
LESSONS FROM THE PAST FOR REGULATING AI

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*Lessons from the Past for Regulating AI*¹

ABSTRACT

To offer some insight into the question of how Artificial Intelligence should be regulated, this essay looks at experience with regulating past novel technologies—commercial flight, biotechnology, and the internet. These case studies help inform some preliminary lessons that may be applicable to other emerging technologies, including AI.

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I. Introduction

Ever since ChatGPT burst on the scene in November 2022, the potential risks as well as promises of generative AI have commanded the attention of policy officials and the public. Within weeks of its launch, a [Guardian](#) editorial warned that “AI’s potential for harm should not be underestimated,” and called for regulation to keep people safe. In March 2023, the Future of Life Institute issued an [open letter](#), signed by some tech industry CEOs, academics, and others, warning that “AI systems with human-competitive intelligence can pose profound risks to society and humanity,” and calling on “all AI labs to immediately pause for at least 6 months the training of AI systems more powerful than GPT-4.”

The European Union was the first government to take comprehensive regulatory action. In March of 2023, it passed the [EU Artificial Intelligence Act](#) establishing EU-wide rules on data quality, transparency, human oversight, and accountability. The Act classifies [AI systems](#) into four categories of risk, which face different restrictions ranging from complete prohibition for those systems determined to present “unacceptable” risks, to no regulation for those considered “minimal” risk.

At the end of October 2023, President Biden issued [Executive Order \(E.O.\) 14110](#), titled “Safe, Secure, and Trustworthy Development and Use of AI.” At 36 pages of fine print, it is among the longest executive orders ever issued. Among other things, it directs agencies to issue regulations within specified time frames and requires developers to share safety test results and other critical information with the U.S. government. In addition to focusing on privacy concerns, it calls for policies to advance equity and civil rights, stand up for consumers, patients, and students, and support workers and collective bargaining. President-elect Trump has [promised to revoke](#) the order when he takes office in January 2025.

How should regulators think about AI? GenAI certainly presents risks, ranging from deepfakes, plagiarism, and falsehoods presented as convincing facts ([ABA 2023](#)), to a technological singularity scenario where machine intelligence surpasses humans. Are these so novel and unique that they require an entirely new regulatory framework, or can existing principles, practices, and regulatory authorities address at least some of these concerns?

To offer some insight into this question, this essay looks at experience with regulation of past novel technologies—commercial flight, biotechnology, and the internet. These case studies help inform some preliminary lessons that may be applicable to other emerging technologies, including AI.

I. Three Case Studies

What lessons for AI policy can we draw from past regulatory experience? Three case studies of novel technologies from the past may provide some clues. Commercial air travel was initially

regulated heavily, not only with respect to safety, but to control prices and routes. When those economic regulations were lifted, competition led to new innovation and consumer welfare gains. In regulating the emerging biotechnology and internet sectors, the U.S. government took targeted approaches to regulation that allowed these burgeoning technologies to flourish.

a. Airline Deregulation

The advent of commercial air travel a few short decades after the Wright brothers' first flight offered exciting new possibilities, but also risks. President Franklin Roosevelt signed the [Civil Aeronautics Act in 1938](#) to oversee and encourage air transportation and commerce, to investigate accidents, and to review and approve routes and rates for air travel that are “in the public interest and in accord with public convenience and necessity.”

The Civil Aeronautics Board (CAB), like the Interstate Commerce Commission established 50 years earlier, responded to concerns over market power in the new sectors they regulated (airlines and rails). Similar market power concerns have been [expressed](#) regarding AI today. The CAB attempted to address these concerns by controlling private sector economic activities with price ceilings or floors, quantity restrictions, and service conditions. Though the public interest argument for these actions was to protect consumers from producers' market power, [observers](#) became increasingly concerned that these economic regulatory agencies, were “captured” by the industries they regulated. Scholarship in the fields of economics, antitrust, and law (e.g., [Stigler 1971](#)) [increasingly found](#) that regulation of private sector prices, entry, and exit tended to keep prices higher than necessary, benefiting regulated industries to the detriment of consumers.

According to a 1977 Harvard Kennedy School [case study](#) of the CAB:

Under its rate-setting philosophy, the CAB totally prevented price competition. All airlines charged the same fares for the same flights. When one raised prices, all followed suit. The market was further limited by the Board's consistent refusal to allow new competition into the arena. In the name of protectionism, the last thing the Board felt “in the public interest” was more competition, so all certificates for entry were denied.

