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AI: How to Regulate an Emerging Tech?

Overall, the public is more concerned than excited about artificial intelligence (AI). Many of the worries seem justified, and politicians are taking note. On October 30, U.S. President Biden issued an ambitious 36-page Executive Order (EO) covering the technology. Further, this is a bipartisan priority and fifty-eight separate bills have been introduced to Congress.[1] We believe it is best to think of the EO and the swarm of legislative proposals as the first step in a long journey. A decade from now we will still be debating many of the same issues that are attracting headlines today.

New regulatory frameworks have followed all major technologies since railways in the 19th century, and AI will certainly not prove an exception. As the tech evolves, so must the regulatory environment. However, policymakers must face this challenge with caution and prudence, as no one knows what the AI landscape is going to look like even a year or two from now. The track record of regulation suggests one major risk is a rush to action, without the benefit of rigorous cost-benefit analysis and a firm understanding of how the technology is evolving. As often occurs, regulators would inflict a lot of harm in their vain attempt to do a little good. A second risk is strangling innovation, as frequently transpires in Europe, while a third is regulatory capture, which seems likely given the high stakes and dearth of AI expertise in government.

Survey results: A large majority is worried about AI

AI has been a big focus of pollsters in 2023 with dozens of surveys released.[2] The results are remarkably consistent across polls with several themes jumping out. The public is worried AI will:

- Reduce personal privacy and move us toward a surveillance state.
- Expedite algorithmic bias, deep fakes, deceptive political ads, and cyber-attacks.
- Be released prematurely, before models have been shown to be safe and secure.
- Accidentally cause a catastrophic event.

Overall, the survey results make it abundantly clear the public is much more anxious than optimistic about AI.

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[1] See the American Action Forum's AI legislation tracker: https://www.americanactionforum.org/list-of-proposed-ai-bills-table/

[2] Including those by Pew Research, YouGov, Ipsos, Gallup, Associated Press, NORC Center for Public Affairs, MITRE, Harris, Gartner, McKinsey, University of Chicago Harris School of Public Policy, and the AI Policy Institute.

Regarding the economic impact of AI, most people are concerned it could eventually replace their jobs and result in further concentration and power in the tech sector.[3] On a more positive note, a majority of respondents are optimistic AI will improve the quality of services they receive, especially in health care.

When asked about regulatory frameworks, most respondents do not trust tech self-regulation. This seems fair as, given the inherent conflict of interest, self-regulation rarely, if ever, works. Moreover, AI is largely owned by big tech, with most firms engaged in a race to the bottom, releasing systems before they are ready in an attempt to retain their dominant position. Given the field's winner-takes-most dynamic, big tech firms are less interested in safety than in speed, turbocharging their AI efforts to ensure they are on the front of the wave.[4] Given this economic imperative, it is not surprising the public wants increased transparency and supports federal regulation.

President Biden's Executive Order: A 10,000-mile journey begins with the first step

The EO issued on October 30 is remarkably long and comprehensive, covering a wide range of AI-related issues, with 150 requirements that federal agencies must now implement, in some cases, by the end of 2023.[5] The EO balances the two key priorities of innovation and safety, with thirty-six of the requirements addressing the former and another thirty focused on the later. A third priority, attracting AI talent to the federal government, is the subject of thirty-two requirements. Other policy issues addressed include privacy, intellectual property, cybersecurity, workforce disruption, competition, global leadership, and the military use of AI.

One of the most significant outcomes of the EO concerns the new regulations imposed on large foundation models. Specifically, going forward, any model that is more powerful than GPT-4 will need to conduct "red-team" safety tests pre-launch and report the results to the federal government.[6] A recent poll by the AI Policy Institute shows that 71% of American voters believe such "red-team" testing of large AI models is important.[7] Further, Biden's EO receives 69% support—including 64% by

Republicans—with only 15% opposing it. In fact, 75% of voters think the government should do even more to regulate to AI. While today's tech is new, we now show that many of the debates it has sparked are centuries old.

All major technologies are followed by new regulatory frameworks

The Baltimore and Ohio railroad, completed in 1827, was America's first regular carrier of passengers and freight. By 1835, dozens of local railroad networks had sprouted up, although most lines were only a few miles long. It was not until 1869 that the first transcontinental railroad was constructed. As the railroad industry boomed and became increasingly concentrated and powerful, the public demanded regulation of the sector. With the Interstate Commerce Act (1887) railways became the first industry subject to federal regulation. As the sector evolved the act was amended, at least eight times over the following century, and then in 1995 regulatory oversight was passed to the Surface Transportation Board.

