The Global Rise of Public AI

Vanderbilt
Policy Accelerator
for Political Economy & Regulation

VANDERBILT UNIVERSITY

Vanderbilt
Policy Accelerator
for Political Economy & Regulation

May 2025

The Vanderbilt Policy Accelerator focuses on cutting-edge topics in political economy and regulation to swiftly bring research, education, and policy proposals from infancy to maturity.

About the Authors

Ganesh Sitaraman holds the New York Alumni Chancellor's Chair in Law at Vanderbilt University and is the director of the Vanderbilt Policy Accelerator. He is the author or co-author of six books, including *Networks, Platforms, and Utilities: Law and Policy*.

Karun Parek is a policy analyst at the Vanderbilt Policy Accelerator.

Acknowledgements: This paper emerged from a conference co-hosted by the Economic Security Project (ESP), Mozilla Foundation, and VPA, and with the generous support of the Rockefeller Foundation. Thanks to Becky Chao, Diane Coyle, Amba Kak, Josh Mendelsohn, Teri Olle, Alex Pascal, Asad Ramzanali, Brian Shearer, Bruce Schneier, Alejandro Suarez, Josh Tan, Robert Underwood, Jai Vipra, Charles Yang and participants in the conference for providing helpful comments and insights, the Rockefeller Foundation for its support, and ESP and the Mozilla Foundation for their collaboration.

Table of Contents

Introduction

The global competition over the development of artificial intelligence (AI) technologies has received a great deal of attention. Technology leaders have discussed at length the competition between China and the United States over AI[1] and argued that innovation in these new technologies will be central to military and global power as well economic development in the rest of the century.[2] Policymakers, academics, and commentators have followed suit, assessing the status of the AI race,[3] the competition over AI regulation,[4] and the downsides of nationalist competition.[5]

Less frequently discussed is that fact that many countries are swiftly moving to build what can be termed "public AI" resources. This emerging phenomenon encompasses government-led initiatives to create the fundamental infrastructure for artificial intelligence, including cloud computing capabilities, extensive datasets, and advanced AI models. The global rise of *public* AI is itself an important development for two reasons: broadly, it marks an important step away from the neoliberal approach of deregulation, globalization, privatization, and austerity that dominated economic policymaking over the past half-century.[6] Instead of leaving the sector's development largely to market forces, countries are actively shaping and crafting the AI sector, steering it to achieve national aims. More narrowly, there is not one single pathway toward public AI. Rather, countries are adopting a variety of approaches to public AI, each reflecting different political, economic, and strategic considerations. In the process, they are accepting a package of tradeoffs. The shape of the global race for AI, and of the AI sector itself, will depend, at least partly, on these considerations and tradeoffs.

---

[1] KAI FU-LEE, AI SUPERPOWERS: CHINA, SILICON VALLEY, AND THE NEW WORLD ORDER (2018); *Welcome to the Era of AI Nationalism*, THE ECONOMIST (Jan. 1, 2024), https://www.economist.com/business/2024/01/01/welcome-to-the-era-of-ai-nationalism.

[2] Eric Schmidt, *Innovation Power*, FOREIGN AFF. (Feb. 28, 2023), https://www.foreignaffairs.com/united-states/eric-schmidt-innovation-power-technology-geopolitics.

[3] Colin Kahl, *American is Winning the Race for Global AI Primacy—for Now*, FOREIGN AFF. (Jan. 17, 2025), https://www.foreignaffairs.com/united-states/america-winning-race-global-ai-primacy-now.

[4] Anu Bradford, *The Race to Regulate Artificial Intelligence*, FOREIGN AFF. (Jun. 27, 2023), https://www.foreignaffairs.com/united-states/race-regulate-artificial-intelligence-sam-altman-anu-bradford.

[5] AI NOW, AI NATIONALISM(S): GLOBAL INDUSTRIAL POLICY APPROACHES TO AI (Mar. 2024).

[6] For this formulation of neoliberalism, see GANESH SITARAMAN, THE GREAT DEMOCRACY (2019). For broad overviews, see Gary Gerstle, THE RISE AND FALL OF THE NEOLIBERAL ORDER (2022) and DAVID HARVEY, A BRIEF HISTORY OF NEOLIBERALISM (2005).

In this white paper, we examine governmental efforts to build public AI by nine governments: the United Kingdom, India, the United Arab Emirates, Japan, Canada, the European Union, Singapore, China, and the United States. Through detailed case studies, we show how each of these governments are currently developing, or planning to develop, public AI infrastructure at various levels in the AI tech stack. From this comparative analysis, we identify four emergent approaches to building public AI: Outsourced Provision, Networked Collaboration, State-Corporate Fusion, and Public Options. In an Outsourced Provision approach, governments partner with firms to acquire public access to AI tools. Networked Collaboration involves governments build up existing public and non-profit research networks to conduct AI research and development independent of private industry. State-Corporate Fusion characterizes governments with significant presence in private markets through investment funds and state-owned enterprises. Public Options are governmental efforts to directly create and run AI resources that coexist with those in the private sector. Countries have adopted these different approaches, and in many cases, a single country has adopted different approaches for different layers in the tech stack.

The approaches to public AI matter because there are important tradeoffs within and across these models. The approaches we discuss differ along critical dimensions, including (1) the degree to which they build state capacity, (2) whether they leave governments more or less dependent on a small number of private corporations, (3) the extent to which they entrench dominant corporate players or facilitate market competition, (4) the degree to which they are motivated by national security and geopolitical considerations, and (5) whether they are likely to deepen economic inequality. Where along these dimensions countries end up, of course, has significant implications for the country's economic development, the growth of its AI sector, and more broadly, for its global competitiveness.

The global rise of public AI, then, is a critical part of the emergence and development of the AI sector. It should not be ignored.

I. Public AI: An Overview

Since the release of OpenAI's ChatGPT, artificial intelligence (AI) has emerged as a central focus of policymakers. Governments around the world have focused on the technology from a range of perspectives: ensuring AI safety,[7] facilitating the growth of the industry,[8] harnessing the technology for national security and defense,[9] among other things. Often overlooked, however, is that governments have been advancing different approaches to "public AI." The term "public AI" can often cause confusion. By "AI," we mean to include any of the layers in the AI tech stack – the supply chain for AI services.[10] The AI tech stack has four primary layers. The first layer is hardware: photolithography equipment and the semiconductor chips that they make. This hardware creates the next layer in the tech stack: cloud computing infrastructure. The infrastructure layer consists of data centers, networking cables, servers, and all the other hardware and software components that enable training, hosting, and using AI models. The third layer, the model layer, consists of data (raw or processed), models, and model hubs. The fourth and final layer of the AI tech stack is the application layer, in which consumers use a product like ChatGPT or Claude.

Scholars and commentators have warned that layers in the AI tech stack are already monopolistic or oligopolistic, and that this concentration risks significant abuses of power.[11] They have responded by calling for governments to develop "public AI": policy programs to compete with the private sector, ensure public access to AI, and assert the public's role as a key stakeholder in AI technology.[12] Among proponents, a broad spectrum of perspectives have emerged as to what qualifies as "public AI". One approach has focused on government-run public options operating across the AI tech

---

[7] *See, e.g.*, Bletchley Declaration by Countries Attending the AI Safety Summit (Nov. 2, 2023), https://www.gov.uk/government/publications/ai-safety-summit-2023-the-bletchley-declaration/the-bletchley-declaration-by-countries-attending-the-ai-safety-summit-1-2-november-2023.

[8] *See, e.g.*, Cong. Budget Office, Artificial Intelligence and Its Potential Effects on the Economy and the Federal Budget (2024), https://www.cbo.gov/publication/61147.

[9] *See, e.g.*, NAT'L SEC. COMM'N ON A.I., FINAL REPORT (2021), https://reports.nscai.gov/final-report/.

[10] For a longer form discussion of the AI tech stack see Tejas Narechania and Ganesh Sitaraman, *An Antimonopoly Approach to Governing Artificial Intelligence*, VAND. POL'Y ACCELERATOR 11 (Oct. 10, 2023).

[11] *See, id.*; Eric Posner, *The AI Octopus*, PROJECT SYNDICATE (Jan. 8, 2024), https://www.project-syndicate.org/commentary/ai-will-strengthen-big-tech-oligopoly-market-concentration-and-corporate-political-power-by-eric-posner-2024-01.

[12] Bruce Schneier & Nathan E. Sanders, *Build AI by the People, for the People*, FOREIGN POL'Y (Jun. 12, 2023), https://foreignpolicy.com/2023/06/12/ai-regulation-technology-us-china-eu-governance/.

stack from data pools to government developed AI models.[13] Others focus on government procurement of AI resources from the private sector, and still others have cast a combined view of public AI that includes any publicly accessible and publicly oriented tools created by either the public or private sector.[14]

In this paper, we use "public" AI to refer to government efforts to develop AI infrastructure in any of the four layers of the tech stack: hardware, cloud computing, model development, and applications. We use this definition to review various governmental programs that fall under this definition to better understand the benefits, drawbacks, and tradeoffs involved. We do not include open-source AI efforts that are not government-backed because we do not see them as "public," in the sense that they are not directed by governments. We also do not include regulatory actions or other governance efforts, as we see this as distinct from the development of AI resources.

Proponents of public AI argue that government action to develop AI resources has significant benefits. Public AI projects can focus on public goods, market failures, and other areas in which profit-seeking corporations might not sufficiently invest.[15] This would lead to public benefits that might otherwise be ignored or at least delayed. For example, some advocates have argued that public AI could improve energy system management, infrastructure development, educational services, and democratic deliberation.[16] Such projects could also generate positive spillovers and better distribute the economic benefits of AI. Public AI could inject necessary competition into an already consolidated AI marketplace at multiple layers in the stack. The public option would compete with private options.[17] National security and self-sufficiency arguments have also become prominent, as many governments grow wary of leaving

---

[13] Ben Gansky, Michael Martin & Ganesh Sitaraman, *Artificial Intelligence Is Too Important to Leave to Google and Facebook Alone*, N.Y. TIMES (Nov. 10, 2019), https://www.nytimes.com/2019/11/10/opinion/artificial-intelligence-facebook-google.html.

[14] Nik Marda, Jasmine Sun, & Mark Surman, *Public AI: Making AI Work for Everyone, by Everyone*, MOZILLA FOUNDATION (Sep. 30, 2024), https://assets.mofoprod.net/network/documents/Public_AI_Mozilla.pdf.

[15] *Id*. at 11.

[16] Public AI Network, *Public AI: Infrastructure for the Common Good*, 15-18 (Aug. 10, 2024), https://publicai.network/whitepaper; Bruce Schneier, Henry Farrell & Nathan E. Sanders, *How Artificial Intelligence Can Aid Democracy*, SLATE (Apr. 21, 2023), https://slate.com/technology/2023/04/ai-public-option.html; Nathan Sanders, Bruce Schneier & Norman Eisen, *How Public AI Can Strengthen Democracy*, BROOKINGS (Mar. 4, 2024), https://www.brookings.edu/articles/how-public-ai-can-strengthen-democracy/.

