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ARTIFICIAL INTELLIGENCE USES AND COMMERCIALIZATION OPPORTUNITIES

This memorandum provides information on the current and emerging uses of artificial intelligence (AI) among industries and state and local governments, opportunities for the commercialization of AI, and the projected impact of AI on economic growth, workforce development, and government services.

ARTIFICIAL INTELLIGENCE USE CASES AMONG INDUSTRIES

The use of AI is rapidly expanding among numerous sectors and industries, including agriculture, business, education, energy, health care, and manufacturing.

Agriculture[1]

Artificial intelligence is seeing increased use in the agriculture industry, especially in precision agriculture practices, which involve collecting, analyzing, and taking actions based on data. Data-informed decisionmaking helps the agriculture industry meet increasing demand for food products and helps farmers improve efficiencies through reduced input costs. Tools assisted by AI include drones and ground robots to measure crop conditions; soil sensors to report temperature, moisture, and nutrient levels as conditions change; and spray systems using data for targeted application of fertilizer or pesticide. Recent innovations include automated steering systems for planting crops and wearable monitors for tracking the health of dairy cattle.

Reported benefits include higher profits from greater yields per unit of input, lower use of fertilizer, herbicide, fuel, and water, and less chemical and nutrient runoff. The United States Department of Agriculture and the National Science Foundation (NSF) provided almost $200 million for precision agriculture research and development in fiscal years 2017 through 2021, including partnerships supporting AI research institutes.

In 2023, only 27 percent of farms or ranches used precision agriculture practices to manage crops or livestock. However, from June 2022 to June 2023, North Dakota was one of five states with more than 50 percent of farms using precision agriculture practices.

Business[2,3]

In the business sector, McKinsey & Company found nearly 90 percent of the largest firms report regular use of AI in at least one business function.[4] A 2026 report published by Deloitte found 34 percent of companies report using AI to substantially change operations, 30 percent report restructuring core processes around AI, and 37 percent report limited use with few changes to existing processes. Fewer than 60 percent of workers with employer-approved access use AI daily. Business survey data from the

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[1] U.S. Government Accountability Office, *Precision Agriculture: Benefits and Challenges for Technology Adoption and Use*, U.S. Government Accountability Office (January 31, 2024).
[2] Jeffrey S. Allen, *Monitoring AI Adoption in the US Economy*, Board of Governors of the Federal Reserve System (April 2026).
[3] Deloitte, *State of AI in the Enterprise: The Untapped Edge*, Deloitte (January 2026).
[4] Dan Tinkoff et al., *The State of AI in 2026: On the Road to ROI*, Quantum Black AI by McKinsey (August 25, 2026).

United States Census Bureau notes 18 percent of all firms had adopted AI by the end of 2025, demonstrating 68 percent growth in the rate of adoption over the prior year's figures.

While many technology executives report business value from AI use cases, only 24 percent report a return on investment (ROI) across multiple use cases, and more than half report difficulty demonstrating AI value to stakeholders. Seventy-four percent of organizations expect AI to increase future revenue, and 20 percent report AI-driven revenue growth to date. Measurable productivity gains are highest in structured tasks with clear outputs, with studies reporting gains of 14 to 15 percent in customer support, 26 percent in software development, and 50 percent in marketing output, with weaker effects reported in tasks requiring more complex judgment.

Common business use cases include customer service chatbots and agent-assist tools; personalization and recommendation engines; document processing combining optical character recognition and generative artificial intelligence (GAI) for contracts, invoices, and claims; workflow automation for procurement and onboarding; cybersecurity threat detection; supply chain demand forecasting; and coding assistants supporting legacy application modernization.[5] Among small and medium-sized businesses, 81 percent of leaders believe AI can help achieve business goals.

In the financial sector, financial services firms apply AI in automated trading, credit decisions, and customer service.[6] The financial sector reports 30 percent AI adoption, with sustained growth of 127 percent for the year ending September 2025. Work-related GAI adoption is highest in the financial sector at 63 percent.[7] In the insurance industry, providers often use AI to automate claims processing, improve underwriting, and strengthen fraud detection, and predictive analytics help insurers assess risk and set premiums.[8]

Education

In the field of education, four of five high school and college students in the United States report using AI for schoolwork, but only half of middle and high schools have adopted AI policies. Computer science enrollment fell 11 percent at 4-year universities between 2024 and 2025, while master's graduates in AI software-related fields rose 17 percent from 2023 to 2024. Among K-12 computer science teachers, 81 percent say AI should be part of foundational computer science education, but less than half feel equipped to teach it.

In North Dakota, the Department of Public Instruction (DPI) has issued grade-based guidance for K-12 use of AI.

- For lower elementary grades, DPI emphasizes teaching students AI is not a person, noting young children may assign human traits to chatbots and trust chatbots over adults.
- For upper elementary grades, DPI cautions against reliance on AI displacing practice in problemsolving.
- For middle school, DPI recommends students review AI outputs for factual errors and notes age limits on some products.
- For high school, DPI recommends instruction on how AI works and its limits, including bias and inaccuracy, in place of monitoring use.[9]

[5] Matthew Finio et al., *The Most Valuable AI Use Cases for Business*, IBM (September 2026).
[6] U.S. Government Accountability Office, *Artificial Intelligence Use and Oversight in Financial Services* (May 2025).
[7] Jeffrey S. Allen, *Monitoring AI Adoption in the US Economy*, Board of Governors of the Federal Reserve System (April 2026).
[8] Matthew Finio et al., *The Most Valuable AI Use Cases for Business*, IBM (September 2026).
[9] North Dakota Department of Public Instruction, *North Dakota K-12 AI Guidance Framework*, North Dakota Department of Public Instruction.

