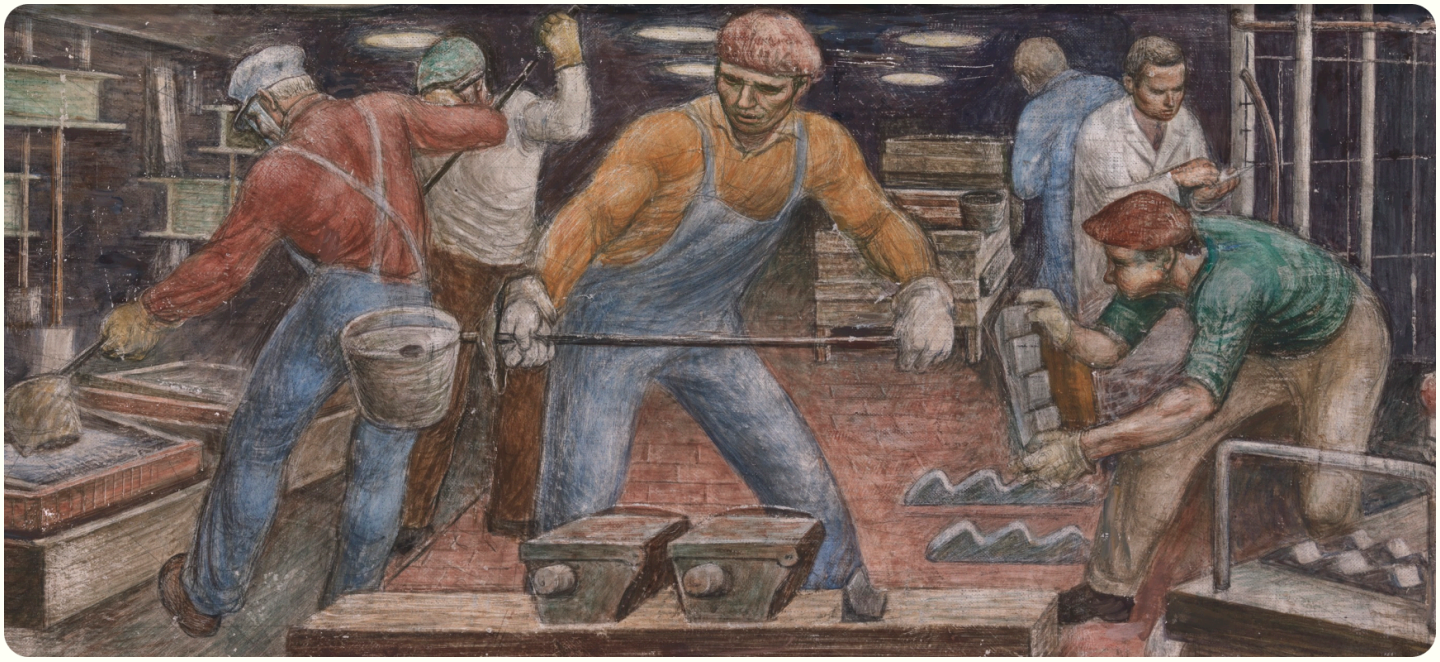

2. A Modern Industrial Strategy for AI?: Interrogating the US Approach

by Amba Kak and Sarah West

A Modern Industrial Strategy

> A modern industrial strategy identifies specific sectors that are foundational to economic growth, strategic from a national security perspective, and where private industry on its own isn't poised to make the investments needed to secure our national ambitions. [...] This is about crowding in private investment—not replacing it. It's about making long term investments in sectors vital to our national wellbeing—not picking winners and losers.[149]

[149] White House, "Remarks by National Security Advisor Jake Sullivan on Renewing American Economic Leadership at the Brookings Institution," April 27, 2023, https://www.whitehouse.gov/briefing-room/speeches-remarks/2023/04/27/remarks-by-national-security-advisor-jake-sullivan-on-renewing-american-economic-leadership-at-the-brookings-institution.

US National Security Advisor Jake Sullivan's speech on April 27, 2023 at the Brookings Institute sketched out key pillars of the Biden Administration's industrial strategy: the Administration's intention to make sound public investments, promote competition, and empower workers to grow the middle class.[150] This signals a notable departure from prior framings of industrial policy in recent decades, which have tended to foreground free market and neoliberal principles at the cost of the wellbeing of the public at large, with effects that are particularly stark along racial divides.[151]

Read in its entirety, the speech is most notable for its delicate disentangling of US national interests from those of the largest American companies. It deliberately distances this administration's industrial policy from promoting so-called national champions, favoring a policy that instead prioritizes workers, small businesses, and the public. It also signals departure from the neoliberal orthodoxy by advocating for the abandonment of traditional approaches like free trade and the notion that all growth is good growth, instead using the apparatus of trade law to advocate for high-quality jobs and the working class, tackling economic inequality and shoring up the nation's industrial capacity. It also matters that this statement came from within the national security establishment, where the strategic benefits of concentrated power are often deployed to perpetuate and maintain monopoly power.[152]

In this essay, we argue that the Biden administration's general posture towards a more democratized and worker-led industrial strategy has not translated into its initiatives on AI. We question if such a vision can even be translated within an industry that is constituted by the unprecedented concentration of capital, talent, and resources in a handful of companies, and a technological trajectory that is trending toward larger- and larger-scale development? While Sullivan's speech makes clear that the Biden administration does not want to be seen to promote national monopolies as national interest (a stance also made explicit in Biden's earlier Executive Order on Competition[153]), this should not be confused with a more

[150] White House, "Bidenomics Is Working: The President's Plan Grows the Economy from the Middle Out and Bottom Up—Not the Top Down," June 28, 2023, https://www.whitehouse.gov/briefing-room/statements-releases/2023/06/28/bidenomics-is-working-the-presidents-plan-grows-the-economy-from-the-middle-out-and-bottom-up-not-the-top-down.
[151] Todd Tucker, "Industrial Policy and Planning: What It Is and How To Do It Better," July 2019, Roosevelt Institute, https://rooseveltinstitute.org/wp-content/uploads/2020/07/RI_Industrial-Policy-and-Planning-201707.pdf.
[152] Dakota Foster and Zachary Arnold, "Antitrust and Artificial Intelligence: How Breaking Up Big Tech Could Affect the Pentagon's Access to AI," Center for Security and Emerging Technology (CSET), May 2020, https://www.geopolitic.ro/wp-content/uploads/2020/05/CSET-Antitrust-and-Artificial-Intelligence.pdf.
[153] White House, "Executive Order on Promoting Competition in the American Economy," July 9, 2021, https://www.whitehouse.gov/briefing-room/presidential-actions/2021/07/09/executive-order-on-promoting-competition-in-the-american-economy.

general move away from the promotion of US commercial interests as central to industrial policy: if anything, recent moves indicate a tension between these expressed priorities and the measures used to enact them.

Across emergent industrial policy initiatives on AI, we find a glaring lack of any coherent substantive vision for the public good that would animate and justify this focus on public investment in AI research and development. In this sense AI is unlike green technology, another pillar of the Administration's industrial policy ambitions, where the climate crisis has galvanized a broad, global coalition united by clear objectives. Here, the AI investment imperative threaded through the administration's strategy rests on the assumption that advancements in AI equate to progress (progress toward what?), and that AI, in its current form, is imperative to ensuring national security, sovereignty, and economic well being.

This chapter engages with these key questions, starting with a wide-ranging account of industrial policy in AI over the past five years (2019–2023). But the contours of this reinvigorated industrial policy as applied to artificial intelligence must be located within a longer history: as Susannah Glickman outlines in Chapter 1, for decades, US industrial policy focused on semiconductors and the promotion of a US-led semiconductor manufacturing industry as the foundation for advanced computing technologies, including artificial intelligence. Beginning in the 1990s, Glickman notes a decline in direct government investment in the sector. But this decline did not mean an end to US promotion of its tech industry broadly. Rather, it meant a change in approach. Instead of direct public investment, the Clinton administration and its allies favored promoting US corporate interests, particularly in the tech industry. Nurturing the US tech industry became a key pillar of their trade and domestic policy. During this Clinton-era period of global expansion for tech firms, "permissionless innovation" formed a core element of US policy rhetoric, and the promotion of "free and open" tech development was narrated as broadly aligned with the US national interest. This translated to policies that left US tech companies comparatively unencumbered by regulatory constraints over the past two decades, as policymaking sought primarily to remove obstacles to expansion.

