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The Fierce Competition Driving America's AI Leadership

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This *American Edge Project Issue Brief* (November 2024) examines the competitive dynamics of the U.S. artificial intelligence (AI) industry, outlines the various threats facing U.S. AI leadership and offers solutions to policymakers and enforcers – current and incoming ones – to ensure America maintains its AI global edge.

Executive Summary

AI is revolutionizing the global economy, with the United States at the forefront of this transformation. America's leadership in AI is powered by a dynamic and competitive private sector continuously driving innovation and delivering breakthrough products. However, American AI faces tough competition from foreign rivals, particularly China, as well as increasing regulatory challenges at home and abroad.

At home, in fact, both the federal and state governments have sharply increased the number and burden of AI regulations, with little regard for need or cost. Moreover, even though AI competition is thriving by any metric, the Federal Trade Commission (FTC) recently launched an extensive study of AI markets and signaled a predisposition to find competitive problems. Similarly, even though both the FTC and the National Telecommunications and Information Administration (NTIA) have recognized that **open-source models** can decentralize market control, the FTC also declared open-source AI models problematic because, at some future point, companies could choose to close those models.

Abroad, China plans to lead the world in AI by 2030, particularly in open-source AI. China is investing $1.4 trillion to achieve technological leadership and has already surpassed the United States in global AI patent origins. China supports this AI growth with state subsidies and intellectual property (IP) theft in the range of $500 billion annually. If China's AI capabilities surpass our own, the Chinese Communist Party (CCP) could use AI to spread authoritarian values and surveillance technologies around the globe, including to some of America's most trusted overseas partners.

Among our allies, Europe's protectionist impulses and burdensome regulations are hindering innovation. Europe and the United Kingdom (UK) have targeted American technology companies for tens of billions of dollars in fines and blocked routine transactions that have almost no nexus to the continent, all while giving European and Chinese companies much more favorable treatment. Rather than foster the technology, the European Union's (EU) new AI Act imposes strict regulatory requirements and hefty fines that could deter companies from introducing new models.

American policymakers need to get it right. The global AI market is projected to be worth $15.7 trillion by 2030, and AI leadership will give the United States a profound edge in economic competitiveness, national security, and global influence. But the race with China is about more than just technology – it's a battle of values and vision. While China uses AI to expand censorship and control, pushing its model of "digital authoritarianism," the United States champions a different path – one that fosters innovation, protects freedom, and promotes global prosperity. The country that leads in AI will shape the global landscape for decades, influencing everything from economic power to individual rights.

This is a race America must win. Here's how policymakers can help achieve that:

- **Encourage Light-Touch AI and Tech Regulation:** Avoid burdensome regulation that stifles innovation; existing laws can address most concerns.
- **Ground Antitrust Enforcement in Evidence:** Ensure antitrust actions are based on proven consumer harm, not agenda-based ideology, to avoid slowing AI growth.
- **Invest in Critical AI Inputs:** Urgently invest in advanced chips, infrastructure, and talent to maintain U.S. AI leadership. Ensure America leads in multiple AI approaches – both closed- and open-source.
- **Collaborate with Allies:** Partner with global allies to ensure even-handed enforcement and prevent protectionism that discriminates against U.S. companies and products.
- **Counter Authoritarian Threats:** Work with allies to counter China's influence, especially in AI, by protecting IP, leading in innovation, and providing U.S. tech to the Global South.

Issue Brief

Part One: The Competitiveness of the U.S. AI Market: Four Key Measures

Broadly speaking, AI refers to a computer's ability to perform tasks commonly associated with intelligent beings, such as reasoning and learning from experience. AI encompasses a range of data tools that include algorithms, classic machine learning and large language models (LLMs). Generative AI, which has exploded in popularity, is a type of AI that can create new content, such as images and text.

To assess the robustness of competition in the U.S. AI market, **American Edge Project** examined four key measures: 1) the number and diversity of firms in the AI space; 2) ease of entry and exit; 3) output levels, price competition, and consumer choice; and 4) innovation rate and technological advancement. Each measure provides insight into the level of competition and the implications for U.S. AI leadership.

1. The Number and Diversity of Firms

What an Uncompetitive Market Looks Like:
In uncompetitive markets, consumers have few choices and new firms rarely enter the marketplace to compete.

