MASSACHUSETTS AI STRATEGIC TASK FORCE

2024 REPORT TO THE GOVERNOR

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Massachusetts AI Hub

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“We set sail on this new sea because there is new knowledge to be gained, and new rights to be won, and they must be won and used for the progress of all people. For space science, like nuclear science and all technology, has no conscience of its own. Whether it will become a force for good or ill depends on man...”

President John F. Kennedy, Address at Rice University on the Nation’s Space Effort (1962)

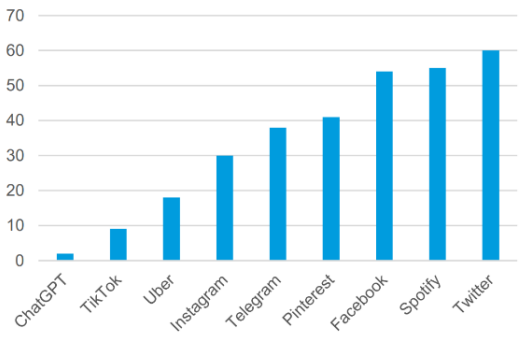
Introduction

John F. Kennedy, from our state of Massachusetts, accomplished much during his brief presidency. His 1962 quote about space science remains relevant today as we consider the implications of artificial intelligence (AI). Like space science, whether AI becomes a force for good or ill depends on our actions. President Kennedy's words continue to inspire and focus our efforts in this state.

Since the founding of this country, Massachusetts has served as a leader and model in many ways. This is the birthplace of not only the country, but also of game-changing technologies and innovations such as the computer, the typewriter, the sewing machine, public education, steel production, the public library, and lifesaving vaccines. Over the past 250 years, this state's talent has fueled our state's leadership to take risks, chase innovation, and serve missions that improve people's lives.

Artificial intelligence (AI) presents another opportunity for Massachusetts to lead by example. AI has existed for many years, with its early developments in Massachusetts. Recent advancements in computational power are now enabling the broader application and scaling of AI technologies across the globe. By harnessing ethical AI, Massachusetts can continue to fuel economic growth and solve critical issues in areas such as life sciences, healthcare, climate change, and beyond. The adoption of AI has been faster than other similar innovations, and it is still the early innings. And, AI is predicted to have significant implications for the economy.

Number of months to reach 100 million users



Source: International Monetary Fund (2023). "Generative Artificial Intelligence in Finance: Risk Considerations".

Massachusetts has all the ingredients to lead, with world-leading academic institutions, strong public schools, robust industry sectors, a dynamic investment community, and supportive city and state governments. In many ways, the state is starting in a strong position, including producing the most AI talent on a per capita basis and attracting top tier AI venture capital investment nationally. Massachusetts has a proven track record of working together to lead, especially in areas like life sciences. But it requires urgency, intentionality, investment, and collaboration, especially as many other states—and countries—are investing and competing aggressively, while the pace of technological change is accelerating.

Potential Macroeconomic Implications for AI

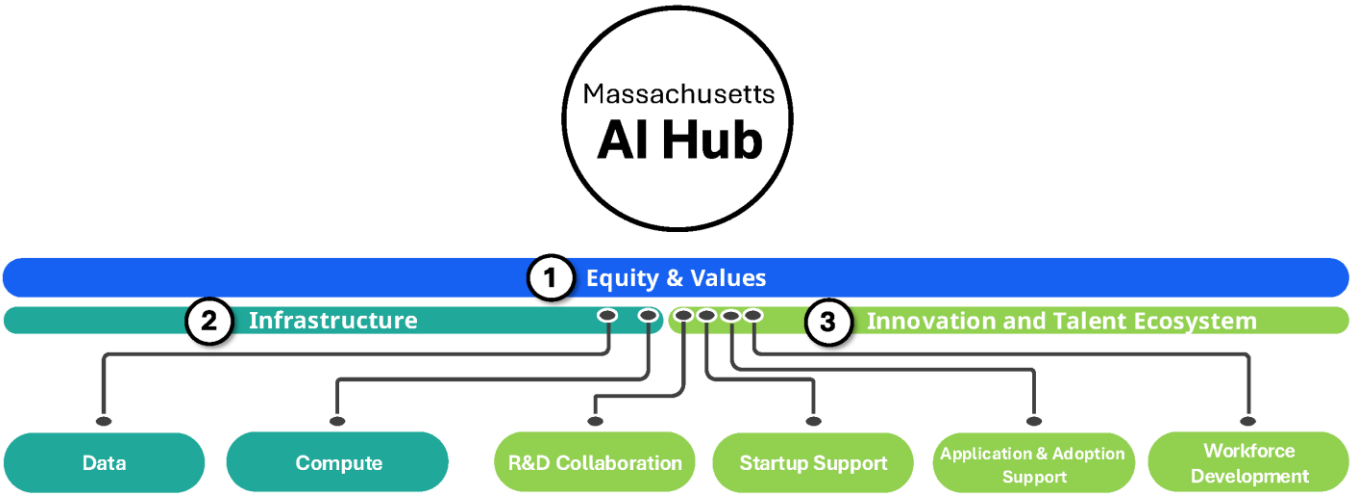
7% increase in global GDP by 2030 (~ $7 trillion)

Boost productivity growth by 1.5 percentage points over a 10-year period.

Source: Goldman Sachs. "Generative AI could raise global GDP by 7%". April 5, 2023

To accomplish this, Governor Healey formed the Massachusetts AI Strategic Task Force in February 2024 to chart a course for Massachusetts to lead in AI innovation while ensuring its responsible and ethical development. The central recommendation of the Task Force is the establishment of the Massachusetts AI Hub to serve as a nexus of AI innovation and facilitate cutting-edge collaboration between government, industry, academia, nonprofits, and startups. This initiative will position Massachusetts to be a leader in applied AI and unlock new economic opportunities for businesses and residents across all regions.

The AI Hub will center around three core components: (1) Equity and Values, (2) Infrastructure, and (3) the Innovation and Talent Ecosystem.



The Massachusetts AI Hub will serve as the central entity for coordinating and managing key assets required for AI innovation including data resources, high-performance compute power, and interdisciplinary research. The Hub will strive to make AI technology more accessible to small and large enterprises in the state's key sectors and enable researchers, entrepreneurs, and startups to pursue the development and commercialization of innovative new ideas. Importantly, the Massachusetts AI Hub will also prepare the state's workforce for AI as part of its mission.