[17] For a general discussion of public options, see GANESH SITARAMAN & ANNE ALSTOTT, THE PUBLIC OPTION (2019).

AI development to big, foreign tech companies.[18] Given these benefits, it is no surprise that countries around the world are aggressively moving to adopt public AI policies and programs.

II. The Emergence of Public AI: Four Approaches

Governments across the world have begun rapidly developing public AI programs. In this paper, we investigate ten case studies of public AI initiatives. These case studies illustrate four different approaches to public AI: outsourced provisioning to the private sector, networked collaboration between public research organizations, state-corporate fusion, and public options. National strategies do not necessarily fit exclusively into a single model at any point in the tech stack, and often governments will implement policies that fit into different models both across the AI tech stack and within each individual level.

A. Outsourced Provision

The Outsourced Provision model involves creating public AI resources through contracts between the government and private providers, such as AWS or OpenAI. This approach leverages the expertise and infrastructure of private firms to rapidly develop and deploy AI capabilities for public use. This model benefits from an existing advanced technology industry that can compete for AI contracts. The model could also involve governments with less extensive technology industries providing seed funding and educational programs to support startups that could emerge as future partners for provisioning. Other examples of outsourcing to private industry include industrial subsidies for chip and compute development, procurement agreements to secure public compute and model access, and contract competitions for firms to create AI applications.

The United States' National Artificial Intelligence Research Resource (NAIRR) pilot program in its current structure stands out as an example of outsourced provisioning. NAIRR aims to provide researchers with access to compute power, datasets, and development tools. Currently these resources are primarily donations from AI firms and other private entities. Compute firms like AWS provide compute access while

[18] *See, e.g.,* Ganesh Sitaraman & Alex Pascal, *The National Security Case for Public AI*, VAND. POL'Y ACCELERATOR (Sep. 29, 2024).

model and application companies OpenAI and Anthropic have donated development toolkits and model access.

The IndiaAI initiative takes a different outsourcing approach. With fewer established AI firms than the United States, IndiaAI has focused on cultivating new startups. Through industrial subsidies, educational grants, startup funds, and development competitions, the program hopes to guide more entrepreneurs toward AI development that build tools for the public. The program seeks to identify partners to address challenges, such as expanding access to compute for the business and research communities and developing specific AI tools for public use.

The primary benefit of outsourcing is the speed at which it can be executed, especially if firms have staked out clear specialties in AI. Governments can create public AI quickly by acquiring private resources without having to wait for years or navigate a complicated policy process to build their own. But with this speed comes a range of drawbacks that could generate long term negative impacts. The AI market is dominated by monopolistic and oligopolistic players who, if given government contracts, could become further entrenched, making it difficult or impossible for new competitors to emerge while potentially extracting monopoly and oligopoly rents.[19] This model also creates a dangerous power imbalance as the government would be dependent on these firms for service provision.[20] Outsourcing may also reduce a government's capacity to understand the technology deeply, thereby inhibiting its ability to act independently of contractors and potentially leading to less effective contracting.[21]

B. Networked Collaboration

The Networked Collaboration model involves the state building public AI by creating networks between public universities, research institutions, and non-profit organizations. In this model, governments primarily operate as financial backers providing funding for education opportunities, hardware acquisitions, and compute construction. This model for public AI is particularly common as nations often have existing civil service and non-profit research networks. By expanding funding to these networks, this approach complements private industry's AI research and innovation.

---

[19] Narechania & Sitaraman, *supra* note 10, at 21-24.
[20] Sitaraman & Pascal, *supra* note 18.
[21] JENNIFER PAHLKA, RECODING AMERICA: WHY GOVERNMENT IS FAILING IN THE DIGITAL AGE AND HOW WE CAN DO BETTER (2023).

The networks themselves are largely self-guided with their own protocols for distributing funding and designing infrastructure, such as compute centers.

Empire AI in New York State exemplifies this model. The state functions as a financial backer, leaning on scientists and researchers at partner universities to guide technical decision making. This approach allows researchers to benefit from financial support and provides governments an opportunity to pursue public policy goals. In this case, New York has placed the compute center at the University of Buffalo where massive amounts of hydropower are readily available, in line with the state's clean energy goals. This siting decision also helps distribute potential economic benefits of AI across the state and away from its economic core, New York City. China's research network follows this line more explicitly with its "Eastern Data, Western Computing Initiative" which highlights the government's goal of building compute centers in the country's sparsely populated West to ensure economic benefits of AI are distributed beyond high population centers where AI data and queries are generated.

Canada's public AI program also follows a networked collaboration approach to public AI. Canada's AI research institutes develop an AI talent base and support research. These institutes are distributed across Canada and rely on a combination of existing public and private resources. They also provide technical assistance to businesses and governments interested in adopting AI tools. These AI research institutes thus support both scientific development and economic innovation.

Compared to other models, Networked Collaboration is a relatively easy blueprint for building public AI projects, as they rely on existing research networks. This approach is especially valuable for expanding the AI research workforce, including in the public sector. Networked Collaboration also can support research endeavors that might not have a clear path to profitability and therefore is unlikely to be supported by private capital, but that could still generate long term societal benefits. At the same time, successful networks will need to achieve massive scale and coordination of various entities to rival the private sector for AI talent and resources. This will require significant political support and long-term funding commitments that could impede the success of these projects. Networked Collaboration is also necessarily limited in what it can achieve: ensuring access to AI resources outside of profit-seeking firms is important, but civil society-based research programs will not address all aspects of AI development and deployment.

C. State-Corporation Fusion

The State-Corporate Fusion model of public AI predominates in countries where the government has a significant presence in the private sector through investment funds and state-owned enterprises. Government subsidies and regulatory policy are designed to support these private sector extensions of the state. State-corporate actors can drive industrial and technological development, with leeway to build relationships with foreign firms and recruit from a global talent base that the government cannot necessarily access. The state, in turn, assists these corporations through financial support and favorable regulation that encourages adoption of their technology across an economy. This model also affords the state the opportunity to directly control AI development across the tech stack and have government leadership take a much more hands on approach in governing the domestic AI market.

China's AI program fits with this model, as the government retains significant influence over many of the nation's leading tech firms. Even as it faces sanctions and trade restrictions by the US and its allies, the Chinese government at both the national and subnational level has emerged as a key provider of venture capital for AI startups, and it retains an ownership stake in emerging AI firms. Ownership stakes are coupled with social connections between industry and government leaders, many of whom share educational backgrounds with one another. This system has afforded China the opportunity to move rapidly in developing AI hardware and compute and ensure an alignment of interests between developers and national leadership on model and application development.

The United Arab Emirates (UAE) offers another example of state-corporate fusion. Unlike in China, personal wealth is a central feature, as the royal families of the UAE have become major investors in AI projects. Members of the royal families have wide remit to act both as private investors in AI projects and as heads of government agencies where they can guide regulatory policy. This approach blurs the line between private development and public research initiatives. As a result, the scale of government involvement in the private sector is often unclear.

Unlike the Networked Collaboration and Outsourcing Models, the State-Corporate Fusion model features more significant government involvement in directing decisions, operations, and results. The model is likely not feasible for countries that do not already exert control over major corporations or in which political leaders do not act as

investors. State-Corporate Fusion also has its own tradeoffs: it is difficult to determine whether actions are truly for the public benefit as opposed to individual gains.

D. Public Options

The Public Options model involves governments directly creating and operating AI resources that coexist and even compete with offerings from an independent private sector.[22] Public options in AI technology can take many different forms, from government funded and operated cloud infrastructure, to publicly created LLMs, to generally available applications, to specific applications to improve public sector operations. What defines this category is that the programs are publicly-funded and publicly-run.

Japan has taken a public option approach at the infrastructure level with its AI Bridging Cloud Infrastructure (ABCI) system. This AI compute system is open for public researchers and commercial operators working on AI projects. While ABCI is small compared to private sector infrastructure, it provides a blueprint for how governments can create expand compute access to users beyond the research community. Public options can also emerge further up in the tech stack, such as when government research networks develop new AI models and applications for public use. The UAE and US have both made progress in this area with the development of the UAE's FalconLLM, which is oriented to serve Arabic speakers, and the US's AuroraGPT, marketed as AI research assistant. Both models are publicly owned AI options that serve specific use cases and are oriented to populations the market is unlikely to serve. These models are in early development and their long-term competitiveness with private options remains to be seen.

Public options expand access to AI resources while retaining market dynamism. Governments ensure that the public—whether the government itself or the public at large—has access to the AI programs it needs, and without the additional costs or restrictions of reporting to profit-seeking shareholders. Because they are options, they also inject new competition into an AI marketplace that is already highly concentrated at many levels in the tech stack. This approach can thus help ensure fair access to resources across a wider population than networked collaboration or the state-corporate fusion approaches. The primary downside of public options are they require

[22] SITARAMAN & ALSTOTT, *supra* note 17.

significant and sustained government investment in labor and technology, in addition to a commitment to building state capacity for such projects.

III. Tradeoffs and Implications

Each of these approaches raises important tradeoffs and has significant implications for the development of the AI sector and the shape of global competition over AI. In this section, we discuss how these approaches relate to state capacity, dependence on private actors, competition and consolidation, geopolitics, and distributional effects.

A. State Capacity and Positive Spillovers

The choice of approach is likely to impact a government's ability to build AI expertise and create positive spillovers for the broader economy. The Networked Collaboration and Public Options models tend to foster the development of civil society and public AI talent and infrastructure, potentially leading to long-term benefits for the national innovation ecosystem. Public spending and initiatives have long been the source of innovation,[23] and it is not clear why public AI efforts would be different. Building up state capacity also has benefits: it means capacity to create AI tools designed for public purposes; increases government expertise for identifying and specifying the services that need to be contracted out; and has positive spillovers into regulatory capacity. To the extent that public AI systems are made available to the public, they could also introduce competition into the increasingly concentrated AI marketplace,[24] which could expand options for consumers and companies. Conversely, while the Outsourced Provisioning model enables rapid access to AI resources in the short term, it will invariably lead to lower state capacity and knowledge about AI systems and thereby diminish government capacity to procure, regulate, and apply AI services effectively in the longer term.[25]

B. Dependance on Private Actors

Outsourced Provision and State-Corporate Fusion risk creating dependencies that could lead to regulatory capture and skew public policy away from the public interest.

---

[23] *See, e.g.,* MARIANA MAZZUCATO, THE ENTREPRENEURIAL STATE (2011); MARIANA MAZZUCATO, MISSION ECONOMY: A MOONSHOT GUIDE TO CHANGING CAPITALISM (2021).
[24] *See* Narechania & Sitaraman, *supra* note 10.
[25] PAHLKA, *supra* note 21.