AI Market Analysis:
In the U.S. AI space, however, consumers have more AI options than ever, with the ability to choose from established companies, newer firms and startups, and to switch among them seamlessly. While major players, including **Google, Microsoft and OpenAI**, lead in certain areas, such as large language models and cloud-based AI services, the overall market remains highly fragmented.

In fact, in 2023 alone, more than 897 new U.S. AI companies entered the marketplace (5,590 total from 2013 to 2023 – see chart below), adding to the diversity and dynamism of the industry. AI applications span numerous sectors, including healthcare, finance and autonomous systems, with different firms excelling in different niches. This range of applications and the number of active companies means that no single company (or small group of them) dominates the market.[1]

The Bottom Line:
The U.S. AI industry is marked by a **healthy level of competition** spread across both large corporations, midsize firms, and a thriving ecosystem of startups. This diversity in market players ensures that innovation continues to flourish, driven by a wide range of competitors.

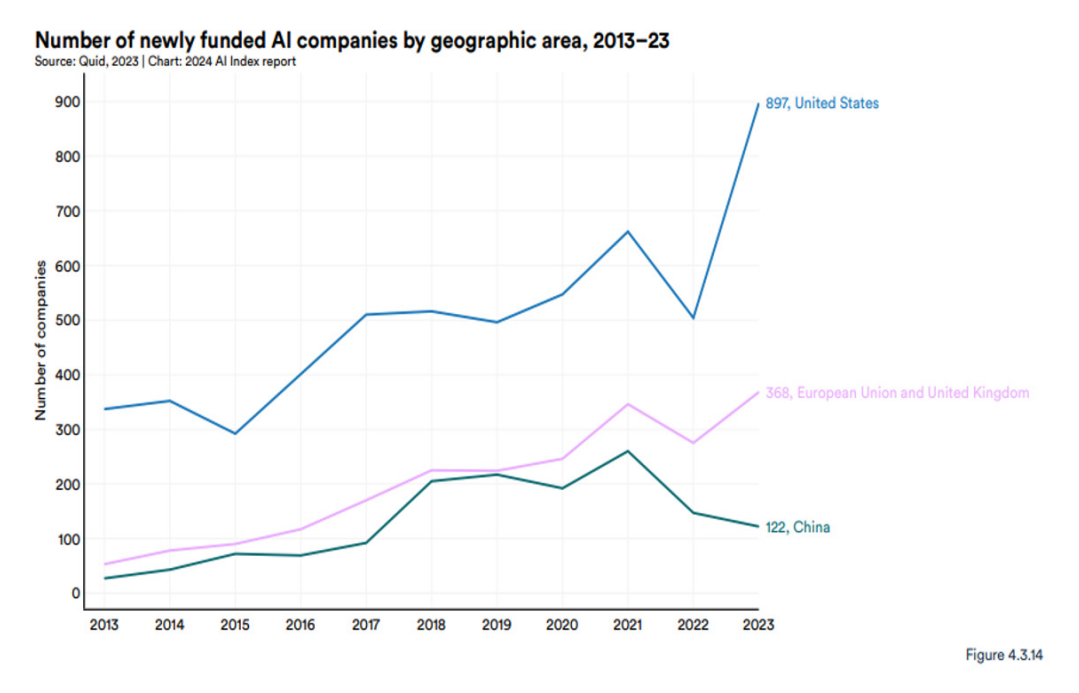


Figure 1: Perrault, R., & Clark, J. (2024, April 15). AI Index Report 2024. https://aiindex.stanford.edu/wp-content/uploads/2024/05/HAI_AI-Index-Report-2024.pdf

2. Ease of Entry and Exit

What a Market with High Barriers to Entry/Exit Looks Like:
Markets with high barriers to entry make it difficult for new firms to enter due to factors such as high capital requirements, regulatory hurdles, or proprietary technologies. High exit barriers, such as sunk costs and lack of acquisition opportunities, also indicate a less competitive market.