It is imperative that the Massachusetts AI Hub is quickly brought to life in partnership with government, academic institutions, industry, and residents across the state. Massachusetts must invest and work together while leveraging existing resources, such as the Massachusetts Green High Performance Computing Center in Holyoke and the state's quasi-public economic development agency Massachusetts Technology Collaborative, and the resources recently made available by the Legislature through the Mass Leads Act and the FutureTech Act.

Background on the Strategic AI Task Force

On February 14, 2024, Governor Healey signed Executive Order 629 to establish the AI Strategic Task Force. The Task Force was charged with creating specific recommendations for how the Administration can best support the state's businesses around AI adoption and explore how Massachusetts can harness these tools to address mission-critical challenges and drive economic growth.

The AI Strategic Task Force consisted of 26 individuals from the business community, higher education institutions, labor, and state and local government. Executive Office of Economic Development Secretary Yvonne Hao and Executive Office of Technology Services and Security Secretary Jason Synder served as state co-chairs, alongside Michael Milligan of the University of Massachusetts and Santiago Garces from the City of Boston, who served as co-chairs from academia and local government.

Secretary Yvonne Hao, EOED (Co-Chair)

Secretary Jason Snyder, EOTSS (Co-Chair)

Michael Milligan, University of Massachusetts (Co-Chair)

Santiago Garces, City of Boston (Co-Chair)

AI Task Force Members (26)

Secretary Yvonne Hao, EOED (Co-Chair)	Patricia Geli, C10 Labs	Armen Mkrtchyan, Flagship Pioneering
Secretary Jason Snyder, EOTSS (Co-Chair)	Segun Idowu, City of Boston	Jane Moran, Mass General Brigham
Michael Milligan, University of Massachusetts (Co-Chair)	Dr. Robert Johnson, Western New England University	Ed Park, Devoted Health
Santiago Garces, City of Boston (Co-Chair)	Meghan Joyce, Duckbill	Rudina Seseri, Glasswing Ventures
State Senator Michael Moore	Chrissy Lynch, Massachusetts AFL-CIO	Soundar Srinivasan, Microsoft New England
State Representative Tricia Farley-Bouvier	Jeffrey Leiden, Vertex Pharmaceuticals	Fernanda Viegas, Google
Pat Larkin, Massachusetts Technology Collaborative	Spyros Matsoukas, Amazon	Grace Wang, Worcester Polytechnic Institute
Erica Bradshaw, Harvard University	Vipin Mayar, Fidelity	Jeremy Wertheimer, Broad Institute of MIT and Harvard
Usama Fayyad, Northeastern University	Sears Merritt, MassMutual	

Over the past several months, the AI Task Force collected input from stakeholders across the ecosystem and debated the best approach for the state. The recommendations outlined in this report are the product of working group sessions and conversations with nearly 250 individuals across a wide range of backgrounds and expertise. For additional information on the process, see the appendix.

While this Task Force did not reach unanimous agreement, these recommendations reflect a shared vision that emerged from the discussions and findings of the Task Force.

Strategic Vision for AI in Massachusetts – Our "North Star"

Massachusetts will be the global leader in applied AI innovation, where transformative technologies are developed and deployed to solve real-world challenges and fuel sustained economic growth. The state will lead by fostering an open, inclusive, and collaborative AI ecosystem that thrives on cutting-edge research, responsible development, and equitable access to the benefits of AI.

We envision an ecosystem where:

- Open collaboration among startups, investors, corporations, academia, government, and regulators leads to transformative AI developments across sectors.
- AI researchers and developers can access data, computing resources, capital, and talent to develop new AI applications and models.
- Government plays an active role in supporting the development and responsible adoption of AI technologies across industries.
- AI transcends industry boundaries, driving innovation and creating new markets and opportunities.
- All Massachusetts residents benefit from AI-driven advancements that improve quality of life and create equitable economic opportunities.

In order to realize this vision, Massachusetts should leverage a public-private partnership to establish the Massachusetts AI Hub. This AI Hub will serve as a nexus for collaboration between government, industry, academia, and startups, ensuring that AI-driven innovation benefits researchers, businesses, and residents across all regions of the state.

Through this framework, the goal is for Massachusetts to lead in using AI in the right ways to solve problems and drive economic growth for our state. Successful execution of this strategic vision will strengthen economic competitiveness for the state:

- Key sectors, such as life sciences, healthcare, robotics, climatetech, and financial services, are more effective, efficient, and productive, and top companies and institutions within these sectors will have AI hubs in Massachusetts.
- Startups want to be at the center of gravity here in Massachusetts.
- Enterprises developing AI applications choose to base their AI development teams here in Massachusetts to tap into the talent pool, including some frontier companies.
- Talent gains the skills to compete and stays here.

Summary of Recommendations

The AI Task Force recommends the establishment of the Massachusetts AI Hub. The Massachusetts AI Hub will serve as the central entity for AI collaboration and innovation. By connecting academia, industry, and government, the Hub will foster interdisciplinary research, open access to data and compute resources, facilitate the commercialization and adoption of AI technologies, and promote AI talent training and workforce development.

The Massachusetts AI Hub will center on three core components:

1. **Equity and Values**
   a) **Strong Core Principles**: The Massachusetts AI Hub will be expected to champion and accelerate the equitable and ethical development and deployment of AI across the state economy. The Hub should support initiatives that reflect Massachusetts values and provide a clear benefit to the public that it serves.

2. **Infrastructure**
   a) **Expand Compute Resources**: Access to high-performance computing (HPC) is critical for developing and deploying AI technologies. The Massachusetts AI Hub will work with institutions such as the Massachusetts Green High Performance Computing Center

(MGHPCC) to provide equitable access to computational power, enabling researchers and businesses to scale their AI projects.

b) **Enhance Access to Data**: Establish the Massachusetts Data Commons to provide AI innovators with access to high-quality, ethically governed datasets that are essential for AI development. This data infrastructure will promote data sharing across industries with clear protocols for privacy and ownership, ensuring that stakeholders have the resources they need to drive AI advancements.

