them all in advance. NIST notes that “[t]his flexibility is particularly important where impacts are not easily foreseeable and applications are evolving” and acknowledges that although some of the risk and benefits of AI are well known, assessing the degree of actual harm associated with some of the negative impacts can be challenging.¹⁰² This is a sensible way to think about AI risks because it makes it clear that it will be difficult to preemptively identify and address all potential issues and concerns in advance.

Product Recall Authority and Consumer Protection Law

It is also worth reiterating that emerging technologies like AI and robotics will continue to be governed by a wide variety of other existing regulatory and court-based mechanisms. Consumer protection agencies (like the Federal Trade Commission or comparable state offices) continuously bring actions against bad actors who engage in unfair and deceptive practices. Moreover, several regulatory agencies possess recall authority that allows them to remove products from the market when certain unforeseen problems become apparent. For example, the National Highway Traffic Safety Administration, Food & Drug Administration and Consumer Product Safety Commission all possess broad recall authority that could be used to address risks that develop for many algorithmic or robotic defects.

Courts and Common Law

Meanwhile, America’s court system offers countless remedies for actual harms that may develop. Contracts, property rights, nuisance laws, torts and products liability are all bodies of law that offer potential solutions to complex (and potentially unforeseeable) issues that come about. One scholar noted that “when confronted with new, often complex, questions involving products liability, courts have generally gotten things right.”¹⁰³ He added that “[p]roducts liability law has been highly adaptive to the many new technologies that have emerged in recent decades,” and, by extension, it will adapt to other technologies and developments as cases and controversies come before the courts.¹⁰⁴ The common law will adapt to



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99. Lawrence E. Strickling and Jonah Force Hill, “Multi-stakeholder internet governance: successes and opportunities,” *Journal of Cyber Policy* 2:3 (2017), pp. 298-299. <https://www.tandfonline.com/doi/abs/10.1080/23738871.2017.1404619>.

100. National Institute of Standards and Technology, “Artificial Intelligence Risk Management Framework (AI RMF 1.0),” U.S. Department of Commerce, January 2023. <https://www.nist.gov/news-events/news/2023/01/nist-risk-management-framework-aims-improve-trustworthiness-artificial>.

101. Ibid.

102. Ibid., p. 4.

103. John Villasenor, “Who Is at Fault When a Driverless Car Gets in an Accident?” *The Atlantic*, April 25, 2014. <http://www.theatlantic.com/business/archive/2014/04/who-is-at-fault-when-a-driverless-car-gets-in-an-accident/361250>.

104. Ibid.

address new technological realities in the world of AI and robotics just as it already did for consumer electronics, computing, the internet and many other earlier technologies. Unfortunately, the Biden *AI Blueprint* makes little mention of existing regulatory or court-based remedies, instead suggesting that we will need many new layers of potential preemptive compliance burdens.

Reputational Incentives and Ongoing Competition

Finally, firms have powerful incentives to improve the safety and security of their systems to avoid not only punishing liability, but also unwanted press attention and lost customers.¹⁰⁵ Moreover, competition will continue to be the most important pro-consumer policy of all. The most effective solution to technological problems usually lies in more innovation, not less of it.

Conclusion: Embracing a Dynamic, Open Future

As policymakers consider governance solutions for AI and computational systems, they should appreciate how a policy paradigm that stacks the deck against innovation by default will get significantly less innovation as a result. Innovation culture is a function of incentives, and policy incentives can influence technological progress both directly and indirectly.

Over the last half century, “regulation has clobbered the learning curve” for many important technologies in the United States in a direct way, especially those in the nuclear, nanotech and advanced aviation sectors.¹⁰⁶ Society has missed out on many important innovations because of endless foot-dragging or outright opposition to change from special interests, anti-innovation activists and over-zealous bureaucrats.

Furthermore, when government leaders and other critics demonize AI and computational science, it discourages individuals from studying or pursuing careers in these fields. After all, few would want to try to operate in an innovation cage, constantly struggling to gain the freedom to experiment, when other sectors (or even nations) offer a more hospital environment.

The Biden administration’s *AI Blueprint* could send a similar message. It reads more like a blueprint for aspiring tech critics and trial lawyers who hope to bottle up algorithmic innovations rather than helping to advance them. That is not the best way for a country to craft a positive innovation culture. Our nation’s policy toward AI, robotics and algorithmic innovation should embrace a dynamic future and the enormous possibilities that await us.

“Regulation has clobbered the learning curve.”



Society has missed out on many important innovations because of endless foot-dragging or outright opposition to change from special interests, anti-innovation activists and over-zealous bureaucrats.

105. Adam Thierer et al. “How the Internet, the Sharing Economy & Reputation Feedback Mechanisms Solve the ‘Lemons Problem,’” Mercatus Center at George Mason University, May 2015. <https://www.mercatus.org/students/research/working-papers/how-internet-sharing-economy-and-reputational-feedback-mechanisms>.

106. J. Storrs Hall, *Where Is My Flying Car?* (Stripe Press, 2021), p. 164.

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