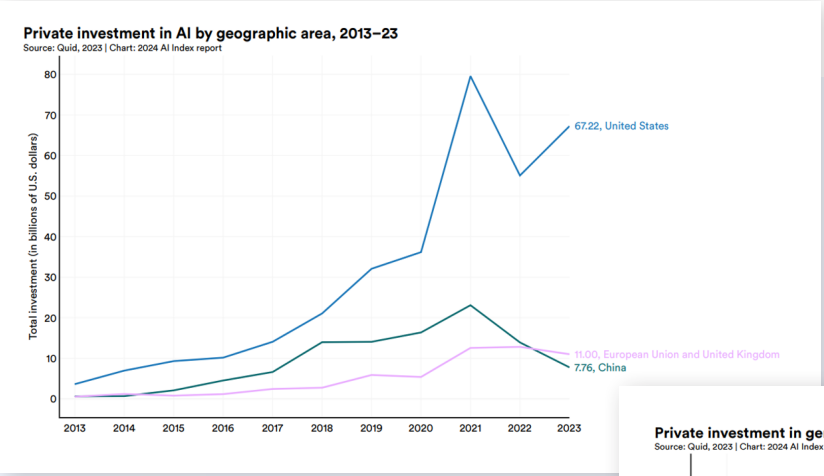
AI Market Analysis:
The U.S. AI industry offers **fairly low barriers to entry** for software-based AI firms, thanks in part to open-source providers (e.g., **Meta**) and open-source platforms that lower capital requirements. Since 2018, 94 different companies have developed more than 250 foundational models, with more than half available with an open license. Millions of open-source AI projects are in the works on GitHub, a web-based platform that allows users to collaborate on code projects.

[1]This paper sets aside the important question of whether there is an "AI market" in the sense contemplated by the antitrust laws, and if so, what to include in that market. AI technologies include machine learning, deep learning, natural language processing, computer vision, generative AI, and more. From 2013 to 2023, more than 5,500 AI companies were funded in the U.S. alone.

Venture capital funding is plentiful, with $67.2 billion invested in U.S. AI in 2023, while generative AI attracted $22.5 billion, nearly a **nine-fold increase** over the prior year and about **30 times** the amount from 2019. Much of this investment flows from established tech companies, who are spending tens of billions of dollars on AI and who are helping to provide startups with the necessary resources to innovate and compete. Thirteen generative AI startups have received "unicorn status," with a valuation of $1 billion or more.

Additionally, exit barriers are low, as many AI startups are acquired by larger firms or complete an initial public offering (IPO). A growing set of a regulatory barriers threaten to child America's robust M&A activity (see "Threats" section below). In hardware-intensive areas, namely **AI chip development**, exit barriers are higher due to significant research and development (R&D) costs, but there is growing competition within that sector among companies, such as Nvidia, AMD, Intel, Cerebras Systems and others, fostering competition in AI processing power. Several companies are also developing in-house AI chips for their specific workloads.

The Bottom Line:
Ease of entry and exit in the U.S. AI market is **favorable** for startups, particularly in software. The low barriers promote high levels of competition, while even capital-intensive areas, such as chip manufacturing, maintain competitive dynamics. A half dozen companies are investing heavily to develop new chips, while numerous players can provide the necessary infrastructure for training and running AI models in the cloud server market. In short, as the Information Technology and Innovation Foundation (ITIF), noted to the U.S. Justice Department (DOJ), compute resources "have not proven to be an entry barrier."



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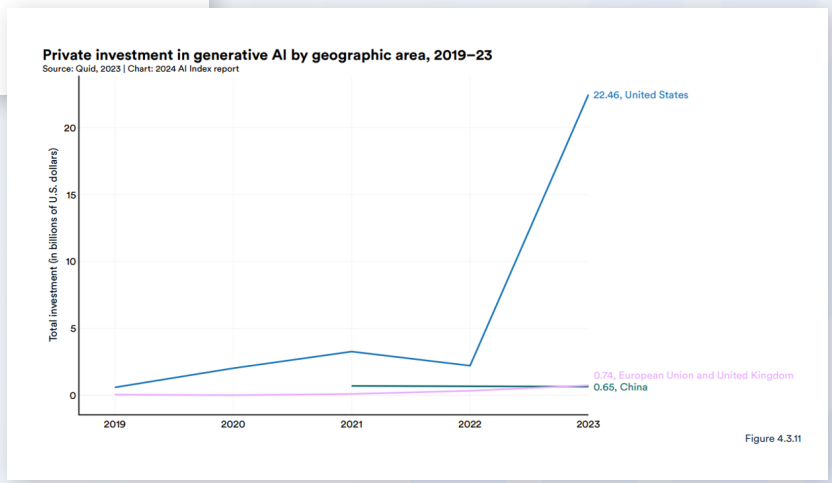


Perrault, R., & Clark, J. (2024, April 15). Artificial Intelligence Index Report 2024. https://aiindex.stanford.edu/wp-content/uploads/2024/05/HAI_AI-Index-Report-2024.pdf

3. Output, Price Competition and Consumer Choice

What a Market with Weak Price Competition Looks Like:
In a market with weak price competition, output and consumer choice tend to remain static or rise only slowly, even as prices tend to rise. These factors often signal a lack of competition.