3. **Innovation and Talent Ecosystem**
   a) **Strengthen the AI Research Ecosystem**: Massachusetts must continue to strengthen its AI research ecosystem by promoting interdisciplinary research and partnerships between academia and industry. Targeted research grants will accelerate development of cutting-edge AI models and foster collaborations in fields such as healthcare, robotics, and climatetech in order to create real-world solutions that address critical challenges.
   b) **Foster Conditions for Startup Growth**: Additional support for entrepreneurship programs and accelerators is needed to ensure that AI startups have the resources they need to scale and succeed.
   c) **Encourage AI Adoption:** Small and medium-sized enterprises (SMEs) across Massachusetts will benefit from an AI adoption pathway that lowers barriers to integration. Technical assistance, financial support, and pilot programs will help SMEs leverage AI for operational improvements and innovation.
   d) **Support Workforce Development**: To meet the demands of an AI-driven economy, Massachusetts must invest in workforce development initiatives that align with industry needs. By upskilling and reskilling workers, the state can retain and attract top AI talent, ensuring that its workforce is prepared for the future.

In the near term, the Massachusetts AI Hub and its associated initiatives will expand collaboration between stakeholders, improve access to essential resources like data and computational power, and accelerate the adoption of AI technologies across industries. Small and medium-sized businesses will become more competitive, AI research will advance rapidly, and Massachusetts will strengthen its position as a leader in AI innovation.

In the long term, these initiatives will drive sustained economic growth, establish Massachusetts as a hub for AI talent, and create high-value jobs across sectors. The state will be recognized for its leadership in responsible and ethical AI development, setting a standard for innovation that prioritizes public good.

1. Equity and Values

The Commonwealth of Massachusetts is committed to fostering innovation through the lens of ethical responsibility, sustainability, and inclusiveness. To guide its efforts in the pursuit of AI advancement, the Hub must adhere to a clear set of core principles that reflect the state's broader commitment to responsible technological growth and environmental stewardship. These values are essential to ensuring that AI innovation serves the public interest, drives equitable access, and contributes to the long-term sustainability of both Massachusetts companies and the environment.

To that end, the Massachusetts AI Hub's mission will center around four core principles:

- **Responsible and Ethical AI:** At the heart of the AI Hub's mission is the responsible development and deployment of AI technologies. This entails prioritizing transparency, fairness, and accountability in all AI applications. The Hub will work to ensure that AI systems are designed and used in ways that respect individual rights, avoid bias, and promote trustworthiness. In collaboration with public and private partners, the AI Hub will set a national standard for responsible AI development, positioning Massachusetts as a leader in ethical AI.

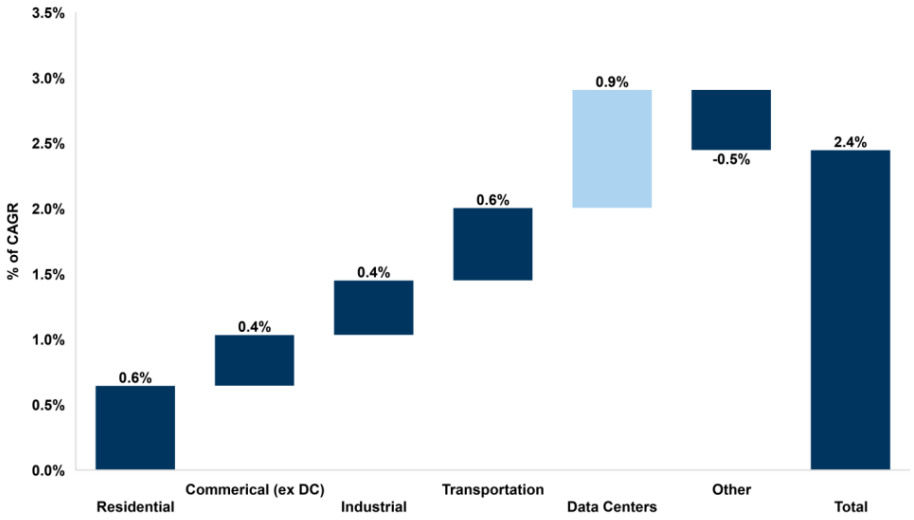
- **Inclusivity and Equity:** The AI Hub will actively work to ensure that the benefits of AI innovation extend across the state, from urban centers to rural regions, and across diverse industries and communities. Inclusivity means not only providing access to cutting-edge AI tools and technologies but also creating opportunities for underrepresented groups in AI development and decision-making. Digital equity must be top of mind as the state cannot afford to leave people behind and exacerbate existing inequality. This equitable approach is vital to unlocking the full potential of this emerging technology while ensuring that all residents can participate in and benefit from AI-driven advancements.

- **Collaboration and Partnership:** The success of the AI Hub will depend on its ability to facilitate strong collaborations across sectors. The Hub will bring together stakeholders from academia, industry, government, and the nonprofit sector to ensure that AI development is aligned with the needs and values of its stakeholders. Emphasis on strong partnerships, human-centered design, and use-inspired research will be crucial in addressing the challenges of scaling AI innovation while maintaining ethical and sustainable standards.

"Rosie the Riveter" is on Team MA, as produced by AI ecosystem member Kara Peterson.

- **Environmental Sustainability:** Sustainability is a core principle that will guide the Hub's operations, particularly in the design and management of AI infrastructure. AI models, especially those requiring high performance compute power, can significantly impact energy consumption. The AI Hub will align its practices with the Commonwealth's climate goals, leveraging Massachusetts' leadership in clean energy. Through partnerships with institutions such as the Massachusetts Green High Performance Computing Center (MGHPCC), the Hub will prioritize energy-efficient AI development and promote the use of renewable energy in AI infrastructure. This commitment positions Massachusetts as a leader in the development of environmentally responsible AI technologies and it is aligned with the state's climate goals.

Composition of US power demand growth, % CAGR 2022-2030



By 2027, AI servers used to power large-language models like ChatGPT could use up to 134.0 TWh of electricity – roughly the equivalent of Argentina's annual electricity usage. Goldman Sachs projects that power demand from AI-related data centers will grow 160% between 2023 and 2030 and will account for 0.9 percentage points of the 2.4% annual growth in US power demand through 2030.

Within state government, Massachusetts must continue to lead with these core principles in mind. To keep and grow our leadership in emerging technology, it is recommended that state government continue to adopt AI solutions that can result in efficiencies and that are resident centric, yielding positive outcomes for delivering services to Massachusetts residents.

Through key levers, such as policy, procurement and collaboration, the Executive Branch is already leading the way. As a customer, the state has set procurement standards to ensure AI products and models are responsible and effective, with strong accountability and transparency measures for third-party vendors. These standards complement an enterprise policy framework that reflects an ongoing commitment to maintain the security of data and protect the privacy of residents. There must also be an ongoing dialogue with lawmakers at the state and federal level to ensure that new and existing laws and regulations strike a balance that adequately protects residents while enabling innovation and economic growth.

