



## SUSTAINING CAPITALISM

A series focused on nonpartisan reasoned solutions in the nation's interest to the central challenges we face in order to provide prosperity for all Americans.

# Future-Proofing the Workforce for the AI Era

Artificial intelligence (AI) is increasingly and rapidly transforming the US economy, with the potential to fundamentally impact how we work, live, and innovate. Its widespread and rapid adoption presents both opportunities and challenges that policymakers and business leaders must address to navigate this technological transformation successfully.

Maximizing AI's potential while mitigating its risks requires equipping the US workforce with the necessary skills and flexibility to adapt in this changing environment. This requires a collaborative and proactive approach from policymakers, business leaders, educators, and all those with a stake in determining how this technology will reshape society. Further, in response to lackluster productivity growth and one of the most severe labor shortages in the country's history, the AI revolution can help mitigate these and other economic challenges, driving efficiency throughout the economy.

This Solutions Brief explores AI's potential economic impacts and implications for the US labor market, offering solutions for business and policy leaders to respond proactively to this transformative technology by working to future-proof the US workforce. Equipping workers with the knowledge and tools needed to adapt and thrive best ensures that AI serves as a catalyst for growth.

### Trusted Insights for What's Ahead™

- AI is transforming the US economy; both its rapid adoption and effective implementation present opportunities and challenges that policymakers and business

leaders must address to navigate the country successfully through this transformation. Some reports suggest that AI and broader efforts at automation could double the recent slow pace of productivity growth.

- As AI continues to develop, greater adoption of AI tools may lead to quicker labor market turnover. Education and training systems must keep pace with the labor market's evolving skill needs and be prepared to support the level of upskilling and job-matching efforts needed to underpin a successful transition.
- New training efforts such as "stackable" credentials will help workers move more rapidly and easily between opportunities; current federal and state retraining efforts will need to be reformed for the AI era.
- Educational institutions also need to evolve with new curricula, and educators will need to develop a deep understanding of this changing technology.
- Many businesses will need to evaluate their organizational structure and workflow to strategize around future AI-enabled roles and conduct a skills gap analysis, communicating with employees across the organization during development and implementation of AI plans.
- Government, too, needs to upskill its AI workforce and share knowledge broadly to serve as a catalyst for AI adoption throughout the economy and better delivery of government services.

## Recommendations

Navigating the transition to an AI-integrated economy will require a comprehensive and collaborative strategy from leaders across public policy, business, and education. Success demands addressing the nation's existing skills gap and better preparing the workforce for technological change, including significantly expanding workforce training opportunities and instilling STEM, computer science, and AI literacy into curricula in both K-12 and higher education. Successful initiatives must be scaled to the level of the challenge we face, investing in job training and employment services, bolstering targeted research funding, and rethinking training to leverage AI-integrated learning and stackable credentials.

### Expand future-focused workforce development and education opportunities

- Expand training programs and apprenticeship opportunities, leveraging public-private partnerships and private-sector guidance on in-demand skills to build local workforces.
- Streamline the approval process to expand the Registered Apprenticeship Program.
- Enhance STEM and computer-related educational offerings in K-12, university, and community college curricula; explore AI-integrated education approaches for personalized learning; and strengthen students' awareness around post-secondary and career pathways.
- Foster a growing pipeline of well-trained STEM and technology educators.

- Increase the use and recognition of stackable credentials, modular pathways in which workers can acquire progressively advanced skills and work experience to earn stackable credentials aligned with industry needs.

#### Target federal research funding

- Expand federal AI research initiatives in academic institutions through NSF, NIH, and other agencies, including research on human-complementary technology.
- Ensure federal investments in research and advanced manufacturing touch each region to form new technology clusters that provide job opportunities for workers potentially displaced.

#### Support workers

- Provide targeted federal and state support to workers displaced by AI disruptions, including skill development training and employment services to open reskilling pathways and match workers to new opportunities.

#### Enhance government's AI expertise and capabilities

- Build AI expertise to drive government's response to AI challenges and to review and advise on how government workers use AI technology.

#### The role of business leaders

- Review organizational structure and workflows to strategize around future AI-enabled roles and conduct a skills gap analysis, communicating with employees across the organization during development and implementation of AI plans.
- Invest in workers' upskilling and retraining through programs geared toward different employee groups and their specific learning needs related to future job roles.

## US Labor Market Challenges and the Role of AI

The US labor market faces multifaceted challenges: persistent shortages, an aging population, and a widening skills gap. At the start of 2024, job openings exceeded prepandemic levels by 1.5 million.<sup>1</sup> Demand will continue to outpace the number of workers in key industries such as healthcare, engineering, and computer science.<sup>2</sup> Despite this growing demand, education and training initiatives across the public and private sectors often do not keep pace with the economy's evolving skill needs.

Labor market challenges will only grow as the US population ages rapidly. The Congressional Budget Office projects that the US population will grow between 2024 and 2054 at less than half the pace of the prior 50 years.<sup>3</sup> This underscores the urgency to build talent pipelines to match the skills the economy demands and better match workers with suitable roles.