Energy[10,11]

In regard to the energy industry, the United States hosts 5,427 data centers, which is more than 10 times the number of data centers hosted by any other country. Data centers are expected to demand 35 gigawatts of electricity by 2030, up from 17 gigawatts in 2022, and a single data center can use as much electricity as 80,000 homes. By 2034, summer and winter peak energy demands are expected to increase by 17 percent and connecting new renewable generation will require utilities to roughly double existing transmission capacity. The North American Electric Reliability Corporation (NERC) estimates summer peak demand will rise by nearly 20 percent over the next 10 years.[12] Artificial intelligence grid applications include identifying high and low periods of renewable output and use, improving load and generation forecasts, automatically rerouting power or isolating damaged sections during outages, and detecting network intrusions and malware.

The North American Bulk Power System (BPS) resource outlook is deteriorating, with 13 of 23 assessment areas expected to face resource adequacy challenges over the next 10 years. Challenges are anticipated due to planned generation and transmission additions falling short of projected demands from data centers and other large loads. Battery storage and photovoltaic account for most planned generation additions over the next 5 years, with retirements of fossil fuel plants reducing generation using fuel stored onsite. All of North Dakota falls within a high- or elevated-risk area according to NERC's 2026.30 risk area summary published in NERC's January 2026 *Long-Term Reliability Assessment*. As of 2023, 70 percent of grid lines and transformers were more than 25 years old, with much of the equipment from the 1960s and 1970s nearing the end of its expected 50- to 80-year service life.[13]

The Eastern and Electric Reliability Council of Texas (ERCOT) interconnections have each observed load-reduction events of approximately 1,500 megawatts of voltage-sensitive load, primarily attributed to data centers transferring to backup generation, causing frequency overshoot and high voltages.[14] On July 16, 2026, the Federal Energy Regulatory Commission (FERC) issued an order directing NERC to address computational loads. Findings indicate data-center-driven load growth is at its highest rate in 2 decades. The order requires modified reliability standards addressing computational load integration by December 31, 2026, registration of computational load entities by the same date, and a workplan for additional standards by March 1, 2027.[15]

Health Care

In the health care industry, the Food and Drug Administration (FDA) authorized 258 AI medical devices in 2025, 35 more than in 2023, and 252 more than in 2015, with most cleared through device-modification pathways relying on existing safety and efficacy evidence. Artificial intelligence tools automatically generating clinical notes saw broad adoption in 2025, with physicians across multiple hospital systems reporting up to 83 percent less time writing notes and significant reductions in burnout, with Northwestern Medicine reporting a 112 percent ROI. Microsoft's AI Diagnostic Orchestrator scored 85.5 percent on solving complex benchmarked case studies, versus 20 percent for physicians working without AI-assisted tools.[16,17]

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[10] American Society of Civil Engineers, *2025 Report Card for America's Infrastructure: Energy*, American Society of Civil Engineers (2025).
[11] North American Electric Reliability Corporation, *Long-Term Reliability Assessment* (January 2026).
[12] National Association of Regulatory Utility Commissioners, *Core Sector: Load Growth and Customers*, National Association of Regulatory Utility Commissioners.
[13] Cara Kuuskvere and Weston Dengler, *The Aging US Power Grid: Navigating Toward Modernization*, Smart Electric Power Alliance (September 2024).
[14] North American Electric Reliability Corporation, *Characteristics and Risks of Emerging Large Loads* (July 2025).
[15] Bruce Grabow and Shane P. Early, *FERC Directs NERC To File Reliability Standards That Apply To Data Centers*, Sheppard (July 2026).
[16] Stanford University, *Artificial Intelligence Index Report 2025* (2025).
[17] Stanford University, *Artificial Intelligence Index Report 2026* (2026).

An expert panel rated personalized medicine as the single highest-impact technological advancement in its 2030 outlook, with AI-driven breakthroughs moving personalized treatments, early disease diagnostics, and individual genetic therapies into everyday medical care within the next 4 years.[18] In North Dakota, Sanford Fargo was the first facility in the state to use the Medtronic GI Genius, the first FDA-cleared AI-assisted colonoscopy tool, helping physicians detect potentially precancerous polyps.[19]

Manufacturing

The manufacturing industry is another key area using AI-driven advancements, notably through the use of physical AI. Physical AI refers to AI systems that sense physical surroundings and direct machines or control systems to act. Common use cases for physical AI include collaborative robots on assembly lines, inspection drones with automated response capabilities, robotic picking arms, and autonomous forklifts. The adoption of physical AI is especially advanced in the areas of manufacturing, logistics, and defense.[20] Manufacturing showed the largest increase in reported AI adoption between recent United States Census Bureau survey series, at 159 percent, and the strongest year-on-year growth in work-related GAI adoption of any sector, at about 58 percent.[21] In predictive maintenance, machine learning models monitor live sensor data for early signs of equipment failure, and some organizations use digital twins, or virtual models of physical equipment, to test operating changes before the changes are implemented.[22]

ARTIFICIAL INTELLIGENCE ADOPTION BY GOVERNMENT

Opportunities to Improve Government Services Through Artificial Intelligence

The use of AI is expanding at all levels of government. A 2025 survey of state chief information officers (CIOs) indicates 82 percent of employees in the CIO's organization now use GAI tools in daily work, up from 53 percent a year earlier.[23] Government agencies are applying AI to cybersecurity, disaster preparedness, law enforcement, procurement, and the modernization of legacy information technology systems.[24] Among 11 selected federal agencies with AI inventories, total reported AI use cases nearly doubled, from 571 in 2023, to 1,110 in 2024, with GAI use cases increasing about ninefold, from 32 to 282.