In the United States, the close relationship between tech giants and the government has raised concerns about capture and potential conflicts of interest. The result could be a dangerous dependence on such firms that hampers innovation, increases costs, prevents legal accountability, and impedes oversight and regulation. China and the UAE's State-Corporate Fusion approach allows for more government influence over AI development priorities, but these models, by definition, entangle the government with private actors.

C. Market Competition and Oligopoly

The approach to public AI is also likely to have a significant impact on market dynamics in the AI sector. Outsourced Provisioning, for example, may strengthen the position of already dominant tech companies. The US's NAIRR initiative has been criticized, for example, for potentially reinforcing the market dominance of major cloud providers. Some commentators have raised similar concerns about India's AI initiative, as the country considers working with existing large players in telecommunications and technology. Networked Collaboration and Public Options, in contrast, foster a more diverse ecosystem of AI providers. Both approaches, however, would require a degree of strategic focus regarding hardware procurement, as government compute projects could lock in monopolistic players in AI hardware manufacturing, even while increasing competition at other layers in the tech stack.

D. Geopolitical and National Security Factors

The development of public AI resources is also central to national security and geopolitical competition. Some countries are already wary of becoming overly dependent on foreign AI technologies and are investing in domestic capabilities to ensure technological sovereignty. Japan's public AI initiatives, for example, were shaped by the government's desire to maintain technological competitiveness and reduce reliance on American technology firms. Similarly, the European Union has also pushed initiatives like Gaia-X for cloud infrastructure to keep up with the rapid advancements made by China and the United States. As geopolitical rivalries and fears deepen, governments will become increasingly incentivized to develop domestic AI capacity to reduce the potential of a foreign power controlling their technology.

E. The Distribution of Economic Benefits

Each of these approaches will also shape the distribution of economic benefits from AI within society. Outsourced Provision and State-Corporate Fusion will likely deepen economic inequality because the returns on the public use of AI technologies go to private actors. Networked Collaboration and Public Options, on the other hand, are less likely to further economic inequality because their work is either distributed broadly among civil society non-profits or because their work is purely public, without any profit-seeking shareholders or owners.

IV. Global Public AI Strategies

Across the globe, countries are rapidly developing public AI infrastructure. In this section, we describe efforts by ten governments—the United Kingdom, India, the United Arab Emirates, Japan, Canada, the European Union, China, the United States federal government, New York State, and California. These proposals vary in scale and in the layers of the AI tech stack in which they apply, but they collectively show the different approaches that countries are taking in pursuing public AI.

A. United Kingdom

The United Kingdom (UK) has focused on AI as critical to maintaining a competitive economy.[26] The UK has devoted resources to developing computing platforms for use by AI researchers as a key piece of its agenda to expand that nation's presence in the AI sector. This effort has culminated in a plan for a supercomputer system referred to as the Artificial Intelligence Research Resource (AIRR).[27] The AIRR's focus is on the cloud computing layer of the AI tech stack and involves a series of investments of hundreds of millions of pounds into developing supercomputing infrastructure for AI research across various universities within the UK.

---

[26] Matt Davies, *AI Nationalism(s): 5. A Lost Decade? The UK's Industrial Approach to AI*, AI NOW INST. (Mar. 12, 2024), https://ainowinstitute.org/publication/a-lost-decade-the-uks-industrial-approach-to-ai.

[27] Press Release, UK Research and Innovation, £100m Boost in AI Research Will Propel Transformative Innovations (Feb. 6, 2024), https://www.ukri.org/news/100m-boost-in-ai-research-will-propel-transformative-innovations/; Press Release, UK Research and Innovation, £300 million to Launch First Phase of New AI Research Resource (Nov. 1, 2023), https://www.ukri.org/news/300-million-to-launch-first-phase-of-new-ai-research-resource/.

The first stage of the AIRR plan involved a £500 million investment in supercomputers at the University of Bristol and Cambridge University. Each institution's supercomputer, known as Isambard and Dawn, respectively, were assembled in partnership with Dell and utilize Intel graphical processing units (GPUs).[28] Since coming online in 2024, researchers across the UK have used these systems to develop AI models and run simulations that were previously impossible on various topics including climate modeling, nuclear energy development, and biomedical research.[29] The second stage of investments into the AIRR looked towards upgrading the Dawn supercomputer and developing a third supercomputer at the University of Edinburgh. Despite funding cuts after national elections in 2024, the new Labour government has indicated interest in expanding national AI capabilities.[30]

From a design perspective, the AIRR relies heavily on existing infrastructure and personnel. Computer scientists within the UK university-system helped design the project. Government agencies that stood to gain significant capacity, such as the UK Atomic Energy Authority, provided financing and technical support. The UK is also pursuing investments in education from primary schools through to graduate programs to ensure a steady supply of researchers and support staff.[31]

Importantly, AIRR's designers chose not to rely on Nvidia, the industry leader in GPU design, for provisioning GPUs. AIRR has instead partnered with Intel and Dell to supply the GPUs for the Dawn supercomputer because AIRR's designers were concerned about the drawbacks of Nvidia's dominance in the GPU sector.[32] In particular, the proprietary nature of Nvidia's application programming interface (API) and computing

[28] Louise Walsh, *The Rise of Dawn,* UNI. OF CAMBRIDGE (Feb. 23, 2024), https://www.cam.ac.uk/stories/ai-supercomputer-dawn-research-energy-medicine-climate; Press Release, University of Bristol, Unprecedented £225m Investment to Create UK's Most Powerful Supercomputer in Bristol (Nov. 1, 2023), https://www.bristol.ac.uk/news/2023/november/supercomputer-announcement.html.
[29] *Id*.
[30] Ryan Browne, *Britain Cancels $1.7 Billion of Computing Projects in Setback for Global AI Ambitions*, CNBC (Aug. 2, 2024), https://www.cnbc.com/2024/08/02/uk-cancels-1point3-billion-of-tech-and-ai-infrastructure-projects.html; *AI Opportunities Action Plan: Government Response*, Government of the United Kingdom (Jan. 13, 2025), https://www.gov.uk/government/publications/ai-opportunities-action-plan-government-response/ai-opportunities-action-plan-government-response.
[31] Press Release, UK Gov, Britain to be Made AI Match-Fit With £118 million Skills Package (Oct. 31, 2024), https://www.gov.uk/government/news/britain-to-be-made-ai-match-fit-with-118-million-skills-package.
[32] Mike Juang, *CUDA, Woulda, Shoulda: How This Platform Helps Nvidia Dominate AI*, INVESTORS BUS. DAILY (Sep. 5, 2024), https://www.investors.com/news/technology/nvidia-stock-nvda-cuda-software-ai-artificial-intelligence/.

platform CUDA risks locking in the AIRR to Nvidia's hardware. In contrast, Intel's open source OneAPI can run on non-Intel chips, which offers long-term flexibility in AI hardware sourcing. By sourcing from Intel, the designers hope to support additional competition in the chip market and encourage a more diverse ecosystem of AI hardware manufacturers.[33] While it is yet unclear if this decision will impact the long-term competitiveness of the supercomputers, the choice illustrates the importance of procurement and the problems of lock-in when designing public AI projects.

Beyond compute, the UK government has also expressed interest in supporting AI efforts at higher layers in the tech stack. For example, the Starmer government has called for the establishment of a National Data Library.[34] While the proposal is not yet finalized, early reports indicate that the National Data Library would include opening access to existing government data sets as well as building infrastructure for collecting and cleaning data for specific AI use-cases.[35] The government is also exploring rolling out AI pilot programs in various government services. But like the National Data Library, there are few details as to what this effort would constitute and whether the government would build its own AI tools or procure them from outside developers.

B. India

In 2022, India announced the IndiaAI initiative, which involves scaling up Indian AI through a series of investments and public-private partnerships at multiple layers in the tech stack. The initiative consists of public funding to create a national supercomputing system, a public dataset platform, public LLMs, educational and workforce funding, and an innovation competition to encourage private actors to solve public problems.

IndiaAI's compute program consists of access to over 18,000 GPUs sourced from ten bidding companies. Corporate partners retain ownership of the compute systems and will make them available to IndiaAI affiliates at discounted rates for an initial period of

---

[33] Matthew Gooding, *Breaking Dawn: Inside the UK's Newest AI Supercomputer*, DATACENTERDYNAMICS (Jun. 21, 2024), https://www.datacenterdynamics.com/en/analysis/breaking-dawn-inside-the-uks-newest-ai-supercomputer/.

[34] LABOUR PARTY UK, CHANGE: LABOUR PARTY MANIFESTO 2024 33 (Jun. 13, 2024), https://labour.org.uk/wp-content/uploads/2024/06/Change-Labour-Party-Manifesto-2024-large-print.pdf.

[35] *AI Opportunities Action Plan*, Government of the United Kingdom (Jan. 13, 2025), https://www.gov.uk/government/publications/ai-opportunities-action-plan/ai-opportunities-action-plan (See Recommendations 11, 12 and 13 in §1.2.).

thirty-six months.[36] The IndiaAI program will initially allocate resources from the lowest price bidders.[37] This pricing structure has raised quality concerns, as it incentivizes investing in lower quality, lower priced, end-of-life GPUs, rather than those at the cutting edge.[38] At the same time, these low prices are below the global price for compute, which may lead other clients of these firms to seek the lower prices for their contracts as well.[39] Despite its scale the program still leaves India far behind other countries in AI capabilities.[40]

IndiaAI's public dataset commitment involves making a series of datasets available on the IndiaAI web portal for AI model training. The datasets include Indian government data, such as census information and agency reports, as well as curated data sets from firms and research institutes both within India and across the world.[41] The ultimate ambition is for the IndiaAI platform to resemble HuggingFace, a popular AI software publishing platform that hosts AI datasets, models, and tools for developers.[42]

Beyond the initial computational and data infrastructure that are necessary for foundational AI work, IndiaAI will also support the development of public LLM models that are trained on indigenous languages, many of which are unlikely to be supported

---

[36] Press Release, IndiaAI, *Union Minister of Electronics & IT, Railways, and I&B Announces the Availability of 18,000+ Affordable AI compute Units* (Jan. 31, 2025), https://indiaai.gov.in/article/union-minister-of-electronics-it-railways-and-i-b-announces-the-availability-of-18-000-affordable-ai-compute-units.

[37] Suraksha P., *AI Mission GPU Tender Bidders get Two More Days to Match L1 Rates*, ECON. TIMES (Feb. 13, 2025), https://economictimes.indiatimes.com/tech/technology/ai-mission-gpu-tender-bidders-get-two-more-days-to-match-l1-rates/articleshow/118185854.cms.