This is important context for the return under the Biden administration (and to a lesser extent the Trump administration) to a familiar playbook of direct research and development investment—an approach that characterized US industrial policy for tech from the 1950s through the 1980s, albeit under markedly different geopolitical conditions. During the 1990s and 2000s, consumer tech companies

grew their economic and political power exponentially, with "Big Tech" emerging on the global stage as powerful geopolitical players. In tandem, the role of the US itself evolved with the end of the Cold War and emergence of a multipolar world order. The power of US companies, and particularly the large corporations that now dominate AI, became ascendant at the same moment that the US state itself began a comparative decline, even as US economic and trade policy promoted the interests of US companies and the US national interest as aligned.

AI has been increasingly central to US industrial policy since the Trump administration (and there, primarily a product of the Trump administration's geopolitical interests), with an especially sharp uptick in the last year. Before we delve into specific interventions, these are key narratives that are routinely invoked to justify the need for public investment or public-private hybrid arrangements for AI:

- **AI as critical strategic technology:** The promotion of AI development as necessary to advance US economic and national security interests is prominent in discourses coming from the NSCAI/SCSP, which seamlessly bridge the pro-Big Tech and national security imperatives for fueling public investment into an AI arms race.[154]

- **Democratizing AI:** Under the Biden administration there has been a more recently emergent fault line, and potential historical rupture, in the expressed promise to confront concentrated power centralized in large tech companies. The need to "democratize AI" is a common refrain, notable in both the National Security Commission on Artificial Intelligence (NSCAI) final report[155] and the National Artificial Intelligence Research Resource (NAIRR) midterm.[156] Outside of government, too, there are varying dimensions of what it means to democratize AI, with a diverse range of interests embracing democratization as a key banner.[157]

[154] See also White House, "White House Office of Science and Technology Policy Releases Updated Critical and Emerging Technologies List," February 12, 2024, https://www.whitehouse.gov/ostp/news-updates/2024/02/12/white-house-office-of-science-and-technology-policy-releases-updated-critical-and-emerging-technologies-list.
[155] National Security Commission on Artificial Intelligence (NSCAI), National Security Commission on Artificial Intelligence Final Report, March 2021 https://reports.nscai.gov/final-report/.
[156] White House, "National Artificial Intelligence Research Resource Task Force Releases Final Report," https://www.whitehouse.gov/ostp/news-updates/2023/01/24/national-artificial-intelligence-research-resource-task-force-releases-final-report.
[157] Elizabeth Seger et al, "Democratising AI: Multiple Meanings, Goals, and Methods", Arxiv, March 2023 https://doi.org/10.48550/arXiv.2303.12642.

- **Procurement as industrial policy:** As one of the largest purchasers of AI systems, US government procurement policy forms a key lever in US industrial policy. In fact, procurement has been a central form of shaping technology development for the US government since World War II. In 2022, the US federal government spent an estimated $3.3 billion on AI-related contracts.[158] While the Biden administration's Executive Order on AI and the related OMB guidance promise new oversight structures for federal agencies contracting with private companies to provide "AI" services, however, some in civil society raise the most existential critique that using AI to substitute key public functions also "risks conceding critical ground—that corporate needs, and not the public's, will drive agencies' governing strategies."[159]

- **AI and the production/preservation of "good jobs":** In reaction to narratives about AI driving job replacement, the production and preservation of high-paying, middle-class jobs is another key fault line in AI industrial policy. Public investments in AI, particularly in manufacturing, are frequently justified through promises of job production—although, as we detail below, these figures are often inflated and include lower-paid and contingent work in addition to a smaller pool of unionized jobs. In tandem with these job creation measures are "reskilling" and other initiatives that foreground the need for workers to adapt to the pace of development, rather than mandate that industry meaningfully attend to the effects on workers or position workers in a place of decisionmaking authority on whether and under what conditions AI is used.

AI Industrial Policy: Intervening across the AI stack

Since AI itself is a notoriously underspecified and shape-shifting term,[160] we categorize government efforts based on where they focus their interventions in the AI stack: data, compute, labor, and R&D. We track policy statements, legislation, and

[158] National Artificial Intelligence Advisory Committee (NAIAC),"Recommendations: AI's Procurement Challenge," October 2023, https://ai.gov/wp-content/uploads/2023/11/Recommendations_AIs-Procurement-Challenge.pdf.
[159] Surveillance Resistance Lab, "Re: Request for Comments on Advancing Governance, Innovation, and Risk Management for Agency Use of Artificial Intelligence Draft Memorandum, OMB 2023-0020-0001", December 2023 https://www.regulations.gov/comment/OMB-2023-0020-0077.
[160] AI Now Institute, "What Is AI? Part 1, with Meredith Whittaker | AI Now Salons," July 19, 2023, https://ainowinstitute.org/general/what-is-ai-part-1-with-meredith-whittaker-ai-now-salons.

the broader cross-cutting government narratives that have sustained these developments.

Compute

The infrastructure needed to develop AI is monopolized up and down the stack, most notoriously within cloud computing, data centers, and the chips needed to process AI. In acknowledgment of the effects of these infrastructural dependencies, the shoring up of compute resources forms the core of US AI industrial policy. This focus on compute for AI is premised fundamentally on the idea that more AI development is necessarily good for the public, whether that good comes in the form of innovation, resilience or competition. These premises are woefully underspecified - both whether the shoring up of computational resources will necessarily lead to these end objectives, and whether these objectives necessarily serve the needs of the public (or sufficiently justify the use of taxpayer dollars). Given the detrimental environmental effects of both semiconductor manufacturing and running energy-intensive data centers, investment in supply in this sector may run counter to the Administration's policy goals elsewhere to address climate change.

Two tentpole policy initiatives form the core of compute industrial policy: the CHIPS Act, federal legislation that subsidizes US-based semiconductor manufacturing; and the NAIRR, a proposal for the creation of cloud-based resources for research and development into artificial intelligence. These exist in several forms:

- The CHIPS and Science Act of 2022, signed in to law on Aug. 9, 2022[161]
- NAIRR Pilot, enacted by the National Science Foundation under the Executive Order on AI[162]
- The CREATE AI ACT,[163] proposed legislation that would implement the fuller vision for the NAIRR outlined in the final report of the National AI Research Resource Task Force.[164]

[161] H.R.4346 - Chips and Science Act, https://www.congress.gov/bill/117th-congress/house-bill/4346.
[162] White House, "Executive Order on the Safe, Secure, and Trustworthy Development and Use of Artificial Intelligence," October 30, 2023, https://www.whitehouse.gov/briefing-room/presidential-actions/2023/10/30/executive-order-on-the-safe-secure-and-trustworthy-development-and-use-of-artificial-intelligence.
[163] Anna G. Eshoo, "AI Caucus Leaders Introduce Bipartisan Bill to Expand Access to AI Research," press release, July 28, 2023, https://eshoo.house.gov/media/press-releases/ai-caucus-leaders-introduce-bipartisan-bill-expand-access-ai-research.
[164] White House, "National Artificial Intelligence Research Resource Task Force Releases Final Report," https://www.whitehouse.gov/ostp/news-updates/2023/01/24/national-artificial-intelligence-research-resource-task-force-releases-final-report.

These initiatives share the same broad contours: they involve the use of public resources and appropriations to incentivize US-based technological development in markets that are currently highly concentrated. Where they differ is in the problems they aim to address: the CHIPS Act is tied up in assuring US dominance in technological innovation and the resilience of its supply chains, in the face of geopolitical threats from an increasingly assertive China. By contrast, the NAIRR initiative identifies "democratization," barriers to access, and a lack of diversity in AI as the primary challenges it aims to solve - though it, too, is trending toward adopting 'arms race' framing as a key justification. While it acknowledges the problems of concentrated power as a key issue in AI, it does not offer a structural remedy to the underlying problems with the structure of the compute market. This essentially incremental approach contrasts with the Biden Administration's efforts to signal its willingness to engage in bold policy moves to protect fair competition.