AI Market Analysis:
As an initial measure, AI output has skyrocketed even as many products remain available at zero cost to consumers. In the past few years, the percentage of individuals and organizations using AI has more than tripled, while in just the last year, the use of generative AI has doubled. According to one international survey, 17 percent of people use ChatGPT daily, 36 percent weekly.

Consumers also have more **AI options than ever**. After OpenAI released ChatGPT, Google (Gemini), Meta (Llama), and Anthropic (Claude) quickly followed with their own LLMs. In 2023, the number of new LLMs released worldwide doubled from the previous year. Google and Microsoft have integrated AI into their search engines, while newer companies, such as Midjourney, DALL-E and Stable Diffusion, are leading in image generation, often surpassing larger firms in user traffic.

In terms of AI infrastructure, **price competition is strong**, particularly in cloud-based AI services. Companies, such as **Google Cloud**, **Microsoft Azure**, and **Amazon Web Services (AWS)**, actively compete on pricing and features (see examples below), and regularly offer deep discounts, especially for long-term commitments, adding to the competitive pricing environment. In terms of access to data, freely available open-source models, **Meta's Llama**, allow new entrants to build upon models already trained on large datasets; these open-source models provide new entrants with consistency and low costs. Consumers can also use Small Language Models (SLMs) for specific, simpler tasks, such as virtual assistance. SLMs require fewer resources, computing power and data inputs than LLMs.

The Bottom Line:
The U.S. AI market exhibits rising output, **robust price competition** and a high degree of consumer choice, which are clear indicators of a competitive industry. This dynamic helps ensure that innovation benefits a wide range of users, from individuals to enterprises.

Compare: AWS vs. Azure vs. Google Cloud Platform: Comparing On-Demand Pricing

This chart highlights some of the different price points and features available to cloud consumers from among the largest U.S. cloud providers alone.

Cloud pricing based on On-Demand rates

General purpose

Cloud provider	Instance type	Price
AWS	t4g.xlarge	$0.1344
Azure	B4ms	$0.166
Google Cloud Platform	e2-standard-4	$0.150924
Oracle	VM.Standard3.Flex	$0.104

Compute optimized

Cloud provider	Instance type	Price
AWS	c6a.xlarge	$0.153
Azure	F4s v2	$0.1690
Google Cloud Platform	c2-standard-4	$0.2351
Oracle	VM.Optimized3.Flex	$0.120

4. Innovation Rate and Technological Advancement

What a Market with Low Innovation Looks Like:
In industries with low competition, innovation can stagnate. Firms lack the incentive to develop new technologies, leading to fewer patents, slower technological advancements and limited new product introductions.

AI Market Analysis:
The U.S. AI industry is one of the most innovative sectors globally, with a **621 percent increase in patents** from 2018 to 2022, surpassing all major countries except China, which leads the world in AI patents (see table below).

The U.S. also leads all countries in the number of **notable machine learning models** (see figure below). Major firms, including **Meta**, **OpenAI**, **Nvidia**, and **Google**, continuously push the envelope with cutting-edge AI models and/or hardware. Startups are also driving significant advancements, particularly in niche applications, such as **AI-driven healthcare diagnostics** and **autonomous vehicles**. The competition between **open-source** and **closed-source models** further spurs innovation, as each approach challenges the other.

As of 2023, different models of American AI had achieved levels of performance that surpass human capabilities across a range of tasks, from image classification to basic reading comprehension.