Regulatory frameworks evolved similarly for automobiles (with the Federal Highway Act, 1921 and National Highway Traffic Safety Administration, 1968), airplanes (the Air Commerce Act, 1926 and Federal Aviation Administration, 1958), and nuclear power (the Atomic Energy Act, 1954 and Nuclear Regulatory Commission, 1974). Today there are over 220 federal agencies, including the Food and Drug Administration (1906), the Federal Communications Commission (1934), and so on. All major innovative technologies and industries have quickly been followed by regulations and AI will most definitely not prove an exception.

Regulation is tricky: Three common mistakes

The first risk concerns the balance between encouraging innovation and ensuring safety. The U.S. is usually much better at this than Europe, which tends to strangle innovation. This helps explain why most of the top AI professionals are based in the U.S. or Canada even though they were born abroad.[8] It also clarifies why America captures the lion's share of private sector investment in AI **(Figure 1)**.

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[3] We have recently written two white papers on these topics, "AI is the New Macro: Implications for the Labor Market," Aug 2023 and "AI is the New Macro Part II: An AI Powered Productivity Boom" Oct 2023. We conclude that, while AI will cause most jobs to change dramatically, the overall impact on wages and productivity is likely to be significantly positive.

[4] See "Make no mistake—AI is owned by Big Tech," MIT Tech Review, Dec 5, 2023 and "Inside the A.I. Arms Race That Changed Silicon Valley Forever," NY Times, Dec 6, 2023.

[5] See the tracker from Stanford's HAI (Institute for Human-Centered AI): https://hai.stanford.edu/news/numbers-tracking-ai-executive-order

[6] A "red team" assessment mimics real-life attackers, using tactics, techniques, and tools to evaluate the safety of a foundation model, including its response capabilities and security measures.

[7] See: https://theaipi.org/poll-biden-ai-executive-order-10-30/

[8] Yann LeCun (born in France, now in NY), Yoshua Bengio (also from France, now in Montreal), Geoffrey Hinton (born in the UK, spent much of his career in the U.S., now in Toronto), Andrej Karpathy (born in Czechoslovakia, now at OpenAI), Alex Smola (German, now at Stanford), Mira Murati (Albanian, now at OpenAI) and Fei-Fei Li (from China, now at Stanford). We could keep going, this is a remarkably extensive and impressive list.

Figure 1: Total private investment in AI (USD bn, 2013-2022)

America dominates AI, partially reflecting its pro-innovation approach to regulation
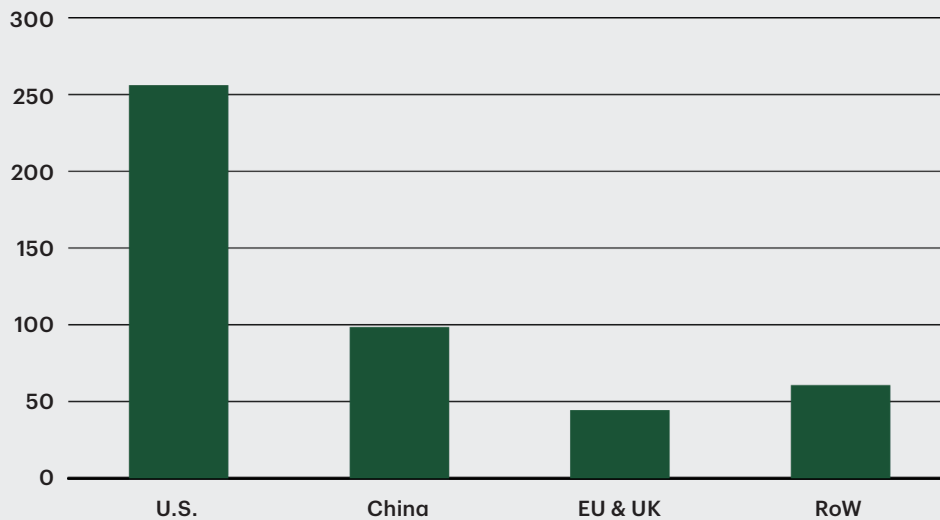
Source: Stanford AI Index Report, 2023