2. Infrastructure

Data and compute are vital to AI and its development. To address existing challenges and shortfalls relative to this vital enabling infrastructure, the Massachusetts AI Hub must establish outsized leadership in coordinating and facilitating access to these key resources.

This section will outline the critical infrastructure components needed to support data access and high-performance computing. By integrating these vital components into a cohesive framework, Massachusetts can ensure that its AI initiatives are not only cutting-edge but also sustainable and inclusive, driving long-term economic growth and societal benefits.

Data Access

The availability of high-quality datasets is the core limiting factor to the development of AI. Major AI breakthroughs are constrained by the availability, or lack thereof, of high-quality data sets that can be used to fuel algorithmic advances. Massachusetts has an opportunity to create a competitive AI advantage by prioritizing data sharing, data curation, data generation, and data governance as bedrocks of the state's AI ecosystem. Access to high-quality and diverse data across industries will fuel scientific discovery, novel AI models, and downstream commercial applications.

The Task Force made the following two recommendations to enhance data access and quality for AI innovators in Massachusetts:

1. **Establish the Massachusetts Data Commons** to manage, analyze, and share data within the Massachusetts AI ecosystem in order to fuel new models, accelerate research, facilitate data-driven decisions, and open access to valuable information across industries.
2. **Establish robust data governance** to secure, manage, and facilitate the ethical use of data, ensuring trust and compliance within the Massachusetts Data Commons.

The goal with this intentional data strategy is to give the Massachusetts research community, industry, and policymakers a competitive advantage through accessible high-quality data to fuel new models, accelerate research, and facilitate data-driven decisions.

In establishing the Massachusetts Data Commons, the state can prioritize several key actions. First, it will promote data access to fill gaps across sectors, particularly for use cases with limited existing data, while centralizing data curation and preparation efforts to reduce redundancy. Rigorous quality control must be implemented to ensure data reliability for research and commercial applications. A secure, privacy-preserving infrastructure will be developed, employing advanced techniques such as differential privacy and confidential computing, along with a comprehensive consent management framework. Open, Findable, Accessible, Interoperable, and Reusable (FAIR) Application Programming Interfaces (APIs) and user-friendly tools will make data accessible, while scalable solutions will support future growth. To foster collaboration, clear governance protocols for ownership, intellectual property, and data use will be established, supported by incentive structures that encourage data sharing across sectors. Finally, the Data Commons will prioritize high-impact, data-driven applications to drive innovation, using a phased approach to scale infrastructure over time.

Robust governance will be necessary to enhance privacy expectations for data subjects and content users alike in order to foster the sharing of information while maintaining necessary restrictions agreed upon in their governance. For example, data owners can stipulate guidelines for the use and access of their data. The Massachusetts AI Hub can enforce these guidelines and expectations. Additionally, a

comparative advantage of incorporating this dimension into the Massachusetts AI Hub is the significance of trust. Data privacy and security is a roadblock for data sharing; an entity like this could help unlock those roadblocks given the public-private mission.

In the near term, this data infrastructure aspires to democratize AI research and development, enabling a more diverse range of stakeholders, including smaller organizations and underfunded researchers, to participate in the AI ecosystem. This democratization is crucial for fostering innovation, as it reduces the barriers to entry for those who may not have had access to these resources otherwise. The successful execution of pilot projects within the Data Commons will showcase the platform's utility and encourage widespread adoption, driving collaboration across sectors and strengthening Massachusetts' position as a leader in AI.

Over the long term, the Data Commons is expected to fuel significant economic growth by enabling the commercialization of AI technologies and the development of data-driven applications that address critical societal challenges. The establishment of a sustainable business model will ensure the continuous operation and expansion of the Data Commons, attracting global firms and investment to Massachusetts. As the Data Commons becomes a cornerstone of the state's AI ecosystem, it will set a benchmark for data management and governance, influencing industry standards and best practices on a broader scale.

High-Performance Computing

Massachusetts, while a leader in many areas of AI research and development, faces significant challenges when it comes to accessing high-performance computing (HPC) resources. The demand for computing power in AI has grown exponentially, driven by the need to process vast datasets, train complex models, and deploy AI solutions at scale.

To enhance the competitiveness of its researchers and innovators, Massachusetts must take strategic steps to improve access to high-performance computing resources. Access to HPC resources is essential for training, deploying, and maintaining AI models at scale.

By leveraging the unique strengths of existing assets such as universities, research labs, and public-private partnerships like the MGHPCC and the Massachusetts Open Cloud (MOC),[1] the state can begin addressing the critical gaps in its current HPC infrastructure. These organizations provide a foundation for expanding compute resources across the state, offering scalable, energy-efficient, and collaborative platforms that can meet the growing demands of AI research and development.

To implement this recommendation, the Massachusetts AI Hub should take steps to establish a networked infrastructure that connects existing compute resources across universities, research institutions, and industry partners. By creating a centralized resource management system, the Massachusetts AI Hub will coordinate access to these resources, ensuring stakeholders have equitable access to the computing power necessary for AI development. In the near term, strategic partnerships with cloud providers can bridge the gap between current demand and available physical infrastructure, allowing flexible, on-demand access to scalable computing power. These partnerships will enable Massachusetts to meet the immediate needs of its AI community while gradually building a more robust HPC infrastructure.

[1] Launched in 2013, the Mass Open Cloud (MOC) is a public computing cloud supported by a consortium of private and public institutions across Massachusetts to enable and facilitate research, such as the analysis of big data.

By building a scalable, energy-efficient HPC infrastructure, Massachusetts will strengthen its position as a national leader in AI research and innovation. Over the long-term, this infrastructure will support breakthroughs across multiple industries, including healthcare, robotics, and climatetech, while promoting energy sustainability with advanced energy management practices. The centralization and equitable distribution of HPC resources will foster greater collaboration between academia and industry, driving the development of new AI models and applications with real-world impact.

Building on these partnerships, the AI Hub would seek to ensure that both established industries and emerging startups have the computational power necessary to advance their AI initiatives. By coordinating HPC resources, the organization would eliminate the inefficiencies of fragmented computing power, providing equitable access and driving more significant advancements in innovation.