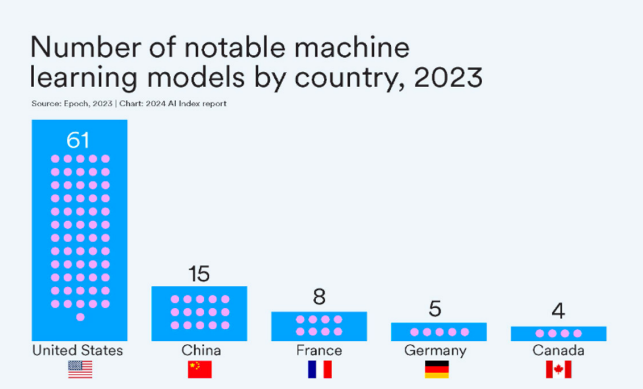
The Bottom Line:
The U.S. AI market is **highly innovative**, with rapid technological advancements and a constant flow of new products. This reflects a competitive environment where firms must continually innovate to maintain their market positions. The presence of **top AI talent** and **widespread AI adoption** help sustain this momentum, with **open-source models** contributing to leveraging innovations from the global community.

AI-Related Patents Granted By Year

Year	China	EU and UK	U.S.	RoW	Global Total
2010	307	137	984	571	1,999
2011	516	129	980	581	2,206
2012	926	112	950	660	2,648
2013	1,035	91	970	627	2,723
2014	1,278	97	1,078	667	3,120
2015	1,721	110	1,135	539	3,505
2016	1,621	128	1,298	714	3,761
2017	2,428	144	1,489	1,075	5,136
2018	4,741	155	1,674	1,574	8,144
2019	9,530	322	3,211	2,720	15,783
2020	13,071	406	5,441	4,455	23,373
2021	21,907	623	8,219	7,519	38,268
2022	35,315	1,173	12,077	13,699	62,264

https://www.visualcapitalist.com/visualizing-ai-patents-by-country/#:~:text=This%20infographic%20shows%20the%20number%20of%20AI-related%20patents%20granted%20each

Machine Learning Models by Country, 2023



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Part Two: The Threats to America's AI Leadership

While the United States leads in AI, its leadership is under threat from domestic overregulation, foreign competitors, namely China, and restrictive policies from the EU.

Threat #1: China's AI Ambitions

China poses a direct and growing threat to U.S. leadership in AI. Through state-backed investments and strategic initiatives, China is rapidly advancing its capabilities, aiming to overtake the United States by 2030. This strategic push is reflected in both the scale of investment and the competitive gains made by Chinese companies in recent years.

- **Significant AI Investments:** China is investing $1.4 trillion in AI and related technologies, including in **natural language processing** and **AI hardware**, where Chinese companies are excelling, and in some cases claiming to outperform U.S. models. According to the National Bureau of Economic Research, between 2000 to 2023, Chinese government venture capital funds invested $184 billion in 9,623 unique AI firms. At least six Chinese AI startups, the "Little Artificial-Intelligence Dragons," are valued at more than $1 billion each. In early 2024, China announced plans to integrate AI across all economic sectors via its "AI+" initiative, a plan to drive growth through innovation in frontier technologies.

- **Expert Consensus and Gains:** China now leads the world in AI research publications, top-tier AI researchers and the adoption of generative AI technologies. Indeed, our own National Security Commission on Artificial Intelligence acknowledges that China could surpass the United States in AI by 2030. The creation of **OpenAtom**, China's state-backed open-source ecosystem, is far more than just software development – it's a collaboration with China's largest tech companies to create a trojan horse designed to embed their core values into global technology infrastructure. In fact, one of China's largest technology companies recently released more than 100 open-source models that are proficient in at least 29 languages, a move that strengthens the company's reach into international markets.

- **Global Implications:** By promoting Chinese technical standards internationally, while making their technology both accessible and essential, Beijing seeks to reshape the digital world in its authoritarian image. This expansion also undermines the United States' technological leadership. As U.S. Representative Darrell Issa (R-CA) noted, "If China wins the AI arms race, their ability to steal technology and harm not just our country but the free world will be permanent."

Threat #2: European Regulatory Overreach

The EU's approach to tech regulation – through the **AI Act**, the **Digital Markets Act (DMA)** and 77 other pieces **of legislation impacting digital technologies** – poses significant challenges for U.S. companies. These regulations, purportedly to ensure AI safety and fairness, in fact disproportionately punish American tech firms that lead the world in AI innovation.