Program-specific examples at the federal level include a Department of Veterans Affairs effort to automate medical imaging processes to enhance diagnostic services and a Department of Health and Human Services effort to extract information from publications to identify polio outbreaks in areas previously thought to be free of the disease.[25] Within the next few years, the Department of Veterans Affairs anticipates automating many routine computer-based tasks, including document summaries, information routing, and responses to standard inquiries. The department's priorities include expanding employee access to cost-effective AI tools, reimagining major workflows, investing in foundational data and infrastructure, establishing an AI-ready workforce with both technical experts and widespread AI literacy, and increasing veterans' trust through transparent governance. The department listed 227 use cases in its 2024 AI inventory.[26,27]

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[18] Institute of Electrical and Electronics Engineers, *How AI Will Reshape Life by 2030* (July 2026).
[19] Jamie Dickerman, *Advantages and Obstacles: North Dakota Embraces the AI Revolution*, NewsDakota (May 2024).
[20] Deloitte, *State of AI in the Enterprise* (January 2026).
[21] Jeffrey S. Allen, *Monitoring AI Adoption in the US Economy*, Board of Governors of the Federal Reserve System (April 2026).
[22] Matthew Finio et al., *The Most Valuable AI Use Cases for Business*, IBM (September 2026).
[23] National Association of State Chief Information Officers, *The 2025 State CIO Survey: Leading Change Through Uncertain Times* (2025).
[24] Matthew Finio et al., *The Most Valuable AI Use Cases for Business*, IBM (September 2026).
[25] U.S. Government Accountability Office, *Artificial Intelligence: Generative AI Use and Management at Federal Agencies* (July 2025).
[26] U.S. Department of Veterans Affairs, *Building the Future: VA's Strategy for Adopting High-Impact Artificial Intelligence to Improve Services for Veterans.*
[27] Edward Graham, *VA AI Strategy Says Early Use Cases Will Inform Adoption in New EHR*, NextGov/FCW (October 2025).

The United States Government Accountability Office also has begun deploying a large language model with use cases including organizing large volumes of text such as public comments, summarizing draft legislative mandates and highlighting potentially duplicative mandates, assisting with copy editing using its style guide, providing automated responses on published work, summarizing qualitative employee survey responses, monitoring congressional committee calendars and press releases to match congressional interests with relevant work, enhancing auditing through extended reality glasses, and triaging help desk requests.[28]

At the state level, North Dakota state government has the highest rate of active Microsoft Copilot users among any state government. As of June 2026, nearly 3,000 state employees were using Copilot each month, adding an average of 5 to 6 hours of additional capacity per month, with some advanced users adding up to 20 hours. Copilot Chat is available to every state employee licensed to use Microsoft 365, offering a secure starting point for GAI use at no added cost. Employees use Copilot for real-time meeting transcription and summaries, document analysis, and policy and compliance lookup.[29]

Ninety percent of state CIOs surveyed on GAI activities report having pilot projects in place, 86 percent report conducting proofs of concept, 71 percent report engaging in employee training, and 51 percent report testing in a sandbox environment. However, only 25 percent of CIOs report having dedicated funding for GAI activities. States also are beginning to use GAI in procurement for drafting requests for proposals and contractual language, with three states adding AI-specific clauses to contracts.[30] Many states are establishing central resources for agencies, some of which offer testing environments or cybersecurity services.[31]

In regard to local governments, a 2024 survey of 637 local governments indicated almost half of respondents ranked AI utilization as a low priority and less than 6 percent as a high priority. Only 10 percent of respondents indicated having delegated personnel to oversee AI efforts and just 3 percent indicated having an organizationwide AI governance policy. Local governments have used AI to draft letters, memoranda, and staff reports; for grant writing; in preparing meeting minutes and agenda synopses; and for emerging uses such as permit processing, contract compliance, crime analysis, and smart water meters.[32]

Citizen Engagement and Service Delivery Applications

States are beginning to use GAI for external purposes, enhancing citizen services through public-facing chatbots and virtual assistants for licensing, permitting, unemployment, and benefits inquiries, and improving call center efficiency.[33] Among local government leaders surveyed, 55 percent identified resident engagement as the area having the greatest potential for AI enhancement.[34] Cities have experienced differing levels of success in implementing AI tools. San Jose, California, saw promising results using AI to monitor traffic safety and shorten bus travel times by adjusting signal timing, whereas an AI chatbot created by New York City to help small business owners navigate regulations produced incorrect and at times illegal advice.[35] A controlled study of AI-assisted citizen-government