Across the administration's stances on computational industrial policy, there thus remain considerable shortcomings in the fit between the diagnosis and the cure—and in the case of the NAIRR, the risk that the solution may in fact exacerbate the problem it aims to solve.[165]

The CHIPS Act: A Legacy of Past Industrial Policy Regimes

As a hallmark of contemporary US industrial policy, the CHIPS Act built on the legacy of past eras of semiconductor investment, positioning AI as one among several "industries of the future" that the US would need to invest in to ensure its continued technological dominance and competitiveness with China. In the wake of the COVID-19 pandemic and a series of supply chain failures, the Biden Administration issued an executive order (EO) that, among other things, identified the need for upgrades to the country's semiconductor manufacturing capacity as a central economic and national security concern,[166] tying supply chain disruption to growing rates of inflation and demands to bring American manufacturing back

[165] AI Now Institute and Data & Society Research Institute, "Democratize AI? How the Proposed National AI Research Resource Falls Short." AI Now Institute, October 5, 2021, https://ainowinstitute.org/publication/democratize-ai-how-the-proposed-national-ai-research-resource-falls-short; Amba Kak and Sarah Myers West, "The Problem With Public-Private Partnerships In AI." Foreign Policy, February 2, 2024, https://foreignpolicy.com/2024/02/12/ai-public-private-partnerships-task-force-nairr/#:~:text=We%20can%20learn%20from%20past,the%20contributions%20of%20workers%20in.

[166] White House, "Executive Order on America's Supply Chains," February 24, 2021, https://www.whitehouse.gov/briefing-room/presidential-actions/2021/02/24/executive-order-on-americas-supply-chains.

within the country's borders.[167] The initiative—and an ensuing legislative push led by senators Charles Schumer and Todd Young[168]—aimed to boost US funding in R&D generally from 0.7 percent to 1 percent of GDP,[169] and to increase the US share in the memory chip market by 500 percent.

Both the EO and legislative proposals reflected an underlying concern about a growing technological Cold War with China: "It's not an overstatement to say [that semiconductors] are the ground zero of our tech competition with China," remarked President Biden in one speech following the passage of the Act,[170] which was followed in short order by a set of sweeping restrictions from the US Commerce Department limiting the sale of semiconductors, chip-making equipment, and other materials needed to maintain chip production facilities,[171] leading several US-based chip manufacturing firms to recall their staff from China-based chip plants.[172]

Press coverage also raised concerns that the US was ominously dependent on chips sourced from Taiwan amid these growing tensions;[173] though the White House foregrounded US-based firms in its drumbeat of public engagement around the act,[174] and US firms have been the first to receive CHIPS funding, Taiwan Semiconductor Manufacturing Company received much of the press attention.

---

[167] White House, "Remarks by President Biden on the CHIPS and Science Act at IBM Poughkeepsie," October 6, 2022, https://www.whitehouse.gov/briefing-room/speeches-remarks/2022/10/06/remarks-by-president-biden-on-the-chips-and-science-act-at-ibm-poughkeepsie.

[168] The CHIPS Act went through several forms prior to its passage; it was initially brought to the floor as the Endless Frontier Act in 2020, and then as the Innovation and Competition Act in 2021. See Endless Frontier Act, S.3832, 116th Congress (2019–2020), https://www.congress.gov/bill/116th-congress/senate-bill/3832/text; and David E. Sanger, Catie Edmondson, David McCabe, and Thomas Kaplan, "Senate Poised to Pass Huge Industrial Policy Bill to Counter China," *New York Times*, June 7, 2021, https://www.nytimes.com/2021/06/07/us/politics/senate-china-semiconductors.html.

[169] White House, "Remarks by President Biden on the CHIPS and Science Act at IBM Poughkeepsie."

[170] White House, "Remarks by President Biden in Meeting with CEOs and Labor Leaders on the Importance of Passing the CHIPS Act," July 26, 2022, https://www.whitehouse.gov/briefing-room/speeches-remarks/2022/07/26/remarks-by-president-biden-in-meeting-with-ceos-and-labor-leaders-on-the-importance-of-passing-the-chips-act.

[171] Ana Swanson, "Biden Administration Clamps Down on China's Access to Chip Technology," *New York Times*, October 7, 2022, https://www.nytimes.com/2022/10/07/business/economy/biden-chip-technology.html.

[172] Bloomberg News, "US Chip Suppliers Pull Back from China's Yangtze Memory After Biden Ban," Bloomberg, October 12, 2022, https://www.bloomberg.com/news/articles/2022-10-12/us-chip-suppliers-pull-back-from-china-s-yangtze-after-biden-ban. Around this time, Intel announced plans to take over an abandoned factory in China for its chip production; it later canceled those plans following the announcement of federal subsidies for homegrown manufacturing. See Ana Swanson, "Congress Is Giving Billions to the Chip Industry. Strings Are Attached," *New York Times*, August 3, 2022, https://www.nytimes.com/2022/08/03/business/economy/chip-industry-congress.html.

[173] See Alan Crawford, Jarrell Dillard, Helene Fouquet, and Isabel Reynolds, "The World Is Dangerously Dependent on Taiwan for Semiconductors," Bloomberg, January 25, 2021, https://www.bloomberg.com/news/features/2021-01-25/the-world-is-dangerously-dependent-on-taiwan-for-semiconductors; Kyle Amonson and Dane Egli, "The Ambitious Dragon
Beijing's Calculus for Invading Taiwan by 2030," *Journal of Indo-Pacific Affairs* 6, no. 3 (March–April 2023): 38–54, https://media.defense.gov/2023/Apr/24/2003205865/-1/-1/1/07-AMONSON%20&%20EGLI_FEATURE%20IWD.PDF; and Mary Bruce, Luke Barr, and Justin Fishel, "Xi Told Biden at Summit That China Plans to Reunify with Taiwan," ABC News, December 20, 2023, https://abcnews.go.com/International/xi-warns-biden-china-plans-back-taiwan/story?id=105815520.

[174] See for example White House, "Remarks by President Biden on the CHIPS and Science Act," November 4, 2022, https://www.whitehouse.gov/briefing-room/speeches-remarks/2022/11/04/remarks-by-president-biden-on-the-chips-and-science-act; White House, "Remarks by President Biden on the CHIPS and Science Act at IBM Poughkeepsie"; and White House, "Remarks by President Biden on Micron's Plan to Invest in Chips Manufacturing," October 27, 2022, https://www.whitehouse.gov/briefing-room/speeches-remarks/2022/10/27/remarks-by-president-biden-on-microns-plan-to-invest-in-chips-manufacturing.

TSMC is central to the supply chain choke point in global chip fabrication, as the sole manufacturer able to make the state-of-the-art chips used in much of advanced AI development and model training, and the company became a particular flash point for the concerns about China that motivated the bill. TSMC announced a $40 billion plan to manufacture two chip fabrication plants in Phoenix, Arizona, which was touted as having particular focus on building the chips needed for Apple to manufacture iPhones and MacBooks.[175]

But the TSMC plants found new relevance on the public agenda in 2023, following a sudden burst of interest in artificial intelligence when OpenAI released ChatGPT. Prior to this moment, the PR and policy narrative around CHIPS included AI on a laundry list of industries that the Act would benefit, including the development of energy-efficient and environmentally sustainable computing, quantum computing infrastructures, and material design and rapid printing techniques, among others. The bill included a handful of AI-specific provisions, including a mandate for the National Institute for Standards and Technology (NIST) to "support the development of AI and data science" and to conduct research and testing to improve AI-enabled cybersecurity, and for the National Science Foundation (NSF) to expand its scholarship programs to include greater funding for AI scholarships.

The investments in CHIPS proved salient, though, when demand for state-of-the-art chips soared in spring 2023. Demand for computational power began to influence the behavior of AI firms large and small, motivating OpenAI to strike an exclusive agreement with Microsoft as its cloud provider and to convert from a nonprofit to a limited partnership in 2019, leading countless startups to make contractual arrangements with cloud infrastructure firms, and those firms themselves to restructure internally to maximize efficient use of data center resources.[176] Picking up on these movements, TSMC decided to inject an additional $3.5 billion into its Phoenix plants,[177] and announced the plants will produce 3nm chips, the current state of the art for AI model training, and an upgrade from the 5nm chips originally slated for production at the plants.[178]

[175] Debby Wu and Jenny Leonard, "Biden Joins Tim Cook to Hail TSMC's $40 Billion US Chip Venture," Bloomberg, December 6, 2022, https://www.bloomberg.com/news/articles/2022-12-06/tim-cook-biden-to-help-tsmc-unveil-40-billion-us-chip-buildout.
[176] See Sundar Pichai, "Google DeepMind: Bringing Together Two World-Class AI Teams," Google (blog), April 20, 2023, https://blog.google/technology/ai/april-ai-update; and Aaron Holmes and Kevin McLaughlin, "Microsoft Rations Access to AI Hardware for Internal Teams," *Information*, March 15, 2023, https://www.theinformation.com/articles/microsoft-rations-access-to-ai-hardware-for-internal-teams.
[177] Tobias Mann, "TSMC Injects a Bonus $3.5B into Arizona Chip Fabs," *Register*, February 14, 2023, https://www.theregister.com/2023/02/14/tsmc_chip_fab_arizona.
[178] TSMC, "TSMC Announces Updates for TSMC Arizona," press release, December 6, 2022, https://pr.tsmc.com/english/news/2977.