[38] *Indian Startups Being Offered Last-Gen, End-Of-Life GPUs in IndiaAI Mission: Report*, FIRST POST (Feb. 18, 2025), https://www.firstpost.com/tech/indian-startups-being-offered-last-gen-end-of-life-gpus-in-indiaai-mission-report-13864326.html.

[39] Suraksha P., *'India AI Mission GPU Hourly Pricing Aggressively Low'*, ECON. TIMES (Feb. 1, 2025), https://economictimes.indiatimes.com/tech/technology/india-ai-mission-gpu-hourly-pricing-aggressively-low/articleshow/117799835.cms.

[40] Amlan Mohanty, *Compute for India: A Measured Approach*, CARNEGIE ENDOWMENT FOR INT'L PEACE (May 17, 2024), https://carnegieendowment.org/posts/2024/05/compute-for-india-a-measured-approach.

[41] Min. of Elecs. & Info. Tech. (India), Datasets, https://indiaai.gov.in/datasets (last visited Oct. 23, 2024).

[42] *IndiaAI Datasets Platform set to go Live by January Next Year*, ECON. TIMES (Oct. 10, 2024), https://economictimes.indiatimes.com/tech/artificial-intelligence/indiaai-datasets-platform-to-launch-by-january-2025/articleshow/114088962.cms ("The aim is to create a platform like HuggingFace, a US-based collaborative and open-source forum hosting datasets and artificial intelligence (AI) models to enable developers to create, train and deploy their own models.").

by traditional private sector actors.[43] As of this writing, the specifics of how this program will be designed, governed, and implemented has not been announced, but it appears that these models would be part of the IndiaAI platform and could be used to develop applications that serve the needs of the linguistically diverse nation.

IndiaAI also includes educational and financing activities for researchers and firms within the country to learn about and work on AI projects. The Future Skills program will provide funding for students interested in AI to receive bachelors, masters, and doctoral degrees. IndiaAI will open labs in cities across the country to support these educational initiatives.[44] And IndiaAI intends to provide direct support to AI startups, though the details of this program are yet unspecified.[45]

In addition to expanding Indian AI capacity and capabilities, the Indian government has directed its agencies to identify policy challenges that could benefit from AI, and it has created an Innovation Competition for startups, large firms, and research institutes to collaborate and propose solutions.[46] The first round of pitches for this program recently closed, and winning bidders will be announced soon. The intellectual property rights for these solutions will be retained by developers but final products must be available for government deployment for a four-year term, with developers receiving compensation of up to 10 million rupees.[47]

IndiaAI is an expansive initiative, it is still unclear how much of it will be truly public. As some analysts have noted, IndiaAI is modeled after Digital India, a project that sought to spur the use of digital technologies across the Indian economy.[48] That initiative was a set of public-private partnerships, which involved some of the most powerful firms

[43] Min. of Elecs. & Info. Tech. (India), IndiaAI Innovation Centre, https://indiaai.gov.in/hub/indiaai-innovation-centre (last visited Oct. 23, 2024).
[44] Min. of Elecs. & Info. Tech. (India), IndiaAI FutureSkills, https://indiaai.gov.in/hub/indiaai-futureskills (last visited Oct. 23, 2024).
[45] Min. of Elecs. & Info. Tech. (India), IndiaAI Startup Financing, https://indiaai.gov.in/hub/indiaai-startup-financing (last visited Oct. 23, 2024).
[46] Min. of Elecs. & Info. Tech. (India), IndiaAI Application Development Initiative, https://indiaai.gov.in/hub/indiaai-application-development-initiative (last visited Oct. 23, 2024).
[47] Innovation Challenge for Development of AI Solutions, MEITY, https://indiaai.s3.ap-south-1.amazonaws.com/docs/iadi-master-schema-13082024.pdf.
[48] Sankar Krishnamurthy & Sugandha Srikanteswaran, *India's AI Ambitions: Can Public-Private Partnerships Lead the Way?*, S&P GLOBAL, https://www.spglobal.com/en/research-insights/special-reports/india-forward/indias-ai-ambitions-can-public-private-partnerships-lead-the-way.

and business leaders in the country.[49] Some of those leaders, like Mukesh Ambani and Gautam Adani, are involved in the IndiaAI initiative as well, and their firms are leading the charge in developing data centers.[50] This involvement highlights some of the tradeoffs that come with the public-private partnership model: the possibility of leveraging expertise and resources risks entrenching already-dominant market players.

C. United Arab Emirates

Since 2017, the United Arab Emirates (UAE) has adopted a strategy to position itself as a global leader in AI development.[51] The UAE has formed an AI Ministry to oversee its AI investments.[52] Unlike other countries that have focused on developing and expanding public compute capacity, the UAE has relied on private firms. G42, an Emirati firm, plays a leading role, as do Microsoft and Amazon, which has established data centers in the country.[53] While native Emirati firms are technically private, they are often owned by state investment funds such as Mubadala or are directly run by

---

[49] Daniel Block, *How Government Decisions are Helping Reliance Jio Monopolise the Telecom Sector*, CARAVAN MAG. (Feb. 1, 2019), https://caravanmagazine.in/reportage/government-helping-reliance-jio-monopolise-telecom.

[50] Georgia Butler, *Reliance Industries to Build GW-Scale AI Data Center in Gujarat, India*, DATACENTERDYNAMICS (Sep. 4, 2024), https://www.datacenterdynamics.com/en/news/reliance-industries-to-build-gw-scale-ai-data-center-in-gujurat-india/; *Adani Group to Invest $4 Billion for Expanding Data Centre Biz as AI Powers Demand: Report*, HINDUSTAN TIMES (Sep. 28, 2024), https://www.hindustantimes.com/business/adani-group-to-invest-4-billion-for-expanding-data-centre-biz-as-ai-powers-demand-report-101727515353435.html.

[51] For a discussion regarding why the UAE has positioned itself as an AI leader, *see* Islam Al Khatib, *AI Nationalism(s): 7. Beyond Techwashing: The UAE's AI Industrial Policy as a Security Regime*, AI NOW INST. (Mar. 12, 2024), https://ainowinstitute.org/publication/beyond-techwashing-the-uaes-ai-industrialpolicy-as-a-security-regime.

[52] *Artificial Intelligence Office*, UAE MINISTER FOR A.I., DIGITAL ECON. & REMOTE WORK APPS. OFF., https://ai.gov.ae/about_us/ (last visited Apr. 28, 2025) (noting that the Minister's responsibilities include "enhancing the government performance levels by investing in the latest technologies and tools of artificial intelligence and applying them in various sectors").

[53] Vikram Bharat, *The Middle East Microsoft, OpenAI Partner Mired in National Security Controversy*, CNBC (Aug. 25, 2024), https://www.cnbc.com/2024/08/25/a-controversial-mideast-partner-to-microsoft-openai-global-ambitions.html; Paul Lorimer, *First Microsoft Cloud Regions in Middle East Now Available*, MICROSOFT (Jun. 19, 2019), https://azure.microsoft.com/en-us/blog/first-microsoft-cloud-regions-in-middle-east-now-available/; Marcia Villalba, *Now Open–AWS Region in the United Arab Emirates (UAE)*, AMAZON WEB SERVICES (Aug. 29, 2022), https://aws.amazon.com/blogs/aws/now-open-aws-region-in-the-united-arab-emirates-uae/.

government figures, as is the case with G42.[54] Such a blurry line between public and private makes it difficult to clearly distinguish state involvement in AI infrastructure, as private data centers and GPU infrastructure are often owned directly or indirectly by state-associated entities.

The UAE has also undertaken a large public-sector effort in the model layer, with the development of Falcon LLM.[55] Falcon LLM was developed by the UAE's Technology Innovation Institute (TII), an outgrowth of the nation's research council.[56] Early reports on Falcon find it comparable in some respects to other LLMs, such as those developed by Google and Meta.[57] The success of Falcon highlights the possibilities of developing public AI models.

Since its creation in 2017, the UAE's National AI Ministry has taken on the role of coordinating government AI regulatory and financing activity. In addition to financing research initiatives such as Falcon LLM, the ministry has issued a National AI Strategy and published guidance documents outlining ethical principles for government AI use and how AI can be integrated into a range of governing activities.[58] The Ministry has also indicated interest in partnering with hardware firms, including potentially funding the establishment of semiconductor foundries within the UAE.[59]

D. Japan

Japan's efforts at developing public AI infrastructure have focused on maintaining technological competitiveness with the West and reducing dependence on non-

---

[54] *The UAE's Technology Ambitions*, INT'L INST. FOR STRATEGIC STUDIES (Oct 7, 2024), https://www.iiss.org/ja-JP/publications/strategic-comments/2024/10/the-uaes-technology-ambitions/ (indicating that the chairman of G42 is the UAE's national security advisor and the younger brother of the UAE's President, and that Mubadala, a state-owned sovereign wealth fund, owns a stake in the firm).
[55] *Falcon 3,* TECH. INNOVATION INST., https://falconllm.tii.ae/ (last visited Apr. 28, 2025).
[56] *Id*.
[57] Billy Perrigo, *The UAE Is on a Mission to Become an AI Power*, TIME (Mar. 20, 2024), https://time.com/6958369/artificial-intelligence-united-arab-emirates/; Amy Gunia, *Oil-rich Abu Dhabi Wants to be an AI Leader. Aligning With the US is Just the Start*, CNN (Jun. 26, 2024), https://www.cnn.com/2024/06/26/tech/uae-ai-minister-omar-al-olama-hnk-spc-intl/index.html.
[58] *Publications*, UAE MINISTER FOR A.I., DIGITAL ECON. & REMOTE WORK APPS. OFF., https://ai.gov.ae/publications/ (last visited Oct. 24, 2024).
[59] Asa Fitch, Alexander Ward & Jiyoung Sohn, *Chip Giants TSMC and Samsung Discuss Building Middle Eastern Megafactories*, WALL ST. J. (Sep. 22, 2024) https://www.wsj.com/tech/ai/chip-giants-tsmc-and-samsung-discuss-building-middle-eastern-megafactories-65adc854.