[28] U.S. Government Accountability Office, *Artificial Intelligence: GAO's Work to Leverage Technology and Ensure Responsible Use* (January 2024).
[29] North Dakota Information Technology Department, *North Dakota Leads Nation in Enterprise AI Adoption* (August 2026).
[30] National Association of State Chief Information Officers, *The 2025 State CIO Survey: Leading Change Through Uncertain Times* (2025).
[31] McKinsey & Company and the National Association of State Chief Information Officers, *Generative Artificial Intelligence and Its Impact on State Government IT Workforces* (April 2024).
[32] International City/County Management Association, *Artificial Intelligence in Local Government: Summary of 2024 Survey Results* (2024).
[33] National Association of State Chief Information Officers, *The 2025 State CIO Survey: Leading Change Through Uncertain Times* (2025).
[34] International City/County Management Association, *Artificial Intelligence in Local Government: Summary of 2024 Survey Results* (2024).
[35] Govern for America, *AI x Talent: A Roadmap for Building, Staffing and Scaling AI Capacity in State Government* (April 2025).

communication found AI-edited messages scored higher on most measures, with residents reporting greater satisfaction, clarity, and trust, and staff reporting greater clarity and responsiveness.[36]

Data Management and Decision-Support Tools

Decision support systems assist with nonroutine and complex problems, combining available data with models or rules to run what-if scenarios, simulate outcomes, and apply optimization, whereas business intelligence tools center on historical data collection and visualization through dashboards. Over 78 percent of global enterprises have implemented decision support systems or business intelligence tools. By incorporating AI, decision support systems can project likely outcomes and suggest actions in addition to summarizing past data, and some systems include features explaining the basis for each recommendation. An estimated 40 percent of enterprise applications anticipate integrating task-specific AI agents, embedding decision support directly into dashboards, enterprise resource planning processes, and customer relationship management pipelines.[37] Among local governments surveyed, 38 percent of respondents identified local policy applications, such as budget modeling and policy analysis, as holding significant AI potential.[38]

From 2025 to 2026, the share of surveyed organizations reporting high preparedness declined to 43 percent for technical infrastructure, 40 percent for data management, and 20 percent for talent, with most respondents expecting the main obstacles to their priority AI initiatives will take more than a year to resolve.[39]

Considerations for Responsible Implementation

In 2025, cases of documented AI incidents increased over prior year incidents. Although most major developers publish capability test results, few publish results on safety and responsible use tests. Models perform well on safety tests under normal conditions, but safety performance dropped across all models tested under jailbreak attempts. Transparency also has declined in recent years, with the average score on the *2025 Foundation Model Transparency Index* dropping from 58 out of 100 in 2024, to 40 out of 100 in 2025. Models also do not consistently solve logic problems with known correct answers, which is a limitation for uses requiring high precision.

Among all states, concern about too little AI regulation outweighs concern about too much regulation. More than 60 percent of state CIOs report having implemented at least one GAI governance practice, including:

- Encouraging responsible use and flexible guardrails (88 percent);
- Inventorying and documenting uses in agencies (84 percent);
- Developing advisory committees and task forces (82 percent);
- Establishing enterprise policies and procedures (76 percent);
- Adopting governance frameworks (65 percent); and
- Establishing data governance policies covering data sources, quality, bias, and privacy (53 percent).

A survey of state CIOs in regard to potential federal regulation of AI indicated broad support for establishing federal baselines that set clear national standards for transparency, data privacy, algorithmic accountability, security, and bias prevention, while allowing states to go beyond those standards. Support also was expressed for using federal funding for AI innovation and workforce development, and for

[36] Ruiyu Zhang and Lin Nie, *Enhancing Citizen-Government Communication with AI: Evaluating the Impact of AI-Assisted Interactions on Communication Quality and Satisfaction*, arXiv (August 2025).

[37] Kateryna Kikidzhan and Serhii Leleko, *AI Decision Support Systems: What They Are, How They Work, and When to Build One*, SPD Technology (April 2026).

[38] International City/County Management Association, *Artificial Intelligence in Local Government: Summary of 2024 Survey Results* (2024).

[39] Deloitte, *State of AI in the Enterprise* (January 2026).

applying consistent procurement language and interoperability standards. State CIOs oppose preemption of state authority or moratoriums limiting state ability to regulate AI, and mandates CIOs view as too prescriptive to keep pace with technology changes.

Federal agencies report parallel challenges, including complying with existing federal policies and guidance, having sufficient technical resources and budgets, and maintaining up-to-date use policies. Officials at 10 of 12 selected agencies said existing federal policies could present obstacles to AI adoption.

COMMERCIALIZATION AND ENTREPRENEURSHIP

Emerging Artificial Intelligence Business Opportunities

The AI market is projected to grow from an estimated $214 billion in revenue in 2024, to $1,339 billion by 2030.[40] Inference costs for a system at the level of GPT-3.5 dropped over 280-fold between November 2022 and October 2024, hardware costs have declined by 30 percent annually, and energy efficiency has improved by 40 percent each year.[41] Increased revenue as a result of AI use is most commonly reported in marketing and sales, strategy and corporate finance, and product and service development.[42] Retailers use AI for dynamic pricing, adjusting prices frequently based on demand, inventory, and competitor prices. The largest e-commerce marketplace makes over 2.5 million price changes per day.[43]

Projects using tools purchased from specialized vendors or developed with partners succeed about 67 percent of the time, and internally built projects succeed about one-third as often.[44] In physical AI, the types expected to have the largest long-term impact are intelligent security systems and smart monitoring (21 percent), collaborative robotics (20 percent), and digital twins (19 percent).[45]

Startup Ecosystems and Innovation Hubs

The annual number of AI startups founded in the United States increased from 311 in 2010, to 1,348 in 2024, raising the share of all technology startups from around 1 to 28 percent. Two-thirds of national AI employment is located in 30 metropolitan areas classified as leading AI centers.[46] In 2025, the United States led entrepreneurial activity with 1,953 newly funded AI companies, which is more than 10 times the number seen in the second leading country.[47]