The AI Hub would be responsible for acquiring access to compute and managing use of those resources by participants within the ecosystem. Due to costs of compute presently, the AI Hub should strive to get started by making new compute capacity available to access in an easy and affordable way for members of the Massachusetts ecosystem. Over time, the goal will be to scale up as additional resources become available.

Cybersecurity measures are essential to safeguard AI data, models and infrastructure against threats that could undermine their functionality, security and ethical application. The AI Hub should coordinate with public and private stakeholders to adopt a risk management approach that protects sensitive data, identifies and patches vulnerabilities, and ensures the integrity and reliability of AI models and their outputs.

The AI Hub must endeavor to foster strong partnerships between public institutions, private industry, and academia to co-invest in and co-manage the compute resources. These partnerships will be crucial to ensuring that the infrastructure meets the diverse needs of Massachusetts' AI ecosystem while sharing the financial and operational responsibilities.

It is imperative to address the technical considerations that underpin successful AI research, development, and deployment. The effectiveness of AI initiatives depends not only on the availability of talent and data but also on the robustness of the underlying infrastructure that supports data access and compute power.

3. Innovation and Talent Ecosystem

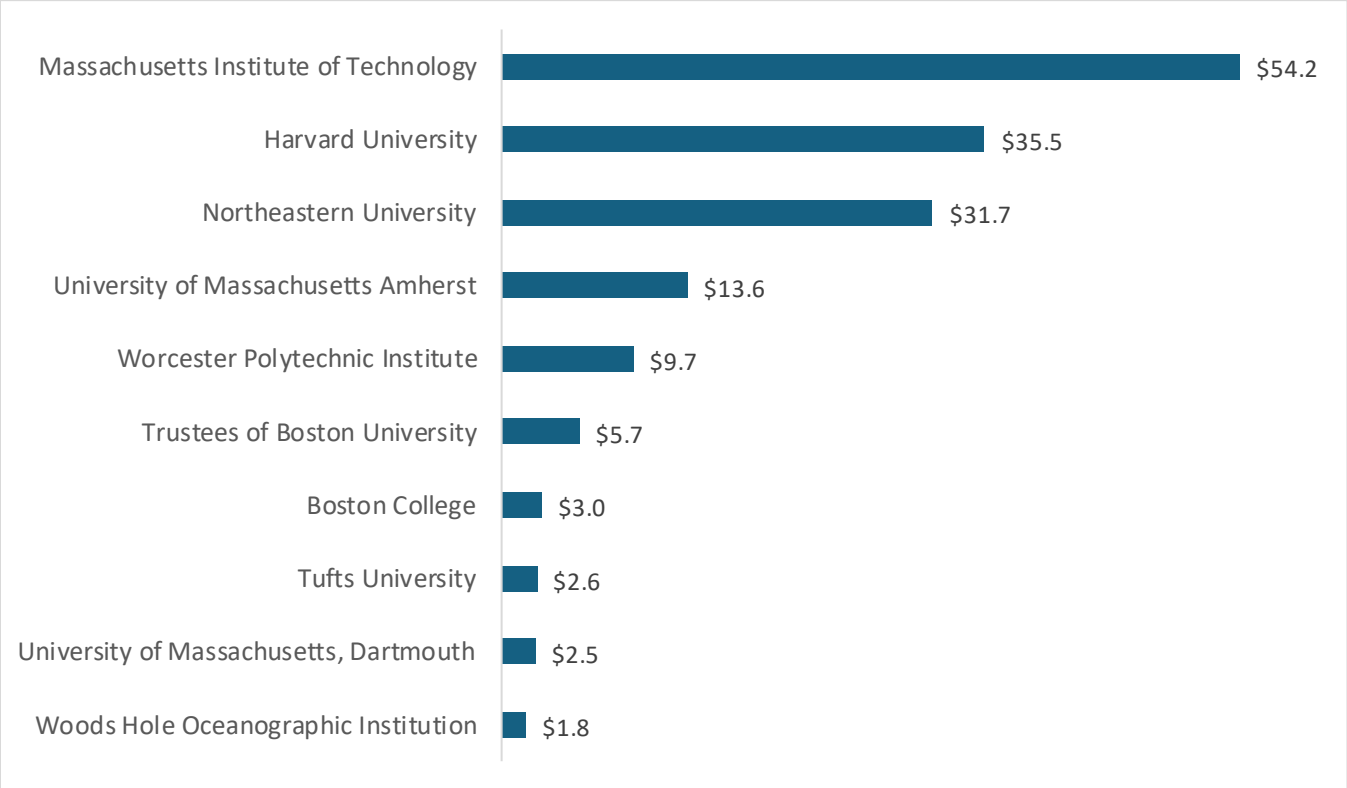
Investing in infrastructure is not merely about expanding physical and digital assets; it is about creating the conditions for seamless collaboration, innovation, and network capabilities between ecosystem stakeholders. As Massachusetts strives to become a global leader in applied AI, it is crucial to address the foundational elements that will support the growth and sustainability of the state's AI ecosystem.

The findings of the AI Task Force indicate that a thriving AI ecosystem requires a combination of key elements working in synergy. This section presents recommendations to strengthen the AI ecosystem by fostering R&D collaboration, startup acceleration, technology adoption, and workforce development.

Research & Development Collaboration

Massachusetts is home to several institutions that lead the nation in AI research funding. Notably, MIT, Harvard University, and Northeastern University are at the forefront, receiving significant AI-related R&D funding from the National Science Foundation (NSF). As of November 2024, these institutions alone had secured a combined total of over $120 million in active NSF awards for AI research. The broader Massachusetts AI research ecosystem included 41 institutions and research organizations with active NSF grants, collectively totaling over $182 million in funding.[2] This federal funding underscores Massachusetts' institutional capacity to drive cutting-edge AI research, particularly in areas such as machine learning, robotics, and ethical AI.

AI-related active R&D funding from NSF – Top 10 institutions in Massachusetts
Active awards as of November 2024, $M



[2] NSF, accessed November 2024, all active awards using keyword search "artificial intelligence"

Despite significant federal and private R&D funding, gaps remain, particularly in early-stage and interdisciplinary research, limiting high-risk, high-reward projects. Equitable access to advanced resources, such as high-performance computing and large-scale datasets, is uneven, with smaller institutions and startups struggling to secure the infrastructure needed for cutting-edge research. Additionally, institutional barriers and funding issues hinder effective collaboration across disciplines in AI and fields like healthcare and robotics, while partnerships between universities and industry struggle with competition, intellectual property, and differing priorities.