Japanese firms. This effort towards developing AI capacity has become increasingly important as the nation continues to age and its workforce shrinks.[60] At the center of its efforts is the creation of the AI Bridging Cloud Infrastructure (ABCI) supercomputer, which was constructed by the National Institute of Advanced Industrial Science and Technology in 2018.[61]

Public or private research groups can submit an application to use the ABCI via an online application in which they outline the scope of the proposed project, the time needed with the supercomputer, and how many compute points the project will require.[62] Compute points are the basic units of measurement for paying to use the ABCI, with various computing needs requiring a discrete number of points per hour. Points can be bought in 1000-unit increments and are currently priced at ¥220 per point, an approximately $1,400 minimum buy-in to use the system. Research groups can buy up to 600,000 points in a fiscal year.[63] In addition to buying points, research groups can earn points by posting their data for public use.[64] Thousands of research groups have already relied on the ABCI for research projects, publishing papers on mathematics, logistics, and drug development.[65] Since its construction, as of this writing, the ABCI has been upgraded once and another upgrade has been announced.[66] Japan has also supported the development of additional computing infrastructure for Japanese firms.[67] The most prominent of these recent efforts has been an update to the existing Fugaku supercomputer, called the Fugaku Next supercomputer, which is expected to become the world's fastest supercomputer.[68] This supercomputer's governing regulations reserve it for use by researchers selected

[60] For an overview of Japan's aging crisis, see, *e.g.,* Jessie Yeung, *Japan's population crisis was years in the making – and relief may be decades away*, CNN (Feb. 29, 2024), https://www.cnn.com/2024/03/01/asia/japan-demographic-crisis-population-intl-hnk-dst/index.html.
[61] ABCI, *About ABCI*, https://abci.ai/en/about_abci/ (last visited Apr. 28, 2025).
[62] ABCI, *ABCI Application Procedure*, https://portal.abci.ai/user/project_register_app.php?lang=en (last visited Apr. 28, 2025).
[63] ABCI, *Usage Fees*, https://abci.ai/en/how_to_use/tariffs.html (last visited Apr. 28, 2025).
[64] ABCI, *Dataset Publication Support*, https://abci.ai/en/dataset_support/ (last visited Apr. 28, 2025).
[65] ABCI, *Publications*, https://abci.ai/en/publications/ (last visited Apr. 28, 2025).
[66] Dion Harris, *Japan Enhances AI Sovereignty With Advanced ABCI 3.0 Supercomputer,* NVIDIA (Jul. 11, 2024), https://blogs.nvidia.com/blog/abci-aist/.
[67] Charlotte Trueman, *Japanese Government to Fund $470m AI Supercomputer*, DATACENTERDYNAMICS (Apr. 19, 2024), https://www.datacenterdynamics.com/en/news/japanese-government-to-fund-new-ai-supercomputer/.
[68] Charlotte Trueman, *Japan Plans to Build Zettascale AI Successor to Fugaku Supercomputer*, DATACENTERDYNAMICS (Aug. 29, 2024), https://www.datacenterdynamics.com/en/news/japan-plans-to-build-zettascale-ai-successor-to-fugaku-supercomputer/.

by the Japanese government, or otherwise by those who perform support and maintenance on it.[69] It is worth noting that the Fugaku supercomputer is not powered by GPUs but instead relies on ARM CPUs designed by Fujitsu.[70]

Beyond building AI compute infrastructure, the Japanese government has allocated funding to support the development of Japanese-language LLMs. The Japanese language uses multiple writing systems, complicating efforts to train existing LLMs and often rendering them incapable of providing useful Japanese language results. With government support, Fujitsu recently released the Fugaku-LLM, a Japanese language LLM built utilizing the Fugaku supercomputer.[71] The current model of Fugaku-LLM was trained on 13 billion parameters.[72] While large, it is dwarfed by the 175 billion data parameters the four-year-old Chat-GPT 3 was trained on, which raises concerns about how useful Fugaku-LLM will be relative to its rivals.[73]

E. Canada

Canada has focused its public AI efforts on workforce development and building a highly skilled ecosystem of AI researchers. In 2017, the Trudeau government announced the Pan-Canadian AI Strategy, providing $125 million Canadian dollars (CAD) to the Canadian Institute for Advanced Research (CIFAR).[74] CIFAR was tasked with

---

[69] RIKEN CTR. FOR COMP. SCI., REGULATIONS FOR THE USE OF THE SUPERCOMPUTER FUGAKU 1 (2021), https://www.hpci-office.jp/materials/f_riken_fugaku_kitei_en.pdf.

[70] Mitch Wagner, *Fugaku, the World's Fastest Supercomputer, Steers Toward 'Society 5.0,'* ORACLE (Nov. 15, 2021), https://blogs.oracle.com/cloud-infrastructure/post/fugaku-worlds-fastest-supercomputer-steers-toward-society-50.

[71] Tim Hornyak, *Why Japan Is Building Its Own Version of ChatGPT*, SCI. AM. (Sep. 15, 2024), https://www.scientificamerican.com/article/why-japan-is-building-its-own-version-of-chatgpt/ ; See also Press Release, Fujitsu, *Release of "Fugaku-LLM" – a large language model trained on the supercomputer "Fugaku"* (May 10, 2024), https://www.fujitsu.com/global/about/resources/news/press-releases/2024/0510-01.html.

[72] Timothy Prickett Morgan, *Japan Gets An LLM Compliments Of Fujitsu And RIKEN*, THE NEXT PLATFORM (May 13, 2024), https://www.nextplatform.com/2024/05/13/japan-gets-an-llm-compliments-of-fujitsu-and-riken/.

[73] Press Release, *supra* note 71; Nefi Alarcon, *OpenAI Presents GPT-3, a 175 Billion Parameters Language Model*, NVIDIA (Jul. 7, 2020), https://developer.nvidia.com/blog/openai-presents-gpt-3-a-175-billion-parameters-language-model/.

[74] GOVERNMENT OF CANADA, BUDGET 2017 106-107 (Apr. 16, 2024), https://budget.canada.ca/2024/report-rapport/chap4-en.html#s4-1; Kathleen Sandusky, *CIFAR announces plans for second phase of the Pan-Canadian Artificial Intelligence Strategy*, CIFAR (June 22, 2022), https://cifar.ca/cifarnews/2022/06/22/cifar-announces-plans-for-second-phase-of-the-pan-canadian-artificial-intelligence-strategy/.

supporting public AI research efforts, encouraging private sector adoption of AI, and expanding commercialization opportunities.[75] CIFAR established three core AI institutes across the country, where it funds the placement of AI researchers.[76] The institutes have expanded educational opportunities for graduate and doctoral students in AI, established partnerships with private industry, and advised the government on utilizing AI for public benefit.[77]

CIFAR-supported researchers have leaned on existing public AI infrastructure developed by the Digital Research Alliance of Canada, a collaboration between government agencies and universities to create research compute infrastructure. In 2023, the Alliance established the Pan-Canadian AI Compute Environment, a subdivision of its advanced research computing array allocated to AI projects.[78] The Trudeau government has committed an additional $2 billion Canadian dollars to fund a Sovereign AI Compute Strategy and an AI Compute Access fund to expand public AI infrastructure.[79] The government, currently, envisions the AI Compute Access Fund as a near-term solution for small businesses and researchers by subsidizing the purchase of compute resources.[80] The Sovereign AI Compute Strategy looks to address long term AI compute needs by building a sovereign compute facility for AI research and establishing an AI Compute Challenge to subsidize private compute projects.[81] While these programs are significant, Canada has still lagged behind in developing high-

[75] Government of Canada, *Pan-Canadian Artificial Intelligence Strategy*, https://ised-isde.canada.ca/site/ai-strategy/en (last visited Dec. 16, 2024).
[76] Sandusky, *supra* note 74.
[77] CIFAR, AICAN: THE IMPACT OF THE PAN-CANADIAN AI STRATEGY 3 (2023), https://cifar.ca/wp-content/uploads/2023/11/aican-impact-2023-eng.pdf.
[78] Digital Research Alliance of Canada, *Pan-Canadian AI Compute Environment* (PAICE), https://alliancecan.ca/en/services/advanced-research-computing/pan-canadian-ai-compute-environment-paice (last visited Apr. 28, 2025).
[79] GOVERNMENT OF CANADA, BUDGET 2024, CHAPTER 4: ECONOMIC GROWTH FOR EVERY GENERATION (Apr. 16, 2024), https://budget.canada.ca/2024/report-rapport/chap4-en.html#s4-1.
[80] Government of Canada, *Consultations on Artificial Intelligence (AI) Compute*, https://ised-isde.canada.ca/site/ised/en/public-consultations/consultations-artificial-intelligence-ai-compute (last visited Apr. 28, 2025).
[81] Press Release, Government of Canada, Canada to Drive Billions in Investments to Build Domestic AI Compute Capacity at Home (Dec. 5, 2024), https://www.canada.ca/en/innovation-science-economic-development/news/2024/12/canada-to-drive-billions-in-investments-to-build-domestic-ai-compute-capacity-at-home.html; Government of Canada, AI Compute Challenge, https://ised-isde.canada.ca/site/ised/en/canadian-sovereign-ai-compute-strategy/ai-compute-challenge, (last visited Dec. 16, 2024).

performance computing: the most powerful supercomputer in the country was ranked 150th place in the most recent global rankings.[82]

F. Pan-European

Across Europe there are growing debates on how the continent can become more economically and technologically competitive.[83] Some nations have looked towards national champions, supporting native AI firms, such as France with Mistral.[84] In other instances, European nations have leveraged dominant non-AI firms to support AI-based research. Denmark, for example, outsourced much of its public AI research to pharmaceutical giant Novo Nordisk, which runs the public-private Danish Center for AI Innovation.[85] While individual nations continue to carve out their AI paths, the European Union has become prominent in developing its own vision of public AI as a key tool in maintaining the economic competitiveness of the continent.

The European Union has taken steps towards developing a regulatory system to govern AI with its AI Act.[86] The bill outlines a regulatory system for governing AI

---

[82] Joël Blit and Jimmy Lin, *Canada's Planned $2.4-Billion Artificial Intelligence Investment is Already Mostly Obsolete: Ottawa Announced a $2.4-Billion AI Strategy in its April Budget; Meta Will Soon have $41-Billion Worth of Computing Power of its Own*, GLOBE AND MAIL (May 19, 2024) https://www.theglobeandmail.com/business/commentary/article-canadas-planned-24-billion-artificial-intelligence-investment-is/; Hessie Jones, *Inside Canada's $2.4 Billion Bet To Close The AI Adoption Gap*, FORBES (Nov. 8, 2024), https://www.forbes.com/sites/hessiejones/2024/11/07/inside-canadas-24-billion-bet-to-close-the-ai-adoption-gap/; TOP500, *Top500 Supercomputer List*, TOP500.org (last visited Mar. 5, 2025), https://www.top500.org/statistics/sublist/ (Top500 is an industry analyst of the most powerful global supercomputers; the most powerful supercomputer in Canada is currently ranked at 150th place).

[83] *See, e.g.,* Mario Draghi, The Future of European Competitiveness Part A (Sep. 9, 2024), https://commission.europa.eu/topics/eu-competitiveness/draghi-report_en.

[84] Liz Alderman & Adam Satariano, *Europe's A.I. 'Champion' Sets Sights on Tech Giants in U.S.*, N.Y. TIMES (Apr. 12, 2024), https://www.nytimes.com/2024/04/12/business/artificial-intelligence-mistral-france-europe.html; Gian Volpicelli, Mark Scott & Océane Herrero, *France Means Business With Mistral-Microsoft Deal*, POLITICO EU (Mar. 1, 2024), https://www.politico.eu/article/why-france-chose-to-be-europes-ai-playground/.