By the 1970s, the negative impact of rate and route regulation was becoming [increasingly apparent](#). Senator Ted Kennedy, chair of the Senate Judiciary Subcommittee on Administrative Practice and Procedure, [launched](#) a “long-range systematic study of economic regulation” through a series of hearings beginning with the CAB. This effort brought together “a group of political forces all in favor [of deregulation] ranging from Senator Thurmond and the [Gerald Ford] administration, and all the traditional laissez-faire Republicans, on the one hand, and over to Ralph Nader and the consumer Democrats on the other” (Justice Stephen Breyer, quoted in [Harvard case study](#)).

[Bipartisan efforts](#) across all three branches of government eventually led to the abolition of the CAB, and removal of unnecessary regulation of rates and service in airlines and several other previously regulated industries, with resulting improvements in innovation and [consumer welfare](#). Airlines offered more frequent flights and ticket prices declined, making airline travel no longer a luxury reserved for the wealthy.

A key lesson from this experience is this: So-called “economic” types of regulation intended to constrain monopolies and achieve vaguely defined notions of the “public interest,” including price controls, rate-of-return regulations, exclusive licenses, line-of-business restrictions, and quality-of-service or access requirements, tend to restrict competition and benefit incumbents. Unleashing competition by removing those forms of regulation can lower prices, improve service, and enable innovation.

b. Coordinated Framework for Regulating Biotechnology

The development in 1973 of recombinant DNA—the ability to splice DNA from different species, edit the genetic code, and create genes with new functions—heralded exciting new possibilities but also raised public health and ethical concerns. In response, scientists, ethicists, and journalists convened in 1975 at what became known as the Asilomar Conference and agreed to halt research until these concerns could be addressed. The moratorium on recombinant DNA research lasted 16 months, while the National Institutes of Health’s (NIH) Recombinant DNA Advisory Committee (RAC) converted the Asilomar Conference’s statement of principles into the first formal framework for biotechnology research and oversight. The RAC guidelines “prescribe[d] the conditions under which institutions which receive NIH funds must conduct [experiments](#).” With experience over the next few years, these NIH guidelines were incrementally relaxed, with fewer experiments requiring case-by-case federal approval.

A key lesson from this very early experience with genetic engineering is that iterative policies that adjust quickly as new information is learned can be most agile when dealing with emerging issues.

The research that flourished under this approach supported rapid development of gene editing technology and began to yield commercial applications by the early 1980s. Then, regulatory agencies began to assert jurisdiction over these new products, and legislators contemplated whether new laws and new agencies might be needed. The White House formed a Working Group on Biotechnology, chaired by the Office of Science and Technology Policy, which included both the cognizant research and regulatory agencies. After several years of joint effort, this led to the issuance of the [Coordinated Framework for Regulation of Biotechnology](#) in 1986. The *Coordinated Framework* “sought to achieve a balance between regulation adequate to ensure health and environmental safety while maintaining sufficient regulatory flexibility to avoid impeding the growth of an infant industry.”

This risk-benefit balancing approach, in contrast to the more precautionary approaches taken by Europe and other countries, fostered U.S. innovation in medical and agricultural applications.

Two features of the *Coordinated Framework* contributed to its success at achieving its stated goal of balancing risks and innovation—one relates to the composition of the working group that developed it and the other to its focus on characteristics of the products rather than processes used to derive them (e.g., traditional vs. newer genetic modification tools).

The White House working group included agencies with a research focus, as well as those with regulatory responsibilities. The research agencies—the NIH and the National Science Foundation, along with parts of the Department of Agriculture (USDA)—were interested in the promise of the new technology, and their involvement helped balance the concerns of the regulatory agencies who were more focused on the risks.

There is a lesson here on the value of bringing different perspectives to bear on novel issues. In the case of biotechnology, engaging agencies with competing views led to policies that appreciated the benefits as well as the risks of the emerging technology. Single-mission agencies are susceptible to [tunnel vision](#) that can be [countered](#) by constructive collaboration and exposure to other viewpoints.

Also important was that the government eschewed establishing a new statutory approach or a single biotechnology regulatory agency as unworkable [given](#) “the very broad spectrum of products obtained with genetic engineering [that] cut across many product uses regulated by different agencies.” [Instead](#), “upon examination of the existing laws available for the regulation of products developed by traditional genetic manipulation techniques, the working group concluded that [with the exception of certain microbial products] these laws as currently implemented would address regulatory needs adequately.”

Using existing authorities, agencies agreed to focus on the characteristics of the products developed through genetic engineering techniques, rather than regulate the techniques themselves (Mannix 2024). The USDA thus oversaw genetically engineered plants and animals in agriculture; the Environmental Protection Agency (EPA) regulated pesticides and new chemical products; and the Food and Drug Administration (FDA) regulated food, drugs, and medical devices derived from biotechnology.

Focusing on the likely risks of a product, rather than focusing on the technology or process used to produce it, made applying existing regulatory practices manageable and avoided unduly precautionary policies. In many cases ex-post remedies, rather than ex-ante approvals, were deemed sufficient to protect public health and safety.

c. Regulation of the Internet

By the mid-1990s, the breakup of the AT&T monopoly and deregulation in the telecommunications sector had opened up competition in high-speed information services. The 1996 [Telecommunications Act](#) distinguished emerging information services from traditional telecommunications services and exempted them from common carrier regulation that still applied to the latter. According to [Ehrlich](#), the Act was a “watershed event” that “set the stage for the dynamic growth we have seen in American broadband,” which has been a key driver in the expansion and evolution of the Internet.

At the same time, the Clinton administration embraced the possibilities the emerging “global information infrastructure” offered. Its [1997 Framework for Global Electronic Commerce](#) emphasized the Internet’s potential to revolutionize commerce, reduce transaction costs, and create a global marketplace. It envisioned the Internet as a “[vibrant global marketplace](#)” whose potential could be realized fully only if governments “[adopt](#) a non-regulatory, market-oriented approach to electronic commerce, one that facilitates the emergence of a transparent and predictable legal environment to support global business and commerce.”

The [framework](#) recognized that:

Unnecessary regulation of commercial activities will distort development of the electronic marketplace by decreasing the supply and raising the cost of products and services for consumers the world over. Business models must evolve rapidly to keep pace with the break-neck speed of change in the technology; government attempts to regulate are likely to be outmoded by the time they are finally enacted, especially to the extent such regulations are technology-specific.

It embodied [five principles](#), which are quoted here in full because they provide valuable lessons for AI and other emerging technology:

1. The private sector should lead. The Internet should develop as a market driven arena not a regulated industry. Even where collective action is necessary, governments should encourage industry self-regulation and private sector leadership where possible.
2. Governments should avoid undue restrictions on electronic commerce. In general, parties should be able to enter into legitimate agreements to buy and sell products and services across the Internet with minimal government involvement or intervention. Governments should refrain from imposing new and unnecessary regulations, bureaucratic procedures or new taxes and tariffs on commercial activities that take place via the Internet.

3. Where governmental involvement is needed, its aim should be to support and enforce a predictable, minimalist, consistent and simple legal environment for commerce. Where government intervention is necessary, its role should be to ensure competition, protect intellectual property and privacy, prevent fraud, foster transparency, and facilitate dispute resolution, not to regulate.

4. Governments should recognize the unique qualities of the Internet. The genius and explosive success of the Internet can be attributed in part to its decentralized nature and to its tradition of bottom-up governance. Accordingly, the regulatory frameworks established over the past 60 years for telecommunication, radio and television may not fit the Internet. Existing laws and regulations that may hinder electronic commerce should be reviewed and revised or eliminated to reflect the needs of the new electronic age.

5. Electronic commerce on the Internet should be facilitated on a global basis. The Internet is a global marketplace. The legal framework supporting commercial transactions should be consistent and predictable regardless of the jurisdiction in which a particular buyer and seller reside.

Lesson: With rapidly evolving technology, the government should let the private sector lead and take a “minimalist” approach to intervention that encourages competition, protects property rights, ensures a “consistent and simple legal environment” and targets tangible concerns (like privacy and preventing fraud).

II. Applying Lessons to AI

Many of these lessons apply to AI and other emerging technologies. Four themes emerge: competition can be a powerful regulator, institutional design matters, existing authorities may or may not be conducive to new innovations, and policies should be designed with adaptation and agility in mind.

a. Unleash competition as a powerful regulator

Past experience with airline regulation and deregulation suggests that competition is more likely to encourage innovation and improve public welfare than economic types of regulation aimed at constraining monopolies and achieving vaguely defined notions of the “public interest.”

Some have [suggested](#) that aggressive ex-ante regulation is necessary to prevent big tech companies from monopolizing AI, but experience with airlines and other forms of economic regulation shows that such regulation is more likely to reinforce market power than restrain it. It would also hinder the innovation that competition and private-sector-led agendas enable, as experience from the early Internet regulation shows.

The Clinton administration’s focus on the government’s role in “[support](#)[ing] and enforce[ing] a predictable, minimalist, consistent and simple legal environment for commerce” enabled the private sector to take risks, experiment, and learn.

The best remedy for potential market power is competition, and what Schumpeter called [creative destruction](#), in which new products are constantly replacing old ones. In mid-2000s, there was much handwringing over MySpace’s market power; it had the [textbook characteristics](#) of a natural monopoly, yet within a few years, it was rendered obsolete by innovative competition from Facebook, LinkedIn, and other platforms.

GenAI is [not currently dominated](#) by a few large companies; however, a real concern is that ex-ante government involvement would provide the venue by which large players can dictate a regulatory framework that imposes barriers to competitors, thereby supporting and cementing their market power.

b. Design institutions to embrace diverse perspectives

[Regulatory humility](#) acknowledges that no one person or entity can possibly have the foresight or knowledge to design an ideal regulatory system that balances the benefits and risks that AI brings. Consciously structuring institutions to embrace different perspectives, disciplines, and evidence can be challenging, but the rewards in recognizing risk-benefit tradeoffs and facilitating positive innovations can be great. As the biotechnology experience shows, single-mission agencies are susceptible to tunnel vision that can be countered by constructive collaboration with other viewpoints. Collaboration across agencies, coordination, and oversight helped achieve policies and practices that allowed beneficial applications to flourish.

Such cross-fertilization should not be limited to government actors. The Clinton Internet framework’s explicit deference to the private sector as the logical leader, along with a recognition that even when collective action is called for, mechanisms other than federal control or regulation may be appropriate, allowed the Internet to flourish.

Note that the Asilomar conference on biotechnology that agreed to a temporary pause in new genetic engineering research involved lead researchers, as well as ethicists, policy officials, and others. It successfully orchestrated a brief moratorium on new research. In contrast, the Future of Life Institute’s [calls for a moratorium](#) [have not](#) been heeded despite an impressive number of signatures, perhaps because they have not engaged diverse views. (Another reason may be its precautionary goal of waiting for “[protocols](#) [that] ensure that systems adhering to them are safe beyond a reasonable doubt.”)

c. Recognize when existing policies are appropriate

The Telecommunications Act recognized that new information technologies were not suited to the traditional common carrier regulations that applied to telephones. By allowing the new “global information infrastructure” to operate without those restrictive regulations, it and the Clinton administration’s light-handed regulatory philosophy, opened the door to unanticipated innovations.

In contrast, the regulation of biotechnology took a different approach. Unlike the Internet, the products of new tools for genetic modification were often very similar to those produced by more traditional means. In some cases, the new products were clearly better: synthetic human insulin was less risky for diabetics than either pig insulin or insulin from human cadavers. Focusing on the likely risks of the product, rather than hypothetical risks of the technology or process used to achieve it, made applying existing regulatory practices manageable and avoided unduly precautionary policies. This is consistent with [long-standing](#) principles preferring performance standards and market-based approaches to technology-based standards.

Many existing laws and regulations [already cover](#) AI-enabled practices that violate civil rights, consumer protections, the environment, intellectual property, and national security.

d. When regulation is necessary, focus on agility

A key lesson from the early days of biotechnology research is that iterative policies that adjust quickly with new information learned can be most agile when dealing with emerging issues. Key to that agility is a learning agenda that applies defaults (e.g., no regulation under certain conditions), embraces trials and experimentation, and focuses on evidence-gathering, evaluation, and adaptation to new information. GenAI itself is based on iterative reinforcement learning—a [concept](#) that could apply well to regulation.

Relatedly, given the rapidly evolving nature of the Internet, the Clinton administration eschewed attempts at ex-ante regulation in favor of case-by-case, ex-post responses to actual problems. Its framework stated, “where governmental involvement is needed, its aim should be to support and enforce a predictable, minimalist, consistent and simple legal environment.” Standards that set performance goals, along with a recognition that private sector efforts to achieve those goals, including through voluntary standards, are more likely to be effective than top-down government controls.

For example, deep fakes are a concern with advances in GenAI. Rather than attempting one-size-fits-all standards (which likely would be violated by malevolent actors anyway), an agile regulatory approach might focus on provision of information (such as watermarks), redress based on [incident reporting](#), and existing laws and regulations against false information. Again, paving the way for the private sector to lead, rather than attempting to foresee and forestall future problems

has been shown to be more agile in the face of evolving technology. An important role for government could be ex-post enforcement against real harms.

GenAI is already in wide use around the world. As governments seek ways to address potential risks without hindering beneficial innovations, lessons from past emerging technology can provide insights. This essay examines past experience with emerging technologies and draws some preliminary lessons that government policy officials may want to consider when contemplating policies for AI.