To strengthen AI research in Massachusetts, the AI Hub should develop a leadership role in the facilitation of interdisciplinary research partnerships among academia, industry, and startups. This could be realized through the establishment of a targeted grant program. These grants would provide financial support for research projects, including the development and fine-tuning of AI models that can be applied within and across key sectors such as healthcare, life sciences, financial services, robotics, advanced manufacturing, climatetech, and education. The Hub can amplify these projects through coordination with the Hub's infrastructure assets (outlined above), including the curating of high-quality datasets and cost-effective approaches to model training.

By incentivizing collaboration and research, the Hub can accelerate the development of innovative AI solutions that address critical challenges in Massachusetts. Importantly, this program would ensure equitable access to funding for both large and smaller research institutions, promoting a diverse and inclusive AI research ecosystem across the state.

Startup Support

Massachusetts already boasts a strong startup culture, but specific support and access to capital for AI-focused startups is crucial. Scaling AI solutions from research to marketable products is a significant challenge across all sectors. Nurturing startups with targeted mentorship, accelerator programs, and streamlined pathways to funding will support innovation and propel early-stage AI companies into global market leaders. Establishing a robust network that connects AI startups with industry partners and research institutions will further amplify their impact, driving breakthroughs that can redefine entire sectors.

Governor Maura Healey discussing AI in Massachusetts with Liquid AI's CEO Ramin Hasani in October 2024 at MIT.

To ensure these companies launch, grow, and remain in the state, the Task Force proposes:

- Launching a **Massachusetts AI Innovation Fund**, which will allocate grants for early-stage investments in AI startups in key industry sectors. The fund could partner with existing private venture capital firms to provide follow-on funding.
- Developing AI-focused entrepreneurship programs such as an "**AI Founder in Residence**" program at major research institutions and providing grants to Entrepreneur Support Organizations to develop programming focused on AI startups that provides them with mentorship, technical resources, and connections to industry partners.
- Leveraging existing tools and resources, such as business development **tax incentives**, to attract and retain AI startups in Massachusetts so these companies can grow and scale in the state.

Application & Adoption Acceleration

Massachusetts' key sectors provide fertile ground for AI applications and innovations. Industry leaders bring deep domain expertise and understanding of sector-specific challenges. Their involvement through public-private partnerships and close advisement will ensure that AI development is focused on solving real-world problems and creating tangible value. Critically important to spurring innovation in the AI ecosystem will be industry leaders' willingness to pilot startup solutions in applicable use cases. Accelerating the real-world testing of ideas with important stakeholders will further our collective understanding of applied AI and position Massachusetts to lead.

To accelerate the adoption of AI technologies among small and medium-sized enterprises (SMEs) across Massachusetts' priority industries, the state should establish a comprehensive **AI adoption pathway program**. Widespread AI adoption across Massachusetts SMEs can lead to sustained economic growth, enhanced global competitiveness, and the emergence of new markets and job opportunities. The creation of a robust AI ecosystem, where SMEs play a significant role in innovation, will solidify Massachusetts as a national leader in AI technology and its application across diverse sectors.

The primary goal of this recommendation is to lower the barriers to AI adoption for SMEs, particularly in sectors where technological integration is challenging due to technical complexity, regulatory requirements, or cultural resistance. By providing a structured pathway, the state will help these companies realize the benefits of AI, ranging from improved operational efficiency to enhanced product offerings.

To implement this recommendation, the AI adoption pathway program should include several key components. First, it should focus on raising awareness through industry-specific workshops, webinars, and case studies that educate SMEs on how AI can solve operational challenges and drive growth. The program can offer technical support by providing consulting services, grants, or subsidies for hardware and software upgrades to ensure AI solutions integrate seamlessly with legacy systems. Partnerships with academic institutions and technology providers will enable SMEs to access cutting-edge tools and tailor solutions to their needs. The state could also fund pilot programs and demonstration projects to showcase successful AI adoption in real-world applications, building confidence among SMEs and illustrating the tangible benefits of AI integration.

As part of this effort, there is a unique opportunity to ensure that input and perspective are gathered from workers. This insight can help inform how AI is applied within sectors and industries. Furthermore, it can serve to help both employees and employers succeed.

Massachusetts also has an opportunity to be a leader in AI adoption across state government while promoting policy frameworks to protect the privacy of residents and align our AI approach with our state's existing robust worker protections and consumer protections. As a customer, the state can impact numerous elements of AI policy and data governance through enhanced procurement policies. The use of AI technology could improve government functions and operations. Strategically leveraging the state as a customer can help the local ecosystem and help state government functions.

Workforce Development

Governor Maura Healey with Northeastern University's InnovateMA co-op students in June 2024

The Massachusetts AI Hub should not only act as a central hub for key assets, such as data resources and high-performance computing, but also emphasize the critical role of talent, workforce training, and education in driving AI innovation. Bolstering the talent ecosystem is a key imperative. Undoubtedly, one of Massachusetts greatest strengths is its concentration of world-class technical research universities – like Harvard, Northeastern, MIT, Boston University, the University of Massachusetts, and Worcester Polytechnic Institute – as well as the talented graduates they produce. In terms of AI talent, Massachusetts ranks fifth in the nation for AI-related job postings[3] and is home to an estimated 25,700 workers with AI-related roles or skills. The state has a high concentration of professionals with AI expertise, accounting for 6% of the total AI profiles in the United States, while only comprising 2.6% of the total national workforce.[4]

Despite this strong presence of AI professionals and Massachusetts' robust academic environment, the state faces challenges in talent retention. In 2022, Massachusetts produced more than 6,500 graduates in AI-related fields, the highest per capita in the nation. However, when compared to peer states like California, New York, and Texas, the state's overall retention of AI graduates is relatively low at around 40% versus approximately 80% in those states.[5]

There is strong anecdotal evidence of a shortage of "bilingual" talent that combines deep AI expertise with sector-specific knowledge. This talent gap is particularly pronounced in sectors like manufacturing, financial services, and life sciences where the integration of AI requires not just technical know-how but also a deep understanding of the industry's unique challenges.

The demand for a blend of both foundational and specialized skills suggests that Massachusetts' AI ecosystem is maturing, with industries increasingly seeking professionals who can apply AI technologies to solve complex, domain-specific challenges. For Massachusetts to continue leading in AI innovation, it will be crucial to support educational programs and workforce development initiatives that align with these evolving demands. Ensuring that the local workforce is equipped with both the core and the specialized skills needed in high-growth areas will be key to maintaining the state's competitive edge.