[85] Ben Cohen, *The Giant Supercomputer Built to Transform an Entire Country—and Paid For by Ozempic*, WALL ST. J. (Nov. 1, 2024), https://www.politico.eu/article/why-france-chose-to-be-europes-ai-playground/; NOVO NORDISK FOUNDATION, *Danish Centre for AI Innovation* (last visited Apr. 28, 2025), https://novonordiskfonden.dk/en/projects/danish-centre-for-ai-innovation/.

[86] Press Release, European Commission, Statement by President von der Leyen On the Political Agreement on the EU AI Act (Dec. 8, 2023), https://ec.europa.eu/commission/presscorner/detail/en/statement_23_6474; Coordinated Plan on

development and establishes an European AI Office to provide technical expertise.[87] The EU Commission's leadership has positioned tech sovereignty as a core goal, with Commission President Ursula Von Der Leyen naming an Executive Vice-President for Tech Sovereignty, Security, and Democracy who is mandated to roll out an AI Strategy that includes establishing an AI Research Council and expanding funding for the EU's "AI Factories," a program where researchers and startups can access computing power and development tools.[88] The commissioner is also required to build on the proposals by former European Central Bank President Mario Draghi, including implementing the EU-wide Chips Act and increased European compute construction as well as standardizing AI regulation and construction across the Union.[89] Von der Leyen has also opened a dialogue with a consortium of firms that have launched the "EU AI Champions Initiative," a private industry effort to accelerate European AI development.[90]

The EU also has a foundation towards developing public compute resources: the European High-Performance Computing Joint Undertaking (EuroHPC JU). This project began in 2018 between individual European states, from both inside and outside the EU, who worked together to establish a continental supercomputer array.[91] Nine

---

Artificial Intelligence 2021 Review, EU Commission (Apr. 21, 2021), https://digital-strategy.ec.europa.eu/en/library/coordinated-plan-artificial-intelligence-2021-review.

[87] EUROPEAN COMMISSION, *European AI Office* https://digital-strategy.ec.europa.eu/en/policies/ai-office (last visited Apr. 28, 2025).

[88] URSULA VON DER LEYEN, HENNA VIRKKUNEN - MISSION LETTER (Sep. 17, 2024), https://commission.europa.eu/document/3b537594-9264-4249-a912-5b102b7b49a3_en.

[89] ID. 6-7. ("[Y]ou will develop the proposal in the Draghi Report for an EU Cloud and AI Development Act to increase computational capacity and create an EU-wide framework for providing 'computational capital' to innovative SMEs"); see also ID. at 7 ("As proposed by the Draghi report, you should also develop a long-term EU Quantum Chips plan"); MARIO DRAGHI, THE FUTURE OF EUROPEAN COMPETITIVENESS PART B 77-91 (Sep. 9, 2024), https://commission.europa.eu/topics/strengthening-european-competitiveness/eu-competitiveness-looking-ahead_en#paragraph_47059; Jorge Valero & Ewa Krukowska, *EU Builds Team to Avoid Draghi's Warning of 'Slow Agony' Ahead*, BLOOMBERG (Sep. 17, 2024), https://www.bloomberg.com/news/articles/2024-09-17/eu-builds-team-to-avoid-draghi-s-warning-of-slow-agony-ahead.

[90] Press Release, EU AI Champions Initiative, 60+ Leading European Companies Launch the 'EU AI Champions Initiative' to Re-Write the AI Playbook and Unlock Europe's Full Potential in AI, https://files.elfsightcdn.com/eafe4a4d-3436-495d-b748-5bdce62d911d/d4981660-c262-46a5-b322-fc1f2c3c48f3/EU-AI-Champions-Initiative-Media-Release.pdf.

[91] Discover EuroHPC JU, https://eurohpc-ju.europa.eu/about/discover-eurohpc-ju_en (last visited Nov. 7, 2024); The European High Performance Computing Joint Undertaking, https://digital-strategy.ec.europa.eu/en/policies/high-performance-computing-joint-undertaking (last visited Nov. 7, 2024).

publicly owned supercomputers have since come online with more planned. These supercomputers form the basis of the "AI factories" initiative and are available to researchers across Europe to submit proposals for various project topics.[92] This networked structure makes the EuroHPC JU similar to other programs like the UK's AIRR, though unlike these other programs, the ownership of these computers is shared by a coalition of states and their compute power is open to a range of projects that stretch beyond AI-focused research initiatives.

As the EU crafts a more refined vision on what European tech leadership should look like, expanding public options in AI appears to be a key starting point. As outlined in the Draghi report, the development of "AI factories" via the creation of the EuroHPC JU could lead to new models of public ownership such as exchanging ownership shares in businesses for public compute access.[93] Future developments in native chip manufacturing within Europe will also play a vital role.[94] These developments could help build a strong public AI resource for the EU.

G. Singapore

In 2014, Singapore launched Smart Nation Singapore, an initiative to integrate new technologies into government and improve public services.[95] AI emerged as a particularly important technology in achieving these goals and led the government to launch AI Singapore to better coordinate public AI research.[96] In the years since, the Singaporean government has invested in a range of public AI efforts to establish its role as a global leader in the technology. This included launching two National AI

[92] Press Release, EuroHPC Joint Undertaking, The EuroHPC Joint Undertaking Launches AI Factories Calls to Boost European Leadership in Trustworthy AI (Sep. 10, 2024), https://eurohpc-ju.europa.eu/eurohpc-joint-undertaking-launches-ai-factories-calls-boost-european-leadership-trustworthy-ai-2024-09-10_en; EuroHPC JU Access Call for AI and Data-Intensive Applications (Mar. 5, 2024), https://eurohpc-ju.europa.eu/eurohpc-ju-access-call-ai-and-data-intensive-applications_en.

[93] Draghi, *supra* note xx, at 83, ("Under this model, public HPC facilities or research centres could competitively offer free computing capacity to innovative entities developing AI models, in exchange for equity options, royalties or dividends to be reinvested in capacity and maintenance").

[94] European Chips Act, https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/europe-fit-digital-age/european-chips-act_en (last visited Nov. 7, 2024).

[95] *Smart Nation: The Way Forward*, Government of Singapore, https://www.smartnation.gov.sg/files/publications/smart-nation-strategy-nov2018.pdf (last visited Mar. 27, 2025).

[96] AI SINGAPORE, https://aisingapore.org/ (last visited Mar. 27, 2025).

Strategies outlining the leadership's approach to supporting AI development,[97] investing hundreds of millions towards AI compute and workforce development,[98] and pushing for foreign investment and research partnerships.[99]

At the compute level, the Singaporean government in 2015 collaborated with several universities to build the National Supercomputing Center (NSCC), a subsidized high-performance computing center for the research community.[100] While founded as a general research-oriented supercomputing system, the NSCC has shifted towards AI-specific computing starting in 2017, when the Center partnered with Nvidia to expand its AI capabilities.[101] As the global AI boom continued, the NSCC has benefited from significant public investment to fund expansion and upgrade efforts. Eighty percent of the NSCCs compute is allocated to publicly-funded research projects, most of which goes toward addressing various "national priorities."[102] The public compute allotment is also directed towards supporting new and early-career researchers as well as improving high-performance computing systems in general.[103] Like Japan's ABCI, the NSCC is open for private research and startup use, with twenty percent of its capacity

---

[97] *National Artificial Intelligence Strategy*, Government of Singapore, https://file.go.gov.sg/nais2019.pdf; *NAIS 2.0: AI for the Public Good For Singapore and the World*, Government of Singapore, https://file.go.gov.sg/nais2023.pdf.

[98] Aaron Tan, *Singapore invests S$200m to upgrade supercomputing capabilities*, COMPUTERWEEKLY.COM (Mar. 12, 2019), https://www.computerweekly.com/news/252459277/Singapore-invests-S200m-to-upgrade-supercomputing-capabilities; Kenny Chee, *Singapore to build third national supercomputer for Covid-19, other healthcare research*, STRAIGHTS TIMES (Dec. 3, 2021) https://www.straitstimes.com/tech/tech-news/spore-to-build-third-national-supercomputer-for-covid-19-other-healthcare-research; *Singapore Artificial Intelligence*, U.S. INT'L TRADE ADMIN. (Jun. 11, 2023), https://www.trade.gov/market-intelligence/singapore-artificial-intelligence.

[99] *See, e.g.,* A*Star Singapore, Japan-Singapore Joint Call for Proposals, https://www.a-star.edu.sg/Research/funding-opportunities/japan-singapore-joint-call-for-proposals--japan-science-and-technology-agency-(jst)-and-agency-for-science--technology-and-research-(a-star)-2024 (last visited Mar. 27, 2025); Singapore Tourism Board, *AI ascent: Inside Singapore's rise as a global hub for artificial intelligence,* FIN. TIMES, https://stb.ft.com/article/inside-singapores-rise-global-hub-artificial-intelligence (The Singapore Tourism Board paid for a partnered content post from the Financial Times to promote its AI sector).

[100] NSCC, *History of NSCC and Singapore Supercomputing*, https://www.nscc.sg/singapores-supercomputing-journey/ (last visited Mar. 27, 2025).

[101] NSCC, *AI Platform*, https://www.nscc.sg/ai-platform/ (last visited Mar. 27, 2025).

[102] NSCC, *Strategic Resource Allocation Policy, Pricing & FAQ,* https://www.nscc.sg/srapolicy/ (last visited Mar. 27, 2025).

[103] *Id*.

allocated to the private sector, though with lower access priority and higher prices per compute hour.[104]

Singapore has also invested in developing public AI applications. AI Singapore operates a product division that has built out AI tools for the public including SEA-LION, a family of LLMs trained on and responsive to queries in eleven Southeast Asian languages.[105] The model is trained on linguistic data collected by AI Singapore and is offered to local businesses to support various tasks like translation and voice assistant development. Another agency, Open Government Products, has launched a suite of AI applications for the civil service including a chatbot and a search tool for government legislation and regulations.[106] These efforts have benefited from Singapore's broader investment in AI education and career programming, which has drawn talent to work with the government in building these products. Though these programs have had success in creating AI applications, Singapore's small economy and labor force limits public capacity to build out foundational models and led many of these efforts to rely on non-public technology like SEA-LION which relies on foundational models developed by Meta and Google.[107]

Beyond internal public investment, the Singaporean government has tried to build its international AI presence. Singapore and Japan have established an AI research partnership, and the government has been using its positive relationships with both China and the United States as a feature in recruiting foreign investors and tech firms.[108] Singapore has also invested in AI governance tools including AI Verify, a testing toolkit for AI programs to check that they align with global standards and rules.[109]

---

[104] *Id.*

[105] AI Singapore: AI Products, https://aisingapore.org/ (last visited Mar. 27, 2025); What is SEA-LION, https://sea-lion.ai/ (last visited Mar. 27, 2025).