- **Europe's Excessive Tech Regulation Targets American Firms First:** The EU's excessive regulatory framework, particularly through the DMA, singles out large American technology firms for fines and compliance burdens. These penalties, imposed to raise revenue and jumpstart domestic companies, are substantial. Via the DMA, General Data Protection Regulation (GDPR) and taxes that appear to target U.S. firms, the EU could seek fines from just a handful

of America's largest technology companies over **$320 billion**, more than the EU's annual budget of €186 billion.[2] Meanwhile, Chinese firms are not subject to the same level of scrutiny, creating an uneven playing field that punishes American firms for their global leadership. ***Just how tilted is this EU playing field against American companies?*** Except for one Chinese firm (ByteDance) and one European firm (Booking.com), every company subject to the DMA is an American company. Additionally, both the EU and the UK have blocked primarily American technology mergers that had little or no economic nexus with the continent.

- **EU Regulations Discourage American Innovation:** Europe's policies hamper American innovation by chilling investment, discouraging firms from introducing new products into Europe, and transferring productive capital from American innovators to European bureaucrats. For instance, both Apple and Meta have delayed the release of new AI products into Europe due to its regulatory morass. For open-source projects, ***including those originating among European companies***, the AI Act's arbitrary lines, sweeping scope and limited exclusions are likely to reduce AI's development and availability. This reluctance to introduce innovative technologies in Europe, or undermine their own open-source tech companies, also risks stifling progress on the continent, which could leave it lagging far behind in the global AI race. In fact, from 2023 to 2024, while more than $47 billion in investments flowed to U.S. generative AI firms, European firms garnered less than one-fifth that amount, or $8.8 billion.

- **Growing Backlash Against EU Regulatory Overreach:** A recent letter from **150 European business leaders** raised concerns about how the EU's AI Act could damage its long-term competitiveness. This growing **backlash against the EU's excessive regulatory focus** was further echoed in a new EU-commissioned report, known as the Draghi Report, which warned of a "slow agony" of decline in global competitiveness unless Europe prioritized innovation. The report calls for cutting red tape, boosting R&D investment and partnering with the private sector to drive growth.

Threat #3: Short-Sighted Domestic Regulations

While the United States leads in AI development, domestic overregulation and infrastructure challenges threaten to undermine America's competitive edge in this critical field.

- **Regulatory Excess:** Recent actions by federal agencies and state legislatures are creating a more restrictive environment for AI innovation. In 2023, state legislatures enacted 65 tech policy changes, primarily focusing on internet usage, AI, and online privacy, that could inhibit technological innovation. Additionally, more than 762 AI-related bills were introduced by federal and state lawmakers, threatening to potentially surrender the edge America currently holds in a transformational technology. Still, states have opportunities to hold the line; earlier this year, California wisely rejected sweeping AI legislation on grounds that it would have reduced innovation.

- **Overly Aggressive Antitrust Investigations:** In recent years, the FTC and Department of Justice (DOJ) have taken an increasingly aggressive stance on antitrust enforcement, often targeting large U.S. technology firms. These investigations frequently **lack clear evidence of consumer harm** but create uncertainty that deters investment and hinders innovation. Speculative antitrust actions, particularly in the AI space, could have a chilling effect on the entire ecosystem, slowing down collaboration and scaling opportunities for smaller firms that rely on partnerships with larger

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2. The Digital Markets Act heavily regulates designated "gatekeepers," almost all American companies, and carries penalties of 10 to 20 percent of global revenue for violations. The EU has preliminarily found that Apple improperly constrained app developers and that Microsoft restricted competition by bundling its Teams software with other Office products. The EU also announced investigations into Google and Meta, and Amazon also has received substantial scrutiny. At the maximum of 20 percent of global revenue, the EU could seek to fine these companies $320 billion.

Beyond the DMA, Europe already has fined American companies billions of dollars for supposed violations of the GDPR and targeted digital services taxes. In announcing a $2 billion fine on Apple, for instance, the European Commission proudly proclaimed that its fines "help to finance the EU and reduce the burden for [its] taxpayers."

companies. Relatedly, the FTC, under Chair Lina Khan, recently launched an extensive study of AI markets and signaled a predisposition to find competitive problems based on speculative theories.