Last year, 69% of human resource professionals reported a skills gap in their organizations, up from 55% in 2021.<sup>4</sup> However, workers often report being dissatisfied with training opportunities available through their employer, with 57% pursuing external training.<sup>5</sup> Government workforce initiatives are also failing to provide the level of skilled workers the economy needs

in some sectors.<sup>6</sup> Further, many students graduating from the K-12 education system are not adequately prepared to meet current and future workforce needs.<sup>7</sup>

In response to talent shortages, businesses increasingly look to automation and digital transformation as avenues to supplement the workforce and increase their firms' productivity.<sup>8</sup> A 2023 World Economic Forum report found that more than 75% of global companies are seeking to adopt AI, big data, and cloud computing both to amplify productivity and to manage and develop talent, with 81% of companies looking to adopt education and workforce technologies.<sup>9</sup> Notably, AI tools themselves can help provide a solution to the skills gap, using both external data, such as labor market data, and "structured and unstructured internal workforce data to reveal both the supply and demand for skills," including skills proximity assessments that will help workers transition to new roles in a company.<sup>10</sup>

Greater adoption of AI and automation will bring heightened productivity, an important key to economic growth. Reigniting US productivity growth is critical to competitiveness following a period of lackluster annual growth of 1.3% since 2010, compared to 2.6% from 1990 through 2009.<sup>11</sup> But for the US to lead in the age of AI requires sufficient pipelines preparing qualified workers. Realizing AI's potential to reshape the economy demands redefining education and workforce development strategies to tackle the skills gap, preparing workers today and tomorrow with the necessary skills to succeed.

## Economic Impact of AI

AI tools are not new; some form of them date back to the 1950s. With the development of machine learning capabilities, they have come to power the content, marketing, and moderation algorithms now ubiquitous across digital platforms.<sup>12</sup> But the introduction of OpenAI's ChatGPT in November 2022—which within two months became the fastest technology in history to reach 100 million users—highlights the transformative nature of recent advances in generative AI technology.<sup>13</sup> The ability to process text requests to generate novel text, images, and sounds has ignited a wave of business interest in its wide applications. Many businesses now regard adoption of AI in their industry, at least to some degree, as inevitable. At the same time, rapid AI development has also shown clear risks associated with the technology, including issues of accuracy, transparency, veracity, and security.<sup>14</sup>

The rapid proliferation of AI tools already portends significant economic and social impact. For instance, AI tools can reduce the time to complete writing and coding tasks by 40 and 56%, respectively.<sup>15</sup> AI can monitor complex systems in real-time, allowing for optimization and waste reduction across a wide range of industry applications, including healthcare, energy, and agriculture.<sup>16</sup>

The 2024 C-Suite Outlook from The Conference Board showed that more than 91% of CEOs and 93% of C-Suite executives globally report that their organizations have either already integrated AI into their operations, plan to do so immediately, or are actively exploring options for the future.<sup>17</sup> Business leaders expect AI to benefit their companies significantly and to address today's multifaceted workforce challenges. Nearly 90% of CEOs believe AI will increase the efficiency and productivity of labor and the firm overall.<sup>18</sup> One study estimated generative AI could double the recent pace of US productivity growth, raising labor productivity by 1.5 percentage points annually over a 10-year period

following widespread adoption—roughly the same magnitude that followed prior transformative technologies such as the electric motor and personal computer.<sup>19</sup> A separate study projected that generative AI alone would boost productivity 0.5-0.9 percentage points annually through 2030, and combined with the impact of all other AI and automation technologies, could raise US productivity growth by up to 4 percentage points.<sup>20</sup>

However, to achieve this promising potential, policymakers and business leaders must each prepare the workforce and their organizations for these changes. More than 94% of CEOs believe that maximizing AI's potential will require new skills and training for their workers, while 75% believe it will mean significant transformation to their business models.<sup>21</sup> However, almost 50% report their organizations are currently not doing a good job of addressing employee and business unit use of AI.<sup>22</sup> The last year has seen a wave of investing in AI-related training, rising 60% over 2023.<sup>23</sup> Yet of companies that have an upskilling program, about 40% of those remain in the early stages of building their program.<sup>24</sup> As AI's capabilities continue to expand and risks such as hallucinations, cybersecurity issues, and users' overconfidence in its results become increasingly clear, so too does the need to empower a skilled workforce with the technology acumen to deploy these tools properly.<sup>25</sup> Security will be a particular challenge; companies can train their workers as their first line of security. Companies and governments must therefore also turn their attention to guide responsible development and implementation of AI tools, maximizing its advantages while minimizing its disadvantages.

## Workforce Implications of AI

Some have also raised concerns that AI may deliver too successfully on its promised capabilities and outpace the ability of the workforce to develop skills to wield AI effectively to augment their work. Indeed, the ascent of AI has renewed longstanding concerns over automation's impact on jobs and the economy. A recent survey found that 58% of workers fear AI could eliminate their jobs, and 57% seek greater clarity on what this technology means for their careers.<sup>26</sup> Fears of AI replacing the human workforce once seemed fantastical; the rise of generative AI has altered that thinking. Artificial general intelligence (AGI)—the ultimate goal of the industry—is defined in OpenAI's charter as "highly autonomous systems that outperform humans at most economically valuable work."<sup>27</sup> The capabilities of generative AI systems have advanced closer to levels of human performance across a wide range of tasks. In the past year, AI models have scored in the 93rd percentile of SAT test takers, placed in the 90th percentile of the Uniform Bar law exam, and performed at roughly passing rate on all three sections of the Medical Licensing Exam—all without additional topic-specific training.<sup>28</sup>

These rapid advances have led to upward revisions of AI's impact on the workforce in the near term. Currently, 19% of workers hold jobs with high AI exposure, and 23% have low exposure.<sup>29</sup> Exposure, however, does not directly correlate to job loss—it simply underscores the need for continued training of workers. A recent study estimated that AI's current capabilities could automate activities that compose 60 to 70% of workers' time, a jump from 50% in 2017.<sup>30</sup> OpenAI researchers estimate that the broader implementation of generative AI could affect 80% of US workers by automating at least 10% of their tasks, while 19% of workers could see at least 50% of their activities automated.<sup>31</sup>