[106] Open Government Products, About Us, https://www.open.gov.sg/about-us (last visited Mar. 27, 2025); Pair Products, https://pair.gov.sg/products/search (last visited Mar. 27, 2025).

[107] SEA-LION V3, https://sea-lion.ai/our-models/ (last visited Mar. 27, 2025).

[108] Japan-Singapore Joint Call for Proposals, https://www.a-star.edu.sg/Research/funding-opportunities/japan-singapore-joint-call-for-proposals--japan-science-and-technology-agency-(jst)-and-agency-for-science--technology-and-research-(a-star)-2024 (last visited Mar. 27, 2025); Kayla Goode, Heeu Millie Kim, Kayla Goode, & Melissa Deng, *Examining Singapore's AI Progress*, CTR. SEC. & EMERGING TECH (Mar. 2023), https://doi.org/10.51593/2021CA014.

[109] What is AI Verify?, https://aiverifyfoundation.sg/what-is-ai-verify/ (last visited Mar. 27, 2025).

H. China

In 2017, China released the New Generation Artificial Intelligence Development Plan, a national plan for guiding China to global AI leadership by 2030.[110] The plan frames AI as integral to the country's long-term success and adopts policies to build AI resources and support domestic AI development. In the years since, tensions between the US and China have risen with the US and its allies blocking China from accessing critical hardware for AI development.[111] The Chinese government has, in turn, pursued a broad AI industrial strategy to build public capacity for AI hardware, compute, data, models, and talent.

The US has barred GPU designer Nvidia and others from selling its most powerful AI chips in China.[112] Chinese firms have since depended on stockpiled chips, black market sellers, and renting foreign compute infrastructures, but over time, the ban could disrupt Chinese AI development as accessing powerful new chips grows harder.[113] The Chinese government has countered by investing in its domestic chip design and manufacturing industries.[114] Through direct subsidies, government-sponsored competitions, and public investment funds, China is supporting local AI chip designers, including telecom giant Huawei.[115] China has used similar mechanisms to support domestic chip manufacturers to reduce dependency on TSMC, the primary beneficiary

---

[110] China State Council, *A New Generation Artificial Intelligence Development Plan* (Jul. 20, 2017), translation available at https://digichina.stanford.edu/work/full-translation-chinas-new-generation-artificial-intelligence-development-plan-2017/.

[111] 87 Fed. Reg. 62186, Oct. 13, 2022; 88 Fed. Reg. 73424, Oct. 25, 2023; 89 Fed. Reg. 23876, Apr. 4, 2024.

[112] *Id.*

[113] Anton Shilov, *Chinese AI Firm Stockpiled 18 Months of Nvidia GPUs Before Export Ban*, TOM'S HARDWARE (Nov. 10, 2023) https://www.tomshardware.com/tech-industry/chinese-ai-firm-stockpiled-18-months-of-nvidia-gpus-before-export-ban; Raffaele Huang, *The Underground Network Sneaking Nvidia Chips Into China*, WALL ST. J. (Jul. 2, 2024) https://www.wsj.com/tech/the-underground-network-sneaking-nvidia-chips-into-china-f733aaa6; Juro Osawa & Aaron Holmes, *Google, Microsoft Help Chinese Firms Skirt Ban on Nvidia Chips*, INFORMATION (Jul. 17, 2024) https://www.theinformation.com/articles/google-microsoft-help-chinese-firms-skirt-ban-on-nvidia-chips?rc=yqdqfb.

[114] Arjun Kharpal, *China Seeks a Homegrown Alternative to Nvidia — These are Some of the Companies to Watch*, CNBC (Sep. 17, 2024), https://www.cnbc.com/2024/09/17/chinese-companies-aiming-to-compete-with-nvidia-on-ai-chips.html.

[115] Hodan Omaar, *How Innovative Is China in AI?* at 5, INFO. TECH. & INNOVATION FOUND. (Aug. 26, 2024), available at https://itif.org/publications/2024/08/26/how-innovative-is-china-in-ai/; Ana Swanson, John Liu & Paul Mozur, *The Chinese Chipmaker at the Heart of the U.S.-China Tech War*, N.Y. TIMES (Sep. 16, 2019), https://www.nytimes.com/2024/09/16/technology/smic-china-us-trade-war.html.

being state-owned Semiconductor International Corporation (SMIC).[116] Huawei and SMIC have since partnered to launch the Ascend series of AI chips as an alternative to Nvidia.

While the Ascend series marks a success for China's chip industry, it is far from sufficient to be globally competitive. There are two versions of the Ascend chips, one manufactured by TSMC and the other by SMIC. Comparisons indicate the SMIC version is weaker than the TSMC version, a consequence of SMIC's inability to acquire the EUV photolithography machinery necessary to make cutting edge chips due to trade restrictions.[117] Huawei and Chinese AI chip designers have also not launched a credible alternative to Nvidia's CUDA, the software toolkit and programming language. As a result, benchmark scores regarding chip hardware might not accurately represent how well the chips perform.[118] However, while China is behind in hardware development, the emergence of DeepSeek and its powerful AI models built using older Nvidia chips indicates that high-powered AI chips could play less a lesser role in future AI development.[119]

Beyond hardware development, China has also built public compute infrastructure, though the full scale of this effort is obscure due to the complex relationship between state and private enterprise. A consortium of agencies is set to launch a "national

---

[116] Yuan Gao & Debby Wu, *China's Chip Advances Stall as US Curbs Hit Huawei AI Product*, BLOOMBERG (Nov. 19, 2024), https://www.nytimes.com/2024/04/12/business/artificial-intelligence-mistral-france-europe.html.

[117] Jacob Feldgoise and Hanna Dohmen, Pushing the Limits: Huawei's AI Chip Tests U.S. Export Controls, CTR. FOR SEC. & EMERGING TECH. (Jun. 17, 2024) https://cset.georgetown.edu/publication/pushing-the-limits-huaweis-ai-chip-tests-u-s-export-controls; Anton Shilov, *Huawei's Homegrown AI chip Examined — Chinese Fab SMIC-Produced Ascend 910B is Massively Different From the TSMC-Produced Ascend 910*, TOM'S HARDWARE (Nov. 29, 2024) https://www.tomshardware.com/tech-industry/artificial-intelligence/huaweis-homegrown-ai-chip-examined-chinese-fab-smic-produced-ascend-910b-is-massively-different-from-the-tsmc-produced-ascend-910 Yuan Gao & Debby Wu, *China's Chip Advances Stall as US Curbs Hit Huawei AI Product*, BLOOMBERG (Nov. 19, 2024), https://www.nytimes.com/2024/04/12/business/artificial-intelligence-mistral-france-europe.html.

[118] Paul Triolo & Kendra Schaefer, China's Generative AI Ecosystem in 2024 Rising Investment and Expectations, NATIONAL BUREAU OF ASIAN RESEARCH (Jun. 27, 2024), available at https://www.nbr.org/publication/chinas-generative-ai-ecosystem-in-2024-rising-investment-and-expectations/ ("Indeed, despite the fact that comparisons of raw technical performance parameters between Nvidia A100 chips and Huawei Ascend 910B chips seem to indicate the chips are relatively comparable, the numbers do not necessarily reflect performance in real-world applications").

[119] Stu Woo & Raffaele Huang, *How China's DeepSeek Outsmarted America*, WALL ST. J. (Jan. 28, 2025) https://www.wsj.com/tech/ai/china-deepseek-ai-nvidia-openai-02bdbbce.

computing power network" in 2025 for researchers and firms to use in AI development.[120] This system aligns with China's "Eastern Data, Western Computing" initiative which pushes for locating computing infrastructure in China's sparsely populated west to process data generated by the more populated east. By distributing computing centers, the government hopes to spread the benefits of AI while leveraging cheaper land prices and access to clean energy.[121] Local governments have also rolled out public compute, through entities such as Beijing Energy, a city-owned company, which launched a compute infrastructure for researchers and startups.[122] An emerging trend in these new projects has been a push to rely on domestic goods and refrain from using foreign chips.[123]

China is also supporting AI model development by opening access to training data. In 2023, the government formed the National Data Administration to coordinate national data resources, develop data sharing standards, and organize government data for AI development that the government has accumulated through its surveillance programs.[124] The agency is building infrastructure for storing and managing this data.[125] Early evidence indicates that firms given access to surveillance data for building government AI tools led these same firms to more quickly develop commercial

---

[120] Ministry of Industry and Information Technology et al., *Action Plan for the High-Quality Development of Computing Power Infrastructure* (Oct. 8, 2023), translation available at https://cset.georgetown.edu/publication/china_compute_infrastructure_action_plan/; Press Release, The State Council People's Republic of China, China accelerates building of national computing power network (Dec. 7,2023), https://english.www.gov.cn/news/202312/27/content_WS658b72afc6d0868f4e8e28ba.html.

[121] Seaton Huang, *China's Latest National Infrastructure Project Spotlights Computing Capabilities*, COUNCIL ON FOREIGN REL. (Nov. 2, 2022), https://www.cfr.org/blog/chinas-latest-national-infrastructure-project-spotlights-computing-capabilities.

[122] Charlotte Trueman, *New Public AI Computing Platform Launched in Beijing*, DATACENTERDYNAMICS (Jan. 2, 2024), https://www.datacenterdynamics.com/en/news/new-public-ai-computing-platform-launched-in-beijing/.

[123] Pei Li, Mackenzie Hawkins, & Debby Wu, *China Urges Local Companies to Stay Away From Nvidia's Chips*, BLOOMBERG (Sep. 27, 2024), https://www.bloomberg.com/news/articles/2024-09-27/china-urges-local-companies-to-stay-away-from-nvidia-s-ai-chips.

[124] *Establishing the National Data Administration*, National People's Congress (Mar. 5, 2023) translation available at https://digichina.stanford.edu/work/translation-establishing-the-national-data-administration-march-2023/.

[125] Press Release, The State Council People's Republic of China, Data Infrastructure Blueprint Unveiled (Dec. 23, 2024), https://english.www.gov.cn/news/202411/23/content_WS67417342c6d0868f4e8ed59e.html.

AI applications, suggesting that state data sharing has successfully boosted AI innovation.[126]

China has also focused on workforce development as part of its AI strategy. China has expanded public funding for AI research,[127] and the government directly supports AI startups through subsidies and state-backed investments.[128] These programs have helped Tsinghua University, an institution with close ties to Chinese leadership, emerge as an AI research champion.[129] The university is a part of China's "Silicon Valley," and many of the nation's startup founders are Tsinghua alumni or faculty, including the founders of many of China's largest AI firms. While technically private, many of these firms have received significant government support, including backing from government venture funds and support from Tsinghua's startup incubator system.[130]

I. United States Federal Initiatives

The US federal government has several public AI projects at various stages of development. Perhaps the most prominent is the National Artificial Intelligence Research Resource (NAIRR), a proposed cyberinfrastructure and compute system for AI researchers. The proposal is awaiting congressional action, but the Biden Administration launched a pilot version of the NAIRR through the National Science Foundation to bring existing AI resources from government agencies and donated resources from private firms to the research community.[131] The program allows researchers to apply for compute access provided by federal agencies or partner firms such as Amazon and Google.[132] NAIRR also provides a platform for knowledge sharing

---

[126] Martin Beraja, David Y. Yang & Noam Yuchtman, *Data-Intensive Innovation and the State: Evidence from AI Firms in China*, 90 REV. ECON. STUD. 1701 (2023).