Grand Farm, a 140-acre agriculture technology innovation campus west of Fargo, offers field trial space open to outside users, supports startup companies, and connects partners working on agricultural AI. Operated by Emerging Prairie, in partnership with North Dakota State University (NDSU), Grand Farm was established with a $1.5 million grant from Microsoft's TechSpark Fargo program and received further support from an NSF Regional Innovation Engines award providing up to $160 million over 10 years to accelerate agricultural technology deployment. Grand Farm has piloted projects such as Microsoft's FarmBeats, hosts an annual AI in Agriculture summit, and has attracted startups to relocate to the region while providing university students hands-on AI experience.[48]

The Legacy Investment for Technology Program, a state loan fund supporting in-state development of new products based on intellectual property, has awarded more than $45 million among 72 projects since inception, with an average award of approximately $635,000. Funding is available to companies working in advanced computing and data management, agriculture technology, autonomous and

[40] Katherine Haan and Lauren Holznienkemper, *22 Top AI Statistics and Trends*, Forbes (July 2026).
[41] Stanford University, *Artificial Intelligence Index Report 2025* (2025).
[42] Dan Tinkoff et al., *The State of AI in 2026: On the Road to ROI*, QuantumBlack AI by McKinsey (August 2026).
[43] Tech Mahindra, *Retail Pricing Reinvented: The AI Advantage* (2025).
[44] Sheryl Estrada, *MIT Report: 95% of Generative AI Pilots at Companies Are Failing*, FORTUNE (August 2025).
[45] Deloitte, *State of AI in the Enterprise* (January 2026).
[46] Mark Muro and Shriya Methkupally, *Mapping the AI Economy: Which Regions Are Ready for the Next Technological Leap?*, Brookings Metro (July 2025).
[47] Stanford University, *Artificial Intelligence Index Report 2026* (2026).
[48] Mark Muro and Shriya Methkupally, *Mapping the AI Economy: Which Regions Are Ready for the Next Technological Leap?*, Brookings Metro (July 2025).

unmanned vehicles, energy, health care, value-added agriculture, and value-added energy.[49] Funding also is available through the North Dakota Growth Fund, which was created in 2021 by the State Investment Board and is managed by 50 South Capital. The fund is a $100 million multistage investment fund targeting venture capital, private credit, private equity, growth equity, infrastructure, and real assets to support the state's entrepreneurial ecosystem.[50]

Commercialization of Artificial Intelligence Research and Intellectual Property

As of March 2026, the leading United States AI model outperformed the leading Chinese AI model by 2.7 percent on benchmark performance. The United States produces more top-tier AI models and higher-impact patents; however, China leads in publication volume, citations, and patent output.[51]

The World Intellectual Property Organization distinguishes four categories of AI inventions:

- AI models or algorithms, such as machine learning and neural networks;
- AI-assisted inventions in which AI serves as a tool but is not evident in the result, such as AlphaFold, which enables protein structure predictions for more than 200 million proteins used in drug development;
- AI-based inventions in which AI is part of the inventive concept and the output itself, such as a self-driving vehicle's navigation; and
- AI-generated inventions made autonomously by AI with only minor human input.[52]

Venture Capital and Investment Trends[53]

Private investment in AI in the United States grew from $109.1 billion in 2024, to $285.9 billion in 2025, a figure 23 times larger than the $12.4 billion invested by China. In 2025, global private investment in AI grew by 127.5 percent, newly funded AI companies increased by 71 percent, and billion-dollar funding events nearly doubled.[54,55] By other measures, global venture capital investment in AI firms reached $258.7 billion in 2025, comprising 61 percent of all venture capital investment worldwide, up from 30 percent in 2022. United States firms attract approximately 75 percent of global AI venture capital deal value, followed by the European Union at 6 percent, China at 5 percent, and the United Kingdom at 5 percent.

Investment deals exceeding $100 million accounted for 73 percent of total AI investment value in 2025, while early stage rounds attract a declining share of investment dollars. Since 2023, AI firms working on information technology infrastructure have attracted the most venture capital, collecting $109.3 billion in investments by 2025. Through the first half of 2026, United States startups raised more than $400 billion, surpassing every previous full-year total on record, with the majority of funds flowing to AI companies.[56]

Public-Private Partnership Opportunities

Public-private partnerships enable governments, private technology companies, and research institutions to jointly develop AI innovations. Strong innovation ecosystems, comprising government agencies, universities, private companies and startups, investors, and regulatory bodies, contribute to faster technological diffusion, increased startup formation, and improved economic growth. Partnership challenges include data governance and privacy concerns when sharing data between public and private

[49] North Dakota Department of Commerce, *Legacy Investment for Technology (LIFT) Announces Loan for North Dakota Energy Services Company* (July 2025).
[50] John Werner, *Fargo, North Dakota, Is A New AI Hub In The Midwest Tech Boom*, Forbes (July 2025).
[51] Stanford University, *Artificial Intelligence Index Report 2026* (2026).
[52] Alexander Cuntz et al., *Artificial Intelligence and Intellectual Property: An Economic Perspective*, World Intellectual Property Organization (2024).
[53] Organization for Economic Co-operation and Development, *Venture Capital Investments in Artificial Intelligence Through 2025* (February 2026).
[54] Stanford University, *Artificial Intelligence Index Report 2026* (2026).
[55] Stanford University, *Artificial Intelligence Index Report 2025* (2025).
[56] PitchBook-NCVA, *Venture Monitor: The Definitive Review of the US Venture Capital Ecosystem* (2026).