Ultimately, however, reports indicate that it may not, in fact, address resilience concerns across the entire semiconductor supply chain: all chips produced at Fab 21 will still be shipped back to Taiwan for assembly and packaging, the final step before they can be used in devices—potentially undermining the underlying goal of the investment in the first place.[179] While CHIPS investments may lead to the reinvigoration of US semiconductor manufacturing, they will not ultimately address the bottlenecks and geopolitical tensions that currently shape the provision of chips for cutting-edge AI development.

NAIRR: "Democratizing" AI Through Compute Subsidies

Against this backdrop, the National AI Research Resource emerged as a much more explicitly AI-focused industrial paradigm, conceptualized through the American Artificial Intelligence Initiative, the Trump Administration's national strategy for coordinating AI development efforts across the federal government.[180] At its outset the NAIRR was designed as a set of public-private partnerships between government, academia, and industry players,[181] meant to prioritize the provision of compute resources and data for AI research in order to "democratize" AI innovation.[182] The problem diagnosis outlined in the final report produced by the Committee is much more critical than this initial frame on the question of how high levels of industry concentration shape the landscape for AI development: it identifies an "access divide" that limits the ability for researchers beyond those at "well-resourced technology companies" to "leverage AI to tackle the big challenges in our society,"[183] treating resource concentration as an inhibitor to technological development. The report notes that barriers to accessing advanced computational power constrain "the diversity of researchers in the field and the breadth of ideas

[179] Wayne Ma, "The Flaw in Apple's Plan to Make Chips in Arizona," Information, September 11, 2023, https://www.theinformation.com/articles/apples-plan-to-make-chips-in-arizona-tsmc-nvidia-amd-tesla.
[180] Trump White House (archive), *Artificial Intelligence for the American People*, n.d., accessed February 13, 2024, https://trumpwhitehouse.archives.gov/ai. NAIRR was first proposed in a letter by Stanford researchers, then outlined in the 2019 Executive Order Maintaining American Leadership in Artificial Intelligence, and finally implemented in the National Artificial Intelligence Initiative Act of 2020, signed into law as part of the National Defense Authorization Act of 2021. See "National Research Cloud Call to Action," Human-Centered Artificial Intelligence, Stanford University, n.d., accessed February 13, 2024, https://hai.stanford.edu/national-research-cloud-joint-letter; National Archives, "Maintaining American Leadership in Artificial Intelligence," *Federal Register*, February 11, 2019, https://www.federalregister.gov/documents/2019/02/14/2019-02544/maintaining-american-leadership-in-artificial-intelligence; and William M. (Mac) Thornberry National Defense Authorization Act for Fiscal Year 2021, H.R 6395, 116th Congress (2019–2020), https://www.congress.gov/bill/116th-congress/house-bill/6395.
[181] Michael Kratsios, "Why the US Needs a Strategy for AI," *Wired*, February 11, 2019, https://www.wired.com/story/a-national-strategy-for-ai.
[182] Trump White House (archive), "The White House Launches the National Artificial Intelligence Initiative Office," press release, January 12, 2021, https://trumpwhitehouse.archives.gov/briefings-statements/white-house-launches-national-artificial-intelligence-initiative-office.
[183] National Artificial Intelligence Research Resource Task Force, *Strengthening and Democratizing the U.S. Artificial Intelligence Innovation Ecosystem: An Implementation Plan for a National Artificial Intelligence Research Resource*, AI.gov, January 2023, https://www.ai.gov/wp-content/uploads/2023/01/NAIRR-TF-Final-Report-2023.pdf.

incorporated into AI innovations, contributing to embedded biases and inequalities found in AI systems today."[184]

But the solution, as outlined in the final NAIRR report, entails a series of awards that would essentially serve as subsidies to an already concentrated cloud market: $2.25 billion earmarked for contracts, capped at $200 million per provider—made in cohorts of at least six providers on six-year contracts for cloud service provision. What this means is that NAIRR—in this version—would be structured as a licensing regime under which term contracts are allocated to commercial cloud infrastructure providers. Though this approach offers a pragmatic path to implementation in the short term, given the paucity of alternatives, it will ultimately entrench incumbent firms, despite the inclusion of some guardrails.[185]

"At present, only a handful of companies can afford the substantial computational resources required to develop and train the machine learning models underlying today's AI," Stanford University's Institute for Human-Centered Artificial Intelligence codirector John Etchemendy told Science in 2021, making clear that the proposal—which he helped draft—was designed to expand rather than contest commercial cloud infrastructure. "The commercial cloud providers are doing the innovation, and they invest massive amounts of money to keep it up to date. It would be a huge mistake to build a facility like a supercomputer center because it would be obsolete within a few years."[186]

The current NSF project CloudBank[187] was designed to offer a template for what this would look like: NSF runs a portal for researchers to access cloud services for NSF-approved research projects.[188] The four commercial cloud providers offered through CloudBank are Amazon Web Services, Google Cloud, Microsoft Azure, and IBM Cloud—a very limited vision for diversity. The CREATE AI Act, the legislation that would ultimately implement the full version for the NAIRR, leaves the exact structure unspecified beyond a mandate for "public cloud providers providing access to popular computational and storage services for NAIRR users", which could take the form of licensing per the Task Force proposal, credits to access computational resources, or some other model. To move forward, this would require congressional approval and appropriations to be brought into being.

[184] Ibid.
[185] AI Now Institute and Data & Society Research Institute, "Democratize AI? How the Proposed National AI Research Resource Falls Short," https://ainowinstitute.org/publication/democratize-ai-how-the-proposed-national-ai-research-resource-falls-short.
[186] Jeffrey Mervis, "U.S. Law Sets Stage for Boost to Artificial Intelligence Research," *Science*, January 6, 2021, https://www.science.org/content/article/us-law-sets-stage-boost-artificial-intelligence-research.
[187] CloudBank (website), accessed February 13, 2024, https://www.cloudbank.org.
[188] Mervis, "U.S. Law Sets Stage for Boost to Artificial Intelligence Research." .

The NAIRR pilot, created under the Biden administration EO on artificial intelligence,[189] offered an interim step toward implementation absent such funding measures. In place, the pilot adopts a new set of distinct structures: first, it creates a platform through which applicants can seek to access existing government supercomputers and government datasets operated by several agencies. Second, it introduces a marketplace of offerings by a range of organizations - including a number of AI companies - for NAIRR users to apply for developer resources. Several of the offerings on this marketplace give the companies providing access the ability to direct how they're used - for example, mandating that compute credits, API access or allocated funds be given only to researchers from specific types of institutions or for specific types of work.

Across these varying structures for the NAIRR, there are a shared set of tensions that call into question whether 'democratization' is an appropriate litmus test for public AI; simply diversifying the range of actors involved in AI development while commercial entities continue to define the horizon for AI research does little to contest their dominance.[190] In practice, the vision for the NAIRR only extends as far as providing on-ramps for researchers to access resources for AI development in a highly captured market. It will not meaningfully perturb the development process itself, exemplifying the deficiencies of public investment-style industrial policy proposals for cloud computing absent other measures for structural accountability in the sector, or that address monopolization up and down the tech stack.

Moreover, proposals like the NAIRR do little to address the question of why artificial intelligence is deserving of additional resourcing and support: it operates from a presumption that more AI development, from a more diverse range of actors, will create beneficial effects that accrue to the nation. But it does little to justify or engage with what these beneficial effects might be.