[3] MHTC Vision2050 slide 7 - https://www.mhtc.org/wp-content/uploads/2024/06/Artificial-Intelligence-MHTC-MassVision2050-2024.pdf
[4] MHTC Vision2050 slide 13 - https://www.mhtc.org/wp-content/uploads/2024/06/Artificial-Intelligence-MHTC-MassVision2050-2024.pdf
[5] Massachusetts High Technology Council. (2024). *MassVision 2050: Becoming the global leader in applied AI for healthcare & life sciences.*

To achieve this vision, the AI Hub and its partners can collaborate with key state agencies, such as the Executive Office of Labor and Workforce Development (EOLWD), to execute job training and career development programming. EOLWD and the state's workforce training network can strengthen efforts to make AI accessible across communities and populations, including unemployed, underemployed, and underrepresented populations in Massachusetts' labor market.

The state should take a developmental role in upskilling the existing workforce on the use of AI tools, especially focusing resources on workers whose jobs are impacted by AI, and workers from underrepresented backgrounds. The state can leverage effective models to train and upskill workers through the Registered Apprenticeship program, work-based learning, and micro-credentialing to support career development for existing and new talent, with a focus on occupations most in-demand for Massachusetts employers so talent stays in the state. For example, the AI Hub could partner with labor organizations to train workers on AI systems and help them adapt to changing landscapes. Government could use AI upskilling resources and education to promote a more equal playing field and expand opportunities to more workers. Excellence in training in AI is itself a differentiated advantage that Massachusetts must pursue.

The AI Hub could also partner with the Executive Office of Education and K-12 schools on curriculum and hackathon initiatives to inspire interest and reward problem solving efforts for the state's school-aged students. The state's K-12 education system leads the nation in various metrics, including the National Assessment of Educational Progress (NAEP) scores in math, science, and English. AI and data literacy should be incorporated, on an age-appropriate basis, into the K-12 curriculum. As part of that work, the AI Hub can be a resource for teacher professional development on curriculum, career exploration learning modules, and applied learning activities, to inspire interest and reward problem solving efforts for the state's school-aged students.

The creation of the Massachusetts AI Hub is vital not only for advancing AI innovation but also for cultivating a skilled workforce that can meet the challenges and opportunities of the future.

Conclusion

AI has been around for many decades, but we are now at a real inflection point, where compute power and algorithms have grown and can enable wide transformative adoption across many areas. AI is going to be a game-changing technology in the same way that the telephone, automobile, and the internet changed history. The technology will enhance productivity, unleash new breakthroughs, and transform work routines across industries and occupations. There is a lot at stake.

Massachusetts is uniquely positioned to shape the future of AI in ways that drive economic growth, address societal challenges, and uphold the state's commitment to values and equity. The recommendations outlined in this report provide a practical and actionable framework to establish Massachusetts as a leader in applied AI, fostering innovation across industries and improving the lives of its residents.

With the establishment of the Massachusetts AI Hub, the state has the opportunity to convene its world-class talent, cutting-edge research institutions, and forward-thinking businesses to build an AI ecosystem that is both impactful and inclusive. This is a moment to act decisively, leveraging Massachusetts' strengths to create transformative applications that not only advance technology but also generate meaningful societal and economic benefits.

Implementing these recommendations will require sustained focus, collaborative partnerships, and a commitment to measurable outcomes. The Massachusetts AI Hub must incorporate key performance indicators to measure impact and outcomes. This effort will take time, and it will be important to assess and track the impact of the Hub's initiatives and programs across the state, including on residents. The AI Task Force believes that successful execution and implementation of this report will drive greater innovation, thereby producing more economic output and expanding the state's ability to grow its GDP over time.

Ultimately, the tangible societal benefits, such as improved health care outcomes, new scientific discoveries, advanced educational tools, and enhanced financial security, will underscore the far-reaching impact of this initiative on the state's economic and social fabric. Ideally, these advances will be relevant on a national and international basis and will establish the state as a leading supplier of these capabilities to the rest of the world, creating new revenue streams and economic activity, much like Silicon Valley did with semiconductor, software, and internet technologies and services.

By embracing this challenge, Massachusetts can ensure its competitiveness in a rapidly evolving global landscape while setting a standard for responsible AI development. Massachusetts has the tools, the talent, and the vision. Now is the time to move forward, translating strategy into action and positioning the state as a leader in the ethical and impactful deployment of AI.

Appendix

Overview of the AI Task Force Process

Over the past nine months, the Task Force gathered input from stakeholders and experts throughout Massachusetts by segmenting the work streams across three phases:

Phase 1 – Verticals

- **What**: Phase 1 focused on sector specific deep dives to identify AI opportunities, challenges, and priorities among leading Massachusetts industries.
- **How**: Task Force members led nine different sector-specific working groups that focused on key sectors of the economy. In addition to the Task Force members, working groups included a variety of industry leaders who shared their expertise, time, and ideas to help shape each group's findings and recommendations.
- **Why**: Leveraging their knowledge and expertise, each sector working group delivered actionable, sector-specific recommendations to the Task Force on how the state can best support and facilitate the successful integration of AI within that respective sector.

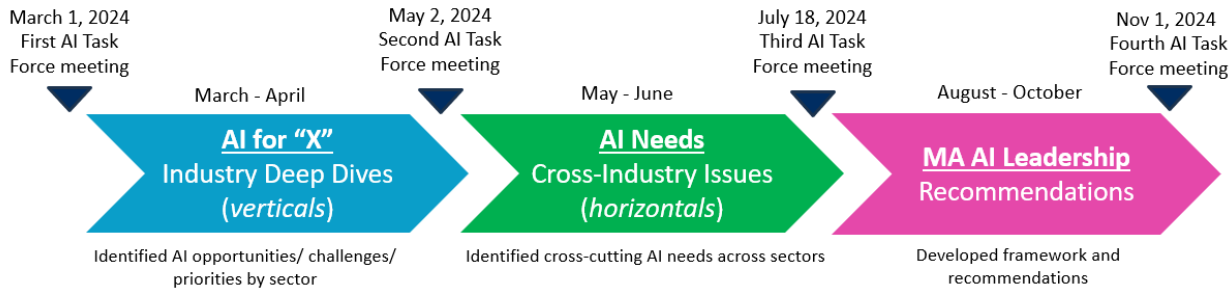
Phase 2 – Horizontals

- **What**: Phase 2 focused on six cross-cutting issues that stretched across industries. These issues were identified as prominent themes and needs that appeared across the findings of the sector-specific working groups in Phase 1.