organizations, regulatory uncertainty, coordination among stakeholders, and skills shortages.[57] The World Economic Forum notes public funding can offset early stage risk for capital-intensive technologies and governments may act as initial purchasers of new technology.[58] Most AI foundation models for science originate from academic and government institutions and result from cross-sector, and often international, collaborations, in contrast with the industry-dominated landscape of general-purpose AI.[59]

WORKFORCE DEVELOPMENT AND ECONOMIC COMPETITIVENESS

Workforce Skills Needed in an Artificial Intelligence-Enabled Economy

Companies have identified insufficient worker skills as the biggest barrier to integrating AI into a business, but fewer than half are making significant adjustments to talent strategies. Among desk workers, 89 percent believe upskilling and reskilling are crucial for staying relevant in an AI-augmented workplace, and 92 percent of technology executives report that managing AI agents will become an important skill within the next 5 years.[60,61]

Roughly 59 percent of the workforce cite lack of adequate training in agentic AI skills as an organizational barrier, while only 52 percent of senior leaders say their organization has fully deployed training and upskilling initiatives. At organizations with clear communication about their AI agent strategy, 92 percent of desk workers report team productivity gains.[62] Fifty-two percent of business professionals considering themselves familiar with AI have not completed any formalized training, while 48 percent of businesses plan to invest in AI training for employees.[63] State CIOs highlighted the role of higher education in widening the talent pipeline, but a majority expect skill-based credentials will carry more weight than college degrees in the technology workforce.[64]

In information and communications technology roles, skills rising in importance include AI ethics, responsible AI, prompt engineering, AI literacy, large language model architecture, and agile methodologies. Whereas traditional data management, content creation, documentation maintenance, basic programming, and research information may decline in importance.[65] As automation reshapes white collar roles, basic AI knowledge is increasingly expected among office, trade, and technical occupations.[66]

In 2026, skills that explicitly referenced AI grew by 109 percent over the previous year, while the most sought-after skills overall, including full stack development, data analytics, and graphic design, remained stable. Nearly one in two business leaders report willingness to pay more for creativity and innovation, and adaptability and agile learning skills are in slightly higher demand than the ability to build or understand AI tools.[67] The World Economic Forum outlines three recommendations for redesigning work in an AI-assisted environment:

- Allowing AI to handle repeatable, data-heavy work such as information extraction, first-draft generation, and routine decision support;

[57] Vinay Baghela et al., *Artificial Intelligence Innovation through Public-Private Partnership: Building Sustainable AI Ecosystems*, International Journal of Creative and Open Research in Engineering and Management (March 2026).
[58] Alois Zwinggi, *Public-Private Partnerships Will Define Innovation in the AI Era*, World Economic Forum (July 2026).
[59] Stanford University, *Artificial Intelligence Index Report 2026* (2026).
[60] Ernst & Young, *Unchanneled Worker Enthusiasm Squanders Agentic AI's Promise*.
[61] KPMG International, *KPMG Global Tech Report 2026* (2026).
[62] Ernst & Young, *Unchanneled Worker Enthusiasm Squanders Agentic AI's Promise*.
[63] WSI, *2025 WSI AI Business Insights Report* (2025).
[64] McKinsey & Company and the National Association of State Chief Information Officers, *Generative Artificial Intelligence and Its Impact on State Government IT Workforces* (April 2024).
[65] Cisco, *AI and the Workforce: Industry Report Calls for Reskilling and Upskilling as 92 Percent of Technology Roles Evolve* (July 2024).
[66] Institute of Electrical and Electronics Engineers, *How AI Will Reshape Life by 2030* (July 2026).
[67] Teng Liu et al., *In-Demand Skills 2026: A Market View of Skills Demand in an AI Economy* (February 2026).

- Tasking humans with focusing on judgment, relationships, and trade-offs in areas where context, accountability, and trust matter; and
- Encouraging organizations to embed guardrails in workflows with defined quality thresholds, bias checks, and escalation paths rather than engaging in constant oversight.[68]

Impact of Artificial Intelligence on Existing Occupations[69,70]

Within a year, 36 percent of surveyed companies expect at least 10 percent of company jobs to be fully automated, increasing to 82 percent in the next 3 years. Companies are prioritizing entry-level jobs involving data entry, reconciliation, and first-level customer support for automation, which are positions that frequently serve as entry points to longer careers. Despite increased expectations for automation, 84 percent of companies have not redesigned jobs around AI capabilities.[71] One-third of organizations expect AI to reduce the workforce in the coming year, while almost half expect little to no change.

Automation including GAI could affect up to 30 percent of work hours in the United States economy by 2030. Automation is expected to enhance work in science, technology, engineering, mathematics, business, legal, and creativity-based professions rather than displace a significant number of jobs outright. Experts project AI will automate 2.4 million jobs by 2030, while also creating trillions of dollars in economic value. In the technology sector, 92 percent of information and communications technology jobs analyzed are expected to undergo high or moderate transformation, with 40 percent of mid-level and 37 percent of entry-level positions expected to see high levels of transformation.[72] Technology-related roles are the fastest growing in percentage terms, including big data specialists, fintech engineers, AI and machine learning specialists, and software developers, whereas clerical and secretarial workers, bank tellers, and data entry clerks are expected to see the largest declines.[73]

Eighty-four percent of desk workers report interest in using agentic AI at work, while 61 percent report feeling overwhelmed by the volume of new information.[74] Approximately three-quarters of surveyed adults fear job losses due to AI, and in 2026 surveys, 55 percent of business leaders and 68 percent of investors said they expect less entry-level hiring.[75] Expert and public views differ, with 73 percent of experts expecting AI to have a positive impact on how people do their jobs as compared with 23 percent of the public.