The messaging surrounding the CREATE AI Act suggests that these are articulated predominantly through a geopolitical 'AI arms race' frame rather than a public benefit frame that might be more easily intuited from the 'democratization' language that accompanied much of the NAIRR Task Force's work. In a fact sheet describing the legislation, this is described as follows: "Without full congressional authorization and approval, American leadership in academic AI research could be

[189] White House, "Executive Order on the Safe, Secure, and Trustworthy Development and Use of Artificial Intelligence.".
[190] Amba Kak and Sarah Myers West, "The Problem With Public-Private Partnerships In AI."

forfeited. Other countries are not waiting around: the UK government recently approved a plan to spend $1.1 billion on a public sector AI supercomputer, and China is moving ahead with similar plans."[191] Even here, it's unclear how an investment even at the scale recommended by the NAIRR Task Force ($2.6 billion) effectively competes with that of the deep pockets of the AI industry - not when Amazon has pledged $35 billion toward upgrading its data centers in the state of Virginia alone.[192] As such, there are reasons to question whether the NAIRR is designed to live up to its intended effects, in addition to challenging the underlying presumption that any benefits it offers justify taxpayer investment.

State-Level Initiatives: Public Compute, Without Scale

In the swell of attention to artificial intelligence over the past year, several states have adopted their own industrial policy measures. These similarly focus on the provision of computational resources to encourage AI research and development, seeking to bring AI investments to specific localities and develop localized innovation hubs. New York has been one of the most active on this front, given Senator Schumer's vocal interest in rallying to ensure that federal funding would flow to his home state of New York.[193] Building on initial CHIPS Act investments in upstate New York, in early 2024 Governor Kathy Hochul announced an "Empire AI" initiative designed to commit state funding toward establishing a university-led consortium focused on "responsible AI research and the public good." The flagship project for the consortium includes the construction of a computing center to be built in upstate New York, a proposal designed to ensure the state has its own cloud infrastructure (as opposed to a licensing contract with an existing cloud firm).[194]

According to a statement announcing the project:

> Access to the computing resources that power AI systems is prohibitively expensive and difficult to obtain. These resources are increasingly concentrated in the hands of large technology companies, who maintain outsized control of the AI development ecosystem. As a result, researchers,

[191] Eshoo, "AI Caucus Leaders Introduce Bipartisan Bill to Expand Access to AI Research."
[192] Matthew Barakat, "Virginia, Amazon Announce $35b data center plan," Associated Press, https://apnews.com/article/technology-data-management-and-storage-amazoncom-inc-virginia-business-c75df1f34069b09549fe15c99335b8fb.
[193] Ana Swanson, "Schumer Wields Political Heft in Bid for New York Chips Funds," *New York Times*, August 6, 2023, https://www.nytimes.com/2023/08/06/business/economy/schumer-new-york-chips-funds.html.
[194] Liz Wolfe, "Empire AI," Yahoo News, January 9, 2024, https://news.yahoo.com/empire-ai-143008080.html.

> public interest organizations, and small companies are being left behind, which has enormous implications for AI safety and society at large.[195]

The new initiative commits $275 million in state resources, matched by $125 million in private funding from the Simons Foundation and Tom Secunda, a cofounder of Bloomberg.[196]

California has also explored similar investments through legislation that would create a "CalCompute" resource within the public University of California system. According to the initial proposal, CalCompute would be "a collaboration between academics, policymakers, and industry experts from large institutions to guide the development of AI in responsible and secure directions and ensure the benefits of this technology are spread widely."[197] Specifics on how this would be structured have yet to be announced, though a bill, SB 1047, seeks to initiate the process by mandating a deliberation on the appropriate structure for CalCompute.[198]

Across these examples, public investment in compute is taking an increasingly prominent role in AI industrial policymaking in the United States, with approaches coalescing around two strategic choices: procurement of cloud resources on one hand, and direct investments in chip manufacturing on the other. Absent other policy measures, neither of these approaches addresses the scope and scale of monopolization of compute in AI, which stretches across the tech stack. In some instances, as in the case of NAIRR and EmpireAI, there's acknowledgment of the harmful effects this concentration can have in narrowing the scope for innovation. But this only goes so far in shaping the diagnosis of evidence marshaled behind the investment, stopping short of rallying political capital behind bolder interventions that would more meaningfully address market concentration.[199]

---

[195] Governor Kathy Hochul, "Governor Hochul Unveils Fifth Proposal of 2024 State of the State: Empire AI Consortium to Make New York the National Leader in AI Research and Innovation," press release, January 8, 2024, https://www.governor.ny.gov/news/governor-hochul-unveils-fifth-proposal-2024-state-state-empire-ai-consortium-make-new-york.

[196] These numbers pale in comparison to earlier rounds of investments made into semiconductor manufacturing in the state: New York committed $5.5 billion to secure $100 billion in investments from Micron into the construction of a new chip manufacturing facility in Syracuse, New York; and IBM announced a $20 billion investment under the CHIPS Act in a new chip manufacturing plant in the Hudson Valley. See White House, "Remarks by President Biden on the CHIPS and Science Act at IBM Poughkeepsie." .

[197] Health Care Coverage: Independent Medical Review, S.B 294 (2023–2024), https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=202320240SB294.

[198] Scott Wiener, "Senator Wiener Introduces Legislation To Ensure Safe Development Of Large-Scale Artificial Intelligence Systems And Support Ai Innovation In California", February 8 2024, https://sd11.senate.ca.gov/news/20240208-senator-wiener-introduces-legislation-ensure-safe-development-large-scale-artificial.

[199] For more on concentration in compute and policy interventions across the AI tech stack, see Jai Vipra and Sarah Myers West, "Computational Power and AI," AI Now Institute, September 27, 2023, https://ainowinstitute.org/publication/policy/compute-and-ai.

Data: Creating "AI-Ready" Data

Access to a large volume of high-quality, "AI-ready" datasets has been a consistent theme in government strategy around AI. From the 2018 Trump Management Agenda, which created a cross-agency goal to "leverage data as a strategic asset" and initiated the "Federal Data Strategy"[200] and the 2019 Executive Order,[201] to the Biden Administration's recent AI R&D strategies[202] and the NAIRR,[203] there has been a range of government activity around data as a core strategic input for AI. Often captured in the term *AI-ready data*, there's also a clear emphasis on *quality* of data, acknowledging that only properly cleaned, labeled, and structured data will be of value for AI uses. There have also been efforts toward standardization and benchmarking in this domain. The Trump White House Office of Science and Technology Policy (OSTP) Subcommittee on Open Science released a four-tier, pilot AI-readiness matrix that agencies could use to benchmark data quality.[204] The Biden Administration's NAIRR Task Force implementation plan similarly calls for "analysis-ready" datasets to be defined using community-driven standards.[205]

Even as data is readily acknowledged as a key input (and therefore a bottleneck) in AI development, the US government rarely calls attention to the fact that a large amount of such high-quality datasets are controlled by private industry, and specifically by Big Tech companies. Unlike in Europe[206] or India,[207] where, as part of a broader movement to call attention to data monopolies, there have been one-off proposals for mandating data-sharing and private-sector contributions to data commons, American AI policy has been notably restrained around pushing for data access or even acknowledging the data advantages enjoyed by large tech

[200] "Federal Data Strategy: Leveraging Data as a Strategic Asset," Office of Management and Budget, the CDO Council, and the General Services Administration, accessed February 13, 2024, https://strategy.data.gov.
[201] See National Archives,"Maintaining American Leadership in Artificial Intelligence," *Federal Register*, February 11, 2019, https://www.federalregister.gov/documents/2019/02/14/2019-02544/maintaining-american-leadership-in-artificial-intelligence. Executive Order 13859 requested that agencies "improve data and model inventory documentation" and "prioritize improvements to *access* and *quality*" based on the "AI research community's user feedback" (emphasis added).
[202] Select Committee on Artificial Intelligence of the National Science and Technology Council, *National Artificial Intelligence Research and Development Strategic Plan 2023 Update*, May 2023, Executive Office of the President of the United States, https://www.whitehouse.gov/wp-content/uploads/2023/05/National-Artificial-Intelligence-Research-and-Development-Strategic-Plan-2023-Update.pdf.
[203] White House, "National Artificial Intelligence Research Resource Task Force Releases Final Report," https://www.whitehouse.gov/ostp/news-updates/2023/01/24/national-artificial-intelligence-research-resource-task-force-releases-final-report.
[204] "ESIP Data Readiness Cluster," Earth Science Information Partners (ESIP), accessed February 13, 2024, https://esip.figshare.com/articles/online_resource/Checklist_to_Examine_AI-readiness_for_Open_Environmental_Datasets/19983722/1.
[205] White House, "The Biden Administration Launches the National Artificial Intelligence Research Resource Task Force," June 10, 2021, https://www.whitehouse.gov/ostp/news-updates/2021/06/10/the-biden-administration-launches-the-national-artificial-intelligence-research-resource-task-force.
[206] Sam Schechner and Kim Mackrael, "Tech Giants to Be Forced to Share More Data Under EU Proposal", *Wall Street Journal,* February 23 2022,https://www.wsj.com/articles/tech-giants-to-be-forced-to-share-more-data-under-eu-proposal-11645618258
[207] Soumyarendra Barik, "Centre considers seeking access to anonymised data of Big Tech firms", *Indian Express,* November 15 2023 https://indianexpress.com/article/india/centre-considers-seeking-access-to-anonymised-data-of-big-tech-firms-9026951/.