- **Raising Exit Costs.** In addition to these investigations, the antitrust agencies have taken other steps that could discourage investment in small, innovative companies. For instance, the agencies' new merger guidelines allow the government to dictate market structures and to target technology companies for investments in smaller firms. Similarly, the new merger form requires companies to submit volumes of new information in ways that likely will discourage smaller acquisitions and investments from private equity. Ignoring these risks, the agencies cavalierly assert that *"in the Agencies' experience, a startup deemed valuable by a dominant incumbent enjoys other exit options."* History, however, suggests that startups thrive when they have the option to obtain financing and technical expertise from larger firms.

- **Inadequate Domestic Infrastructure to Support AI:** America's energy grid and infrastructure are ill-prepared to support the growing demands of AI development. Expanding AI capabilities requires significant energy resources, but the U.S. grid is facing capacity challenges. Without investing in a modernized, resilient energy infrastructure, including existing fuels, renewables and advanced technologies, the United States risks falling behind as other countries, particularly China, make substantial advancements in energy-efficient AI technologies. Addressing these infrastructure gaps is essential to sustaining U.S. leadership in AI.

Part Three: Recommendations for Preserving U.S. AI Leadership

To maintain its technological leadership, the United States should embrace domestic policies that promote innovation and work with allies to counter the threats from China and other authoritarian regimes. The following strategies will help to preserve and enhance America's AI edge:

1. Encourage Light-Touch Regulation

Policymakers must carefully evaluate the costs and benefits of proposed laws and regulations and view all proposed legislation and regulations through the lens of how it affects our national security and economic competitiveness. Too often, policies impose significant burdens on AI innovators, particularly smaller companies, despite minimal risks. Existing laws are often fully capable of addressing any issues that may arise. Overly burdensome regulations could stifle the innovation that drives the U.S. AI industry forward, and hand an unearned advantage to China.

2. Ground Antitrust Enforcement in Evidence and Actual Harm to Consumers

Vigorous antitrust enforcement is essential for protecting competition but must be based on clear evidence of harm. Grounding antitrust actions in the consumer welfare standard ensures that enforcement protects competition without discouraging investment. Speculative enforcement, on the other hand, could reduce innovation and slow AI development.

3. Invest in Critical AI Inputs

Ongoing investment into AI's critical inputs – such as advanced chips, energy infrastructure and a skilled workforce – is crucial, as is strengthening America's overall cybersecurity. Congress and various states are considering several proposals that would encourage further investment in these areas, bolstering America's AI leadership and ensuring the United States remains competitive in this rapidly evolving field. *But we must act with urgency on these inputs.* Additionally, to win the tech race, American policymakers must ensure American leads in all models of AI – open-source, closed-source, hybrids and others.

4. Collaborate with Allies for Evenhanded Enforcement

The United States should continue working closely with its allies, particularly in Europe, to ensure that laws are enforced in a neutral and fair manner. Regulatory frameworks in Europe should avoid protectionist impulses that excessively target American firms, which creates imbalances and hinders global innovation. Ensuring evenhanded enforcement will allow U.S. AI firms to thrive internationally without being unfairly targeted.

5. Counter Authoritarian Ambitions and Threats

The U.S. must continue to collaborate with allies to counter the growing threat from authoritarian regimes, especially China. This includes controlling the export of the most sensitive hardware technologies, protecting intellectual property, countering China's designs on making the Global South more dependent on its technology and continuing to innovate.

The U.S. AI industry is one of the most competitive and dynamic in the world, but it faces significant threats from domestic regulatory pressures, European overreach and China's state-backed AI strategy. To preserve its leadership, the United States must adopt policies that promote innovation, support competition and protect its strategic advantage in AI.

Strategic partnerships between policymakers and private companies are essential to securing America's AI future. Two recent examples include: 1) the collaboration between the U.S. State Department and our leading American tech companies to harness American AI to advance sustainable global development; and 2) Meta making its open-source AI model (Llama) available to U.S. government agencies working on defense and national security applications, and its Llama partnership with defense industry leaders, such as Microsoft, AWS, IBM, Lockheed Martin and Palantir.

By working together, government and industry can ensure that the regulatory environment fosters growth while safeguarding against external threats. Innovation remains the most effective tool for staying ahead of global competitors, particularly those operating under state-driven models, namely China. By addressing these threats and nurturing a competitive environment, America can remain at the forefront of AI development and global strength for decades to come.