- **How**: Like Phase 1, horizontal working groups leveraged the expertise of Task Force members as well as the state's ecosystem. The Task Force recruited a diverse range of perspectives and organized a series of meetings to identify priority recommendations for each topic area.

- **Why**: These horizontal working groups developed recommendations on key issues related to AI that impacted all aspects of the economy. This phase aimed to identify the levers needed to move the needle for Massachusetts to compete on AI.

Between Phase 1 and Phase 2, the Task Force engaged 15 working groups with nearly 250 participants and approximately 30 different meetings. Phase 3 focused on developing the Final Report based on the findings and insights gathered during Phase 1 and Phase 2. Below is an overview of the process over the past nine months:



Competitive Landscape

A notable 2023 analysis concluded that Generative AI could boost global GDP by as much as 7% over 10 years.[6] Given its leadership role, this translates into trillions of dollars of opportunity for the United States. The US continues to lead the world in terms AI research and development, particularly in terms of top foundational models. However, Europe, the Middle East, and Asia are aggressively in pursuit. The AI market is estimated to be worth nearly $200 billion globally and it is expected to grow at a roughly 37% CAGR through 2030, with the US as the market leader followed by China.[7]

There is serious competition nationally and internationally when it comes to seizing this opportunity. Approximately 60 countries have announced national AI strategies. The US remains a global leader in AI, but several countries and regions are vying to establish leadership:

- **Canada**: Prime Minister Justin Trudeau announced a $2.4 billion AI package in April 2024, with approximately $2 billion dedicated to increasing compute capabilities within the country. Canada also has AI institutes located in three major cities, including the Vector Institute in Toronto.
- **China**: Chinese leadership has elevated AI as a national priority, as evident in the country's last two five-year plans. In 2022, China led global AI patent origins with 61.1%, outpacing the U.S., which accounted for 20.9% of AI patent origins.[8] The country was also a first mover globally in terms of developing regulations governing the deployment of AI.
- **European Union (EU):** The EU is actively deploying AI through focused efforts including a robust regulatory framework, significant investments in innovation and advanced computing power/semiconductors and a strong focus on governance, trustworthiness, and international cooperation.
- **France**: In March 2024, France published an ambitious strategic plan to advance the country's global positioning in AI, which includes making France a major location for computing power. France is home to Mistral, a large language model startup valued at $6 billion and backed by Microsoft. Also in March 2024, Microsoft announced its intentions to invest €4 billion in compute infrastructure across the country.
- **Saudi Arabia**: In March 2024, the government of Saudi Arabia announced its plans to dedicate $40 billion towards an AI investment fund.
- **Singapore**: In late 2023, Singapore released its second national AI strategy. The country continues to invest in AI Singapore to advance the country's domestic AI capabilities, with an emphasis in research and development.
- **Switzerland**: Started in December 2023, the Swiss AI Initiative is home to a world-class supercomputer with leading AI capabilities for research initiatives. This capability has drawn talent from around the world.
- **United Arab Emirates**: In addition to highlighting the country's financial and energy capabilities, the government created a "Ministry of AI" in 2017. With support and leadership from the United

[6] Goldman Sachs. "Generative AI could raise global GDP by 7%". April 5, 2023
[7] McKinsey & Company. "MassVision 2050: Artificial Intelligence". Massachusetts High Technology Council, Spring 2024.
[8] Stanford Institute for Human-Centered AI. "AI Index Report 2024." Stanford University, 2024.

Arab Emirates government, the country has released a flagship large language model called, Falcon

- **United Kingdom**: In February 2024, the United Kingdom government released a regulatory framework which was self-described as "a pro-innovation approach to AI regulation." The government also dedicated £100 million in funding for a Foundation Model Taskforce. The National Health Service has also advanced an AI Lab aimed at accelerating the development and scaling of AI-driven health care solutions.

Domestically, the landscape is also hugely competitive among states. More than 30 states across the country have taken some degree of action on AI. However, these actions range broadly in nature, such as forming task forces and commissions, clarifying government use of AI, regulating the use of "deepfakes," protecting personal data, and strategic economic development initiatives.

- **California**: California leads in AI venture capital investment and AI-related job postings nationally. Most notably, the Bay Area is home to the world's leading foundation models, such as OpenAI, Microsoft, Google, and Anthropic. California is also home to the newly crowned most valuable company in the world, Nvidia, which specializes in chips hardware and software. In 2023, Governor Gavin Newsom signed an executive order to study the development, use, and risks of AI technology throughout the state and to develop a deliberate and responsible process for evaluation and deployment of AI within state government.

- **New Jersey**: In December 2023, Governor Phil Murphy announced a partnership with Princeton University called the "AI Hub." In March, Princeton celebrated a $10 million purchase of 300 H100 graphic processing units (GPUs). In late July, Governor Murphy signed legislation to create a new program aimed at supporting AI-related businesses with tax incentives.

- **New York:** Earlier this year, New York announced a $400 million public-private partnership, $275 million of which is comprised of state funds, to create an AI computing center on the University of Buffalo's campus now known as "Empire AI." New York City is also home to rapidly growing AI start-up ecosystem, which trailed only San Francisco globally in terms of AI venture funding from 2021 to the first quarter of 2024.[9]

- **Washington:** Alongside California and New York, Washington is considered a leading AI-hub in the United States. Seattle appears near the top of AI-job posting concentrations nationally.[10] The Washington state legislature established an AI task force in June 2024.

As outlined above, several other states and countries have already stood up AI innovation programs and hubs. Massachusetts therefore should move quickly in launching its own AI Hub or risk being left behind by peers.

The Task Force considers it important to understand the competitive landscape at the state and international level. Massachusetts must be cognizant of the strategies, resources, and characteristics of competing ecosystems in order to succeed. There is no defined playbook for AI yet, though public-private partnerships are a common theme across these jurisdictions.

[9] https://www.wsj.com/articles/ai-startups-are-making-their-home-in-new-york-can-they-turn-it-into-an-aipowerhouse-bd5dab78
[10] https://www.axios.com/local/seattle/2024/04/22/seattle-new-ai-job-hotspot-mapped

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