companies. A rare exception might be the 2023 National AI R&D updated plan, which recognizes an urgent need for "creating partnerships" for data sharing with tech companies, only to eventually concede that competitive challenges with such proposals will likely make them untenable.[208]

Although contesting existing data concentration within industry has been off the table, pushing for greater access to federal government data has been a centerpiece of strategic efforts. One prong of this is creating new infrastructure or exchanges for sharing these data resources. The Biden OSTP announced a new portal for AI researchers to create access to new government datasets and test-bed environments (but there have been few additional details since the announcement and the portal continues to give a 404 error message as of this writing); and the final NAIRR report also floats the idea of AI data commons and AI marketplaces ("social and technical architecture through which the user community contributes, documents, and shares data, codes, and models") as examples of models for enabling access.[209] Absent guardrails on how companies are allowed to use federal data, AI procurement mandates for government services (of the kind established by the 2019 and 2023 Executive Orders) might also end up giving technology companies privileged access to government data, especially in sectors where some of the largest companies have already accrued advantages due to strategic acquisitions.

Questions of data aren't just relevant for questions of competitive advantage and performance. Training datasets for AI is a crucial point of intervention for engineering social outcomes from AI systems, as well as for mitigating concerns around bias and discrimination, privacy, and intellectual property. While data-focused initiatives have primarily indexed on maximizing value extraction from data, rather than attending to the risks of its exploitation, the Biden administration's industrial strategy does integrate data provenance and bias mitigation strategies as part of how efforts like NAIRR are being envisioned, akin to government "pilots" for what "trustworthy AI" systems and processes might look like—but much of this is still theoretical. This will be crucial given that the reckless exploitation of personal data for AI training has already come under the scanner of regulatory agencies like the FTC, who propose remedies like "algorithmic disgorgement" or the deletion of

[208] Select Committee on Artificial Intelligence of the National Science and Technology Council, *National Artificial Intelligence Research and Development Strategic Plan 2023 Update*, May 2023, Executive Office of the President of the United States, https://www.whitehouse.gov/wp-content/uploads/2023/05/National-Artificial-Intelligence-Research-and-Development-Strategic-Plan-2023-Update.pdf. The report finds that the competitive challenges with such proposals will likely make them untenable. The authors even note that such data sharing is "urgently needed"—but they bury the lede!
[209] National Artificial Intelligence Research Resource Task Force, Strengthening and Democratizing the U.S. Artificial Intelligence Innovation Ecosystem.

ill-gotten data for AI.[210] The AI R&D strategy also positions the use of federal data as a way of ensuring representation of underrepresented communities or AI use cases that are designed to avoid replicating discrimination (like using data from the Home Owners Loan Corporation in the 1930s that was used for redlining to avoid replicating it).[211]

Labor: Tackling Fears of AI-Driven Job Replacement through Workforce Development

Impacts on labor have not constituted the primary focal point for US industrial policy investments in AI, but job creation and preservation has frequently been used as a clear justification for public investment in the sector. These discourses are distinctive in the context of artificial intelligence, a domain in which fears of job replacement due to AI deployment have persisted since the 1960s.[212]

Labor provisions in AI industrial policy cluster around three primary types of policy interventions:

1. Mandates tying public investment to compliance with labor guidelines, such as Davis-Bacon requirements that tie funding to union wages or mandates to provide affordable childcare
2. Workforce development and upskilling measures
3. Immigration measures including fast-tracking visas for workers with particular skill sets in AI development

Public Investment Mandates and Workplace Protections

First are guarantees that public investment into the AI sector will be tied to company compliance with certain labor requirements and workplace protections. For example, provisions in the CHIPS Act require employers to pay Davis-Bacon

[210] Jevan Hutson and Ben Winters, "America's Next 'Stop Model!': Model Deletion." Georgetown Law Technology Review: https://ssrn.com/abstract=4225003; *Safeguarding Data And Innovation: Building The Foundation For The Use Of Artificial Intelligence, Before the House Committee on Energy, Commerce, Subcommittee on Innovation, Data, and Commerce,"* (2023) (Statement of Amba Kak, Executive Director, AI Now Institute), https://d1dth6e84htgma.cloudfront.net/Amba_Kak_Testimony_IDC_AI_Hearing_2023_10_18_e02d4b6f51.pdf.
[211] Select Committee on Artificial Intelligence of the National Science and Technology Council, *National Artificial Intelligence Research and Development Strategic Plan 2023 Update*, May 2023, Executive Office of the President of the United States, https://www.whitehouse.gov/wp-content/uploads/2023/05/National-Artificial-Intelligence-Research-and-Development-Strategic-Plan-2023-Update.pdf.
[212] James Boggs, *The American Revolution* (New York: NYU Press, 2009), https://nyupress.org/9780853450153/american-revolution.

prevailing wage rates for the construction of CHIPS-funded facilities,[213] and mandate recipients of CHIPS funds "demonstrate significant worker and community investments, including opportunities for small businesses and disadvantaged communities."[214] Furthermore, rules set by the Department of Commerce dictate that recipients of funds must guarantee affordable and high-quality childcare for workers involved in building or operating plants.[215]

Union representatives were a central constituency in the passage of the bill: the White House held meetings with union leadership about the importance of passing the bill in advance of the floor vote, and union representatives were prominent at a number of flagship events. For example, at an event held with President Biden, Communications Workers Association President Chris Shelton tied the passage of the bill to creation of new jobs that would expand key elements of the union's base in semiconductor manufacturing, growing the union's power: "With the passage of this bill and the growing investment in semiconductor production, I'm expecting to be able to help organize thousands of additional workers. For those workers, this bill will be a ticket to a better life." He went on to tie these measures to competition with China: "I'm also glad that the bill includes key protections to prevent companies that receive the money from turning around and investing in semiconductor production in China instead of the United States."[216] But it's unclear whether the investment will deliver on these promises: for example, a report on one plant being constructed in Syracuse by the company Micron questioned the claim that Micron's investment would create "50,000 good-paying jobs" in the city, noting that estimates overinflated the impact on the local economy by including contingent and low-paying jobs.[217]

Implementation of the labor provisions of the CHIPS legislation remains turbulent, particularly for TSMC: CEO Morris Chang has been vocal in his opposition to the

[213] The Davis-Bacon and Related Acts outline a set of pay standards for construction workers that apply when building public buildings or public works. See United States Department of Labor, "Davis-Bacon and Related Acts," accessed February 13, 2024, https://www.dol.gov/agencies/whd/government-contracts/construction.
[214] White House, "FACT SHEET: CHIPS and Science Act Will Lower Costs, Create Jobs, Strengthen Supply Chains, and Counter China," August 9, 2022, https://www.whitehouse.gov/briefing-room/statements-releases/2022/08/09/fact-sheet-chips-and-science-act-will-lower-costs-create-jobs-strengthen-supply-chains-and-counter-china.
[215] As outlined above, both of these provisions received pushback from TSMC, which asserted that labor protections and a generalized lack of work ethic among US workers were a significant hindrance to its plant construction—though this did not lead to any changes in the provisions themselves.
[216] White House, "Remarks by President Biden in Meeting with CEOs and Labor Leaders on the Importance of Passing the CHIPS Act," July 26, 2022, https://www.whitehouse.gov/briefing-room/speeches-remarks/2022/07/26/remarks-by-president-biden-in-meeting-with-ceos-and-labor-leaders-on-the-importance-of-passing-the-chips-act.
[217] Glenn Coin, "Those 50,000 Jobs Micron Could Create in New York? We Dug into What That Really Means," syracuse.com, December 12, 2023, https://www.syracuse.com/business/2023/12/those-50000-jobs-micron-could-create-in-new-york-we-dug-into-what-that-really-means.html.