State CIOs report little concern among state employees about job replacement, with most state employees viewing GAI as a tool supporting, rather than replacing, human work. Leaders in a majority of states believe GAI will positively affect the state workforce by reducing repetitive tasks and allowing agencies to absorb excess demand, with the biggest productivity improvements expected in software development, quality testing, and data roles. Fifty-seven percent of respondents expected no change in workforce numbers as a result of GAI, while more than a quarter expected to increase staff counts to implement and manage GAI.

Competitive Positioning of North Dakota in the Artificial Intelligence Economy

An estimated 16.7 percent of North Dakota workers use AI at work. The state ranks 41st for ChatGPT queries per capita.[76] North Dakota also ranks 48th of 51 in Claude usage, with a usage index of 0.37

[68] C. Vijayakumar, *Invest in the Workforce for the AI Age: A Blueprint for Scale, Skills, and Responsible Growth*, World Economic Forum (January 2026).
[69] Stanford University, *Artificial Intelligence Index Report 2026* (2026).
[70] McKinsey & Company and the National Association of State Chief Information Officers, *Generative Artificial Intelligence and Its Impact on State Government IT Workforces* (April 2024).
[71] Deloitte, *State of AI in the Enterprise* (January 2026).
[72] Cisco, *AI and the Workforce: Industry Report Calls for Reskilling and Upskilling as 92 Percent of Technology Roles Evolve* (July 2024).
[73] World Economic Forum, *Future of Jobs Report 2025* (January 2025).
[74] Ernst & Young, *Unchanneled Worker Enthusiasm Squanders Agentic AI's Promise*.
[75] Xavier de Souza Briggs, *Getting to All-of-the-Above: A Framework of Solutions for AI's Coming Impacts on Work and Workers*, Brookings (June 2026).
[76] Jaclyn DeJohn, *AI Attitudes, Adoption, and Benefits by State - 2026 Study*, SmartAsset (May 2026).

against an expected 1.0 based on population. Within the state, the top occupational categories using the tool are computer and mathematical (20.85 percent); arts, design, entertainment, sports, and media (14.47 percent); and education instruction and library (12.06 percent). Usage is split nearly evenly between augmentation, at 51.51 percent, and full task delegation, at 48.49 percent.[77]

The University of North Dakota has introduced a doctorate in AI, which is a 90-credit program with coursework in data science and visualization, machine learning, and autonomous systems, along with a graduate certificate in AI and machine learning. The university also developed an AI Instructional Manager position, charged with building an AI-across-the-curriculum program, which is thought to be the first of its kind in the state.[78] The university's Artificial Intelligence Research Center serves as an umbrella for work across eight research areas, including fundamental AI models, autonomous systems, cybersecurity, infrastructure inspection, biology and medicine, physics and chemistry, aerospace and aviation, and education and social sciences, with research underway directly affecting North Dakotans, including using AI to enhance power grid security, train K-12 teachers, and more quickly and accurately predict severe weather and flooding.[79]

Beginning in fall 2026, NDSU will award full-ride scholarships to 30 students in each incoming class through a new Honors College Program focused on the ethical, technical, and societal dimensions of AI, funded entirely by donors. The university also is adding degrees and certificates in AI and machine learning, robotics and automation, materials science and engineering, energy engineering, and nuclear engineering.[80] The university offers a Bachelor of Science in Artificial Intelligence, and the national median salary for high-demand AI-related occupations requiring 5 years of experience or less is $125,300.[81] The NDSU Bison supercomputer went live in August 2026 to support AI research by graduate students and faculty and was funded entirely through NSF grants of nearly $4 million.[82]

TRENDS AND FUTURE OUTLOOK

Emerging Technologies and Market Opportunities[83]

Measured AI capability continues to increase. On one verified coding benchmark, performance rose from 60 to near 100 percent of the human baseline in a single year, and the performance gap between the top-ranked and 10th-ranked models fell from 11.9 to 5.4 percent, making frontier models increasingly competitive. The primary AI capability change in 2025 was the introduction of reasoning, as a new class of models, OpenAI's o-series and "thinking" models, Anthropic's extended thinking models, Google's Gemini 2.0 and 3.0, and DeepSeek-R1, demonstrated chain-of-thought reasoning through reinforcement learning rather than pattern completion. The ability of AI to apply reasoning has moved tasks previously considered too complex for AI, such as multistep financial analysis, policy interpretation, scenario planning, and contract review, into the range of tasks AI can support.[84] Physical AI adoption is expected to grow from 58 to 80 percent of companies within the next 2 years, which is a slower curve than software-based agentic AI, which is expected to rise from 23 to 74 percent in the same period.[85]

In terms of application, Waymo provides over 150,000 autonomous rides each week, and Baidu's Apollo Go robotaxi fleet serves numerous cities across China.[86] The global robotaxi fleet could range between 700,000 and 3 million vehicles by 2035, with the United States fleet growing to about 350,000