[127] Omaar, *supra* note 115, at 10. (Quality is measured by paper citations).

[128] Liza Lin & Rebecca Feng, *For Chinese Tech Startups, Beijing Fills a Funding Void Left by VCs*, WALL ST. J. (Oct. 3, 2024) https://www.wsj.com/world/china/for-chinese-tech-startups-beijing-fills-a-funding-void-left-by-vcs-deeb0e2c.

[129] Omaar, *supra* note 115, at 6; Yixuan Lin, The Gen Z Tsinghua Graduates Driving AI in China, COMMONWEALTH MAGAZINE (Oct. 15, 2024) https://english.cw.com.tw/article/article.action?id=3790.

[130] Eleanor Olcott, *Four Start-ups Lead China's Race to Match OpenAI's ChatGPT*, FIN. TIMES (May 2, 2024) https://www.ft.com/content/4e6676c8-eaf9-4d4a-a3dc-71a09b220bf8.

[131] About NAIRR Pilot, https://nairrpilot.org/about (last visited Nov. 11, 2024).

[132] Resource Catalog, https://submit-nairr.xras.org/resources (last visited Nov. 11, 2024) (The government current has 36 different resource types available for applicants, of which 16 resource types are provided by private firms including cloud compute provided by Amazon, Google, Microsoft, Nvidia

including pre-built models, data sets, coding toolkits, and educational materials for researchers.[133]

The US Department of Energy (DOE), a homebase for US science policy through its national laboratories system, has also established its own public AI program. The DOE's laboratories host thousands of scientists, several of the world's most powerful supercomputers, and a massive amount of scientific data, some of which is already rentable for research.[134] The agency is leveraging these resources and public-private partnerships to support its Frontiers in AI for Science, Security, and Technology (FASST) initiative to develop public AI. FASST aims to develop a national AI capability within the federal government to support scientific competitiveness, energy innovation, and national security.[135] The agency is currently seeking public comments to assist in creating a more detailed project roadmap and legislators have pushed to provide permanent funding for the initiative.[136]

Though the FASST initiative is awaiting funding, one of the DOE's national laboratories and NAIRR collaborator, the Argonne National Laboratory, has emerged as a standout in developing public AI capacity. The facility hosts several of the world's most powerful supercomputers as well the Argonne Leadership Computing Facility (ALCF) Testbed, an AI resource for evaluating the performance AI models.[137] Researchers at Argonne have used their supercomputing capacity to develop AuroraGPT, an AI foundation model, oriented to assist scientists and researchers and trained on scientific data generated by Argonne and partner organizations.[138] While Argonne is still training the model, its focus on assisting researchers highlights a particular use case for public AI in the model and applications level of the tech stack.[139] It is unclear whether AuroraGPT will

---

and others as well as access to APIs from OpenAI and Anthropic, in addition other toolkits platforms and grants for AI development are made available in the NAIRR).

[133] Open Data, Models, and More, https://nairrpilot.org/pilotresources (last visited Nov. 11, 2024)

[134] Frontiers in Artificial Intelligence for Science, Security and Technology (FASST), https://www.energy.gov/fasst (last visited Nov. 11, 2024).

[135] *Id*.

[136] S. 4664, Department of Energy AI Act, 118th Cong., 2d Sess. (2024).

[137] Argonne National Laboratory, ALCF AI Testbed, https://docs.alcf.anl.gov/ai-testbed/getting-started/ (last visited Nov. 11, 2024).

[138] Press Release, Argonne National Laboratory, Argonne and RIKEN Sign a Memorandum of Understanding in Support of AI for Science (Apr. 12, 2024).

[139] Argonne National Laboratory, Project Overview, https://auroragpt-stg.cels.anl.gov/project-overview (last visited Nov. 11, 2024); Franck Cappello, AuroraGPT: Rationale, Challenges and Development of an AI Research Assistant Slidedeck.

match up to private competitors, but if successful, it could be a step forward in continued development of American public AI.

J. New York, United States

Within the United States, New York state is a standout in public AI development through its Empire AI initiative. With high compute needs for research and intense industry consolidation, it can be costly for researchers to access existing compute resources. The Empire AI initiative provides a public compute platform for researchers. The project brings together a consortium of universities within New York to develop a public compute infrastructure for AI researchers. The initial investment by the state of $275 million was accompanied by an additional $125 million from consortium members and other private partners.[140] The state has more recently announced an additional $90 million of funding for the system.[141] Like the UK's AIRR, the program is for affiliates of the consortium that established the cluster and does not accept submissions from outside firms and research groups. The program is still in early stages, with the first part of the cluster coming online in October 2024.[142]

The Empire AI cluster raises an important design consideration in the development of public compute: energy. Data centers and supercomputing infrastructures require massive amounts of energy to train and run AI models. These high energy needs are often disruptive to communities by spiking electricity costs.[143] Private firms have looked to circumvent these costs by establishing partnerships and deals with energy providers

[140] Press Release, Kathy Hochul, Governor of New York Governor Hochul Announces $90 Million Plan to Expand Historic Empire AI Consortium and Enhance Computing Power for Public Good on Behalf of New Yorkers (Feb. 21, 2025), https://www.governor.ny.gov/news/governor-hochul-announces-90-million-plan-expand-historic-empire-ai-consortium-and-enhance.

[141] Press Release, Kathy Hochul, Governor of New York, 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 (Jan. 8, 2024), https://www.governor.ny.gov/news/governor-hochul-unveils-fifth-proposal-2024-state-state-empire-ai-consortium-make-new-york.

[142] FAQs, EmpireAI, https://www.empireai.tech/faqs (last visited Nov. 5, 2024); Press Release, Kathy Hochul, Governor of New York, Governor Hochul Launches First Phase of Empire AI, Powering Critical Research for the Public Good Just Six Months After FY25 Budget (Oct. 11,2024), https://www.suny.edu/suny-news/press-releases/10-24/10-11-24/empire-ai.html.

[143] Evan Halper & Caroline O'Donovan, *As Data Centers for AI Strain the Power Grid, Bills Rise for Everyday Customers*, WASH. POST (Nov. 1, 2024), https://www.washingtonpost.com/business/2024/11/01/ai-data-centers-electricity-bills-google-amazon/.

to power data facilities, often through nuclear power.[144] New York's decision to site Empire AI at the University at Buffalo, allows the program to access clean hydroelectric power for the compute infrastructure.[145] As more public AI proposals are considered, a key takeaway from Empire AI is making siting decisions that take into account clean energy availability.

K. California, United States

In 2024, California was home to a legislative battle regarding SB-1047, the Safe and Secure Innovation for Frontier Artificial Intelligence Models Act.[146] The bill proposed a regulatory structure for AI development in the state and sparked industry opposition, leading to its eventual veto. But the bill also contained an uncontroversial proposal to establish a public computing infrastructure called CalCompute to serve as a public counterweight for AI development. The bill called for the California Government Operations Agency to bring university leaders, tech experts, labor representatives, and other stakeholders together to develop a design for a public compute infrastructure, including costs, governance structure, and parameters for who could use the infrastructure, and identification of potential partners for the project.[147] The report would be used as a framework to build a CalCompute infrastructure, ideally hosted in the University of California System, similar to Empire AI. Due to the veto of SB-1047, the CalCompute proposal was tabled pending continued discussions between California's leaders. In December 2024, California's independent government efficiency commission recommended the establishment of a compute center, and in the months since, state senator Scott Weiner, the original sponsor of SB-1047, has introduced a new AI bill that includes the CalCompute proposal.[148]

---

[144] Ivan Penn & Karen Weise, *Hungry for Energy, Amazon, Google and Microsoft Turn to Nuclear Power*, N.Y. TIMES (Oct. 16, 2024), https://www.nytimes.com/2024/10/16/business/energy-environment/amazon-google-microsoft-nuclear-energy.html.

[145] Responsible AI Innovation, EmpireAI, https://www.empireai.tech/benefits (last visited Dec. 3, 2024) ("Empire AI will be an energy efficient computing facility, sustainably powered by clean and renewable hydropower from Niagara Falls and recirculating heat generated from the facility to warm dorms on campus").

[146] Cecilia Kang, *California Governor Vetoes Sweeping A.I. Legislation,* N.Y. TIMES (Sep. 29, 2024), https://www.nytimes.com/2024/09/29/technology/california-ai-bill.html.

[147] S.B. 1047, 2023-2024 Leg., Reg. Sess. (Cal. 2024).

[148] Little Hoover Commission, *Report #284 Artificial Intelligence and California State Government*, 11-14 (Dec. 2024), https://lhc.ca.gov/report/artificial-intelligence-and-state-government/; Rachael Myrow, *California Lawmaker Ready to Revive the Fight Over Regulating AI*, KQED (Jan. 9, 2025),

Conclusion

As nations around the world race to establish robust public AI infrastructures, the choices they make will have profound implications for future technological capabilities, economic competitiveness, and geopolitical standing. The four approaches outlined in this essay—Outsourced Provision, Networked Collaboration, State-Corporate Fusion, and Public Options—represent different models for balancing the complex tradeoffs in AI development. While the Outsourced Provision model offers rapid deployment and access to cutting-edge technologies already developed by the private sector, it risks creating long-term dependencies on private actors who do not have to account for the long-term needs of the public. Networked Collaboration promotes access and innovation but may face coordination and resource challenges. State-Corporate Fusion allows for an alignment of corporate and government strategies but raises concerns about market competition and concentration of power. The Public Options model aims to balance public access with market dynamism but requires significant and sustained government investment and expertise.

The development of public AI resources is not merely a technological endeavor but a multifaceted challenge that intersects with issues of governance, economic policy, and international relations. As such, policymakers must carefully consider the long-term implications of their chosen approaches, balancing the needs for rapid AI advancement with concerns regarding concentration of power, national security, and economic inequality. In the coming years, the success of these various public AI models will play a crucial role in shaping the global AI landscape and will influence not only the pace of technological progress but also the distribution of AI capabilities across nations and sectors of society.

---

https://www.kqed.org/news/12020857/california-lawmaker-ready-revive-fight-regulating-ai; S.B. 53, 2025-2026 Leg., Reg. Sess. (Cal. 2025).