unionization mandates tied to receipt of federal funding, complaining the US lacks the necessary manufacturing talent[218] and work ethic: "If an engineer [in Taiwan] gets a call when he is asleep, he will wake up and start dressing," he said in a public statement. "His wife will ask: 'What's the matter?' He would say: 'I need to go to the factory.' The wife will go back to sleep without saying another word. This is the work culture."[219] For their part, workers involved in the construction of the plant allege safety violations, and that the construction of the facility has been marred by accidents and labor disputes.[220] The Arizona Pipe Trades 469 union petitioned against TSMC's application to fast-track visas for Taiwanese workers,[221] asserting Chang is inventing a skills shortage to justify the hiring of cheaper labor from abroad rather than comply with the labor requirements tied to federal funding.[222]

Despite these challenges, the Biden Administration reinforced its commitment to labor unions as a key constituency for AI industrial policy in its 2023 Executive Order on AI. "Supporting Workers" is outlined as a tentpole priority in the White House Fact sheet on the executive order, which outlines the need to mitigate risks to workers, "support workers' ability to bargain collectively, and invest in workforce training and development that is accessible to all."[223] Among the EO's provisions was a mandate for the Secretary of Labor to issue guidance "to make clear that employers that deploy AI to monitor or augment employees' work must continue to comply with protections that ensure that workers are compensated for their hours worked, as defined under the Fair Labor Standards Act and other legal requirements."[224] Though it's not explicitly outlined, this measure likely aims to address the emergence of fissured work mediated by artificial intelligence-driven interfaces. For example, one of the issues that platform-based workers have foregrounded is whether they are adequately paid for "time off tasks" that

[218] The Brookings Institution and Center for Strategic and International Studies, "Can Semiconductor Manufacturing Return to the US?" *Vying for Talent* (podcast), April 14, 2022, https://www.brookings.edu/wp-content/uploads/2022/04/Vying-for-Talent-Morris-Chang-20220414.pdf.
[219] Jacob Zinkula, "The World's Largest Chipmaker Promised to Create Thousands of US Jobs. There Are Growing Tensions over Whether US Workers Have the Skills or Work Ethic to Do Them," *Business Insider*, August 16, 2023, https://www.businessinsider.com/tsmc-jobs-taiwan-semiconductor-chip-worker-skills-work-ethic-2023-8.
[220] Michael Sainato, "'They Would Not Listen to Us': Inside Arizona's Troubled Chip Plant," *Guardian*, August 28, 2023, https://www.theguardian.com/business/2023/aug/28/phoenix-microchip-plant-biden-union-tsmc.
[221] "Stand With American Workers: Hold TSMC Accountable," Protect Arizona Workers (website), accessed February 13, 2024, https://protectazworkers.org.
[222] "Block TSMC Foreign Worker Visas," UA Local 469 (archived web page), accessed February 13, 2024. https://web.archive.org/web/20230807155212/https://www.votervoice.net/AZPipeTrades/Campaigns/106830/Respond.
[223] White House, "FACT SHEET: President Biden Issues Executive Order on Safe, Secure, and Trustworthy Artificial Intelligence," October 30, 2023, https://www.whitehouse.gov/briefing-room/statements-releases/2023/10/30/fact-sheet-president-biden-issues-executive-order-on-safe-secure-and-trustworthy-artificial-intelligence.
[224] White House, "Executive Order on the Safe, Secure, and Trustworthy Development and Use of Artificial Intelligence," October 30, 2023, https://www.whitehouse.gov/briefing-room/presidential-actions/2023/10/30/executive-order-on-the-safe-secure-and-trustworthy-development-and-use-of-artificial-intelligence.

algorithmic systems used by employers don't count as paid work, such as time spent by rideshare drivers while awaiting their next passenger.

Workforce Development and Reskilling

Another long-standing pillar of labor in AI industrial policy focuses on the need to develop the US workforce through "reskilling" programs that ensure workers have the tools they need for an AI-driven economy. These narratives frame AI development as inevitable engines of job displacement, positioning workers as disaffected and out of touch without the prodding engine of government intervention, rather than seeking to build worker autonomy and leadership in determining the course of AI development.

Many of these measures start from the need for additional research: for example, a proposed AI JOBS Act of 2019 would have authorized the Department of Labor to create a report analyzing the future growth of AI and its impact on the workforce.[225] The Trump administration's AI Executive Order similarly sought to commission recommendations on how STEM education needed to evolve in response to the demands of artificial intelligence, and prioritized instructional and training programs in addition to establishing a priority path for AI in existing federal fellowship and service programs.[226] The more recent Biden administration's Executive Order on AI builds on this set of mandates by requiring the Department of Labor to, again, research the labor market effects of AI and identify how federal funding can best be used to support workers,[227] developing principles and best practices to mitigate AI-driven harms and providing guidance "to prevent employers from undercompensating workers, evaluating job applications unfairly, or impinging on workers' ability to organize."[228]

The National AI Advisory Commission focused extensively on workforce development considerations, following the mandate in its charter to "prepare the present and future United States workforce for the integration of artificial

[225] Darren Soto, "New Democrat Coalition Endorses Rep. Soto's Bipartisan AI JOBS Act of 2019," press release, October 18, 2019, https://soto.house.gov/media/press-releases/new-democrat-coalition-endorses-rep-soto-s-bipartisan-ai-jobs-act-2019.
[226] National Archives, "Maintaining American Leadership in Artificial Intelligence," *Federal Register*, February 11, 2019, https://www.federalregister.gov/documents/2019/02/14/2019-02544/maintaining-american-leadership-in-artificial-intelligence.
[227] White House, "Executive Order on the Safe, Secure, and Trustworthy Development and Use of Artificial Intelligence."
[228] White House, "FACT SHEET: President Biden Issues Executive Order on Safe, Secure, and Trustworthy Artificial Intelligence."

intelligence systems across all sectors of the economy and society."[229] This mandate is reflected in its recommendation to launch a "moonshot" on US literacy, numeracy, and problem-solving,[230] and to build a national campaign on lifelong AI career success targeted at later-in-life workers. This latter program is intended to "upskill" these workers through "myth-busting" about their capabilities to succeed in high-tech jobs, and conduct targeted outreach to these communities.[231]

These interventions also tend to prize particular types of skill sets—frequently articulated using language such as "AI expertise" or "STEM"—in ways that risk undermining the legitimacy of the subject-matter expertise and the value of normative decision-making more broadly. This extends to the government's own hiring; for example, the Office of Management and Budget guidance to agencies around the "workforce" prioritizes hiring for people with "AI interpretation skills" and could gut both the subject matter expertise of internal staff and their agency to make decisions independent of the recommendations of automated systems.[232]

Countering the "Brain Drain" through Immigration Measures

Concerns about a "brain drain" of talent in the AI sector is a persistent concern in industrial policy narratives. The NAIRR final report frames this in a particularly notable way, expressing concerns about diversity and equity in AI due to the heavy concentration of resources in large private-sector firms, well-resourced universities, and national labs.[233] The report articulates that the "brain drain" of top AI talent to a small set of well-resourced corporations has detrimental effects on US innovation and economic growth. "Extending access to AI research resources as broadly as possible, and incorporating a diverse set of viewpoints into the prioritization of investments, the review of resources and resource providers, and the evolution of the AI research ecosystem, are core to the NAIRR's diversity and capacity goals," the report states.[234]

[229] U.S. Department of Commerce, National Institute of Standards and Technology, National Artificial Intelligence Advisory Committee, *National Artificial Intelligence Advisory Committee Charter*, September 13, 2021, https://ai.gov/wp-content/uploads/2023/10/naiac-charter.pdf.
[230] National Artificial Intelligence Advisory Committee, "RECOMMENDATIONS: Second Chance Skills and Opportunity Moonshot," October 2023, https://ai.gov/wp-content/uploads/2023/11/Recommendations_Second-Chance-Skills-and-Opportunity-Moonshot.pdf.
[231] National Artificial Intelligence Advisory Committee, "RECOMMENDATIONS: National Campaign on Lifelong AI Career Success," November 2023, https://ai.gov/wp-content/uploads/2023/12/Recommendations_National-Campaign-on-Lifelong-AI-Career-Success.pdf.
[232] Office of Management and Budget, "Comment on OMB-2023-0020-0001," December 6, 2023, https://www.regulations.gov/comment/OMB-2023-0020-0077.
[233] National Artificial Intelligence Research Resource Task Force, *Strengthening and Democratizing the U.S. Artificial Intelligence Innovation Ecosystem*.
[234] Ibid.