[77] Anthropic, *Anthropic Economic Index* (June 2026).
[78] University of North Dakota College of Engineering & Mines, *UND Adds Two New STEM Degree Programs: Artificial Intelligence Ph.D. and Cybersecurity Bachelor's Degree* (April 2025).
[79] University of North Dakota College of Engineering & Mines, *Minnkota Current: Finding Real Humanity in Artificial Intelligence* (May 2026).
[80] Robin Huebner and Kjersti Maday, *NDSU President Announces Full Scholarships in AI in State of the University Address*, InForum (September 2025).
[81] North Dakota State University, *Artificial Intelligence*.
[82] Matthew Freeman, *NDSU Launches $4 Million AI Supercomputer*, InForum (August 2026).
[83] Stanford University, *Artificial Intelligence Index Report 2026* (2026).
[84] Ryan Baltrip, *State of AI in Business 2026: A Leader's Guide to the Industrialization Phase*, Navigate AI (2026).
[85] Deloitte, *State of AI in the Enterprise* (January 2026).
[86] Stanford University, *Artificial Intelligence Index Report 2025* (2025).

vehicles, although adoption is expected to be gradual because entering a new city takes up to 2 years and roughly $15 million to $30 million in investments.[87] Recent applications in the field of science include an AI system that ran a full weather forecasting pipeline end-to-end for the first time in 2025, and a model that can generate a 60-day global forecast in under 4 minutes. A 2026 assessment of 30 breakthrough technologies concluded AI growth, computing infrastructure, and electric grid capacity are closely connected and need to be evaluated together.[88]

Implications for Businesses, Workers, and Government[89]

An MIT study of enterprise investment in GAI, estimated at $30 billion to $40 billion, found 95 percent of organizations reported no measurable financial return on investment in GAI. The study attributes the result to the inability of general-purpose tools to adapt to organizational workflows rather than to model quality, noting these tools perform well for individual users.[90] The top ranked reasons AI efforts lose momentum after the pilot phase are poor fit with existing systems, at 40 percent, users not trusting outputs, at 33 percent, and unclear ownership, at 23 percent.[91] At the portfolio level, only 5 to 6 percent of firms are generating substantial AI value at scale and 60 percent report minimal gains despite significant investment. Artificial intelligence agents increase governance demands because agents carry out actions in addition to offering suggestions, and more than 40 percent of agentic projects could be abandoned by 2027 due to cost overruns and unclear business outcomes.

Successful use cases include a financial services firm's AI knowledge assistant succeeding because advisors stopped manually searching more than 100,000 research documents and began receiving instant, cited answers grounded in proprietary content. A major retailer also reported success by redesigned supply chain workflows so AI handles demand forecasting, supplier recommendations, and purchase order generation for routine replenishment. Companies seeing the most value set growth or innovation as objectives beyond efficiency alone.[92] Automation, particularly through GAI, could increase United States labor productivity by 0.5 to 0.9 percentage points annually through 2030, and combining GAI with other automation technologies could drive annual productivity growth to 3 to 4 percent by 2030.[93]

Opportunities for State Investment and Leadership[94,95,96]

Governments are investing in AI at scale, with Canada recently pledging $2.4 billion, China launching a $47.5 billion semiconductor fund, and France committing €109 billion. Europe and Central Asia expanded the number of state-backed AI supercomputing clusters from 2 to 44 between 2018 and 2025, whereas public investment by the United States remains modest by comparison, at approximately $20.4 billion in AI-related contracts and grants between 2013 and 2024, as compared to $285.9 billion in private investment in 2025.

In 2024, federal agencies introduced 59 AI-related regulations, more than double the number introduced in 2023. AI-related witnesses in congressional hearings has grown twentyfold since 2017, rising from 5 in 2017 to 102 in 2025. Since November 2022, at least 32 states have formed an AI task force.

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[87] Markus Hagenmaier et al., *Here at Last: The Evolution of the Robotaxi*, Boston Consulting Group (January 2026).
[88] Institute of Electrical and Electronics Engineers, *How AI Will Reshape Life by 2030* (July 2026).
[89] Ryan Baltrip, *State of AI in Business 2026: A Leader's Guide to the Industrialization Phase*, Navigate AI (2026).
[90] Aditya Challapally et al., *The GenAI Divide: State of AI in Business 2025*, Massachusetts Institute of Technology (July 2025).
[91] Barbara Rainho, *MIT Says 95% of GenAI Pilots Fail: Here's How to Beat the Odds*, Dataiku (October 2025).
[92] Dan Tinkoff et al., *The State of AI in 2026: On the Road to ROI*, QuantumBlack AI by McKinsey (August 2026).
[93] McKinsey & Company and the National Association of State Chief Information Officers, *Generative Artificial Intelligence and Its Impact on State Government IT Workforces* (April 2024).
[94] Stanford University, *Artificial Intelligence Index Report 2025* (2025).
[95] Stanford University, *Artificial Intelligence Index Report 2026* (2026).
[96] Govern for America, *AI x Talent: A Roadmap for Building, Staffing and Scaling AI Capacity in State Government* (April 2025).

For states looking to pursue increased use of AI, a cohort of 13 leading states provided the following six steps for developing a state AI strategy:

- Determine ownership, such as an AI center of excellence within the Information Technology Department;
- Issue responsible-use guidelines covering acceptable uses, data protection, bias intervention, and procurement;
- Raise awareness across agencies through training;
- Source and prioritize use cases;
- Launch standard off-the-shelf solutions first, followed by testing within a sandbox environment before scaling; and
- Prototype custom solutions with caution, because AI pilots projects can experience up to a 50 percent failure rate.