A second risk is regulatory capture, which is especially pronounced given the small number of "superstar firms" that employ most AI talent, set against the dearth of AI expertise in the government. To illustrate, numerous prominent AI leaders are calling for tight regulation, citing highly contentious existential risks, which reminds many (including venture capitalist Marc Andreessen) of the "Baptists" and "Bootleggers" metaphor.[9]

A century ago, Baptists lobbied heavily for prohibition because they sincerely believed banning alcohol would prevent societal disaster. However, they were joined by opportunistic Bootleggers who feigned concern but cynically conspired to make a fortune once prices soared. In today's context, there certainly are some sincere "Baptists" who believe AI poses existential risks for humanity. However, there also appear to be numerous modern day "Bootleggers," including some tech executives, hoping that regulatory barriers will act as an impenetrable moat, protecting incumbents like themselves from new startups and innovative competitors.

A third risk is that policymakers rush to action, without the benefit of rigorous cost-benefit analysis and a firm understanding of how the technology is evolving, and thereby inflict a lot of harm in their vain attempt to do a little good. Prematurely implementing a rigid and complex regulatory framework is likely to impose excessive costs but do little to protect society. Unfortunately, such an outcome seems highly likely given the political pressure to act, even though we have little idea what the AI ecosystem is going to look like just a few years down the road.

AI platforms are still growing exponentially, and we do not know how long it will take for AI to diffuse across the economy **(Figure 2)**. Further, such general-purpose technologies always result in entirely new products, applications and even sectors, and this evolution is pretty much unforeseeable. Nobody possesses a crystal ball and we do not know which startup companies will become the next titans, and which current superstars will fall. This level of uncertainty means we are regulating what we do not really understand, which is actually quite normal and has been the case with every previous tech wave.[10]

To conclude, voters are apprehensive about AI and demanding regulation. Policy makers will certainly respond, but getting the right balance, especially between encouraging innovation and ensuring safety, is an extremely knotty problem. Mistakes will be made, and they will have important implications for the evolution of AI, the structure of the industry and the cash flow earned by investors.

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[9] See https://a16z.com/ai-will-save-the-world/

[10] The inventors of the steam engine were focused on draining water out of coal mines and had no idea their machine would lead to the industrial revolution, steamships, and the railway boom. Similarly, when Thomas Edison invented the light bulb, he did not foresee assembly lines, modern telecommunications and integrated circuits. The same point applies to computers, the internet, mobile phones, and now AI.

Figure 2: Exponential growth – Computation used to train AI systems

The development of AI is still in early innings and regulators, like the rest of us, have little idea how the ecosystem is going to evolve over coming years and decades
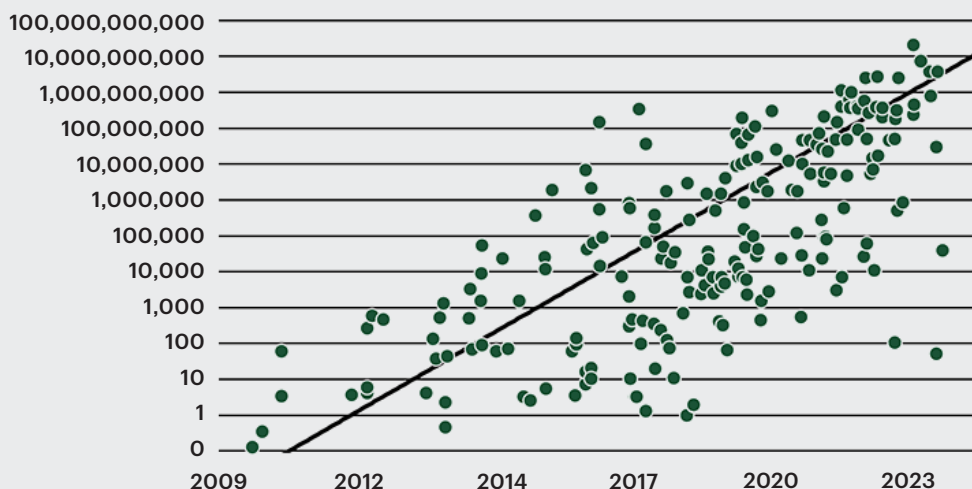
Source: Our World in Data
Note: Computation measured in petaflop (10^{15} floating-point operations)

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