The Biden administration's executive order shifts the "brain drain" framing into more conventional territory, placing emphasis on attracting skilled AI labor by streamlining visa criteria, interviews, and reviews.[235] Notably, the narrow focus on "experts in AI and other critical and emerging technologies" limits the effects of such measures in a manner that will have both class-based and likely geographic limitations, in contrast to a more broad-based approach to immigration records.[236]

R&D: Imaginations of AI for Good

> "The development of AI in the United States is concentrated in fewer organizations in fewer geographic regions pursuing fewer research pathways. Commercial agendas are dictating the future of AI and concentrating heavily in one discipline: machine learning (ML)."
> — NSCAI Report on AI, 2021[237]

This report from the NSCAI, authored by senior figures from both the defense and commercial technology industry, is notable for its damning critique of how private industry is setting the agenda on AI research and development. It stands in marked contrast to the Bush- and Clinton-era shift toward federal support for commercially oriented R&D carried out by the private sector, which Susannah Glickman highlights in her essay in Chapter 2. The vision then was imagining what "a civilian DARPA that could do for U.S. economic competitiveness what the old DARPA had done for military competitiveness."[238] Yet the NSCAI's indictment offered the narrow remedy of simply increasing public investment in AI (undergirding developments like the NAIRR and CHIPS Act) rather than meaningfully overcoming and correcting the overreliance on commercial incentives.

In fact, the allocation of public R&D funds earmarked specifically for AI under both the Trump and Biden administrations has been accompanied by the more generic policy narratives around basic research for pushing the frontiers of science and the public good, alongside more specific directives on using AI to strengthen US global competitiveness; mitigate potentially "catastrophic risks"; and overcome concerns

[235] White House, "FACT SHEET: President Biden Issues Executive Order on Safe, Secure, and Trustworthy Artificial Intelligence."
[236] White House, "Executive Order on the Safe, Secure, and Trustworthy Development and Use of Artificial Intelligence."
[237] https://reports.nscai.gov/final-report/chapter-11.
[238] Alex Roland and Philip Shiman. *Strategic Computing: DARPA and the Quest for Machine Intelligence, 1983–1993* (Cambridge, MA: MIT Press, 2002), 7.

of algorithmic bias.[239] Under the Trump administration, the NSF announced $500 million over five years in research funding focused on "transformational advances" in sectors of societal impact like agriculture, climate, and education, citing examples such as tackling extreme weather preparedness to K–12 education. The grants were in partnership with the Department of Agriculture's National Institute of Food and Agriculture, the Department of Homeland Security's Science and Technology Directorate, and the Department of Transportation's Federal Highway Administration.[240] The contours of "AI for good" under the Biden administration, which allocated $700 million to AI research, highlight traditional national interest sectors like "agriculture, healthcare, manufacturing, critical infrastructure, and sustainability" as ripe for AI R&D. (National security isn't mentioned as a key use case, although "enhancing perceptual capabilities and sensorial data" has been a consistent thrust area,[241] with obvious relevance for military contexts.) Another theme in the 2023 R&D strategy is promoting AI as a tool to counter bias and advance equity; it's notable that these articulations of AI for good seem to borrow concepts from the burgeoning field of "sociotechnical" research on AI (exemplified by conferences like FaccT), which has platformed research on this kind of AI use case. A dominant critique of 'AI fairness' research, including from within FaccT, is an overemphasis on technically oriented questions of bias mitigation, and relatively less so on lenses that interrogate where AI might be used to entrench power dynamics or erode autonomy (as with workplace surveillance), or contribute to concentration of power in the tech industry.

Lawmakers have also called attention to the relatively low levels of public R&D investment compared to the billions of dollars spent by the tech industry.[242] Scholars of American innovation strategy have argued that there is no meaningful comparison because the pressure on firms to produce profits means that American industry barely pays for R&D that doesn't have longer-term horizons, even though on paper they have much larger R&D spend. This wildly different risk appetite for

[239] The FY2024 Biden Administration budget specifically mentions the latter two as drivers of the $700 million investment in AI funding for FY2023. The Budget also specifically allocates funding for AI to both the Department of Energy ($169 million) and NIST ($975 million meant to go toward AI, quantum, and cybersecurity efforts).
[240] National Science Foundation, "NSF Advances Artificial Intelligence Research with New Nationwide Institutes," press release, August 26, 2020, https://www.nsf.gov/news/special_reports/announcements/082620.jsp.
[241] The National Artificial Intelligence Research and Development Strategic Plan, National Science and Technology Council, Networking and Information Technology Research and Development Subcommittee, October 2016 https://www.nitrd.gov/pubs/national_ai_rd_strategic_plan.pdf.2023; Select Committee on Artificial Intelligence of the National Science and Technology Council, *National Artificial Intelligence Research and Development Strategic Plan 2023 Update*, May 2023, Executive Office of the President of the United States, https://www.whitehouse.gov/wp-content/uploads/2023/05/National-Artificial-Intelligence-Research-and-Development-Strategic-Plan-2023-Update.pdf.
[242] Anna G. Eshoo, "AI Caucus Leaders Introduce Bipartisan Bill to Expand Access to AI Research.".

public R&D, the argument goes, makes it particularly suitable for general-purpose innovation.[243]

However, at a time when the AI industry is uniquely influential in defining the notion of "breakthrough science," the assumption that public investment is necessarily better or differently placed to drive these advancements is increasingly shaky. The priorities of federal R&D appear to reflect (and potentially entrench) industry trends; the 2016 R&D strategy identified "narrow AI systems" as most ripe for advancements, whereas the latest 2023 R&D strategy flags "scalable general-purpose AI," the models responsible for the chatGPT-inspired AI industry boom, as an explicit priority for public research. This emphasis on large-scale general-purpose AI never acknowledges the market, financial, and environmental impacts that the compute and data dependencies of this trajectory entails. Scale is increasingly used as a proxy for progress and performance, with ever-larger-scale general-purpose AI models like LLMs often positioned by industry stakeholders as stepping stones to forms of so-called "artificial general intelligence" (AGI). The promise of AGI is also inextricably linked to national security dominance—whoever builds AGI first will win the AI race—making the commercial and national security goalposts all but meld into one another.

In other words, the nostalgic framing around transformative publicly funded "basic research" not only obscures the deep and structural dependencies on private technology companies at every layer of the AI stack (starkest when it comes to compute), but also the more fundamental ways in which the commercial AI industry limits the public imagination of what trajectory these technologies should take, and the interests they should serve. Recent state-led efforts like Empire AI, which attempt to "build their own" rather than license from private industry, demonstrate that it's a weakness that political actors recognize but are hard-pressed to overcome given the unprecedented amount of capital it will require to build genuinely public infrastructure for AI.

Sound industrial policymaking must proceed from a deliberate assessment that particular industries both accrue necessary benefits that serve the national interest, and that these benefits will not transpire absent additional resourcing and strategic support. The current approach to AI industrial policymaking fails on both accounts: first, it is far from clear that the tech industry lacks sufficient resources

[243] Weiss, Linda. *America Inc.? Innovation and Enterprise in the National Security State*. Cornell Studies in Political Economy. Ithaca ; London: Cornell University Press, 2014.

to proceed on its own, or that the structure and scale of these industrial policy interventions will meaningfully contest with monopoly dominance within the industry - if anything, they should be juxtaposed against the comparatively paltry funding granted to the regulatory agencies responsible for enforcing the antitrust laws. And it's abundantly clear that the promotion of AI development exists in tension with the Administration's stated policy goals of growing the middle class, empowering workers, and tackling the problem of climate change. The preoccupation with building larger- and larger scale AI has detracted from genuine reflection on how, if at all, AI systems can be designed to serve public interests beyond the incentives powering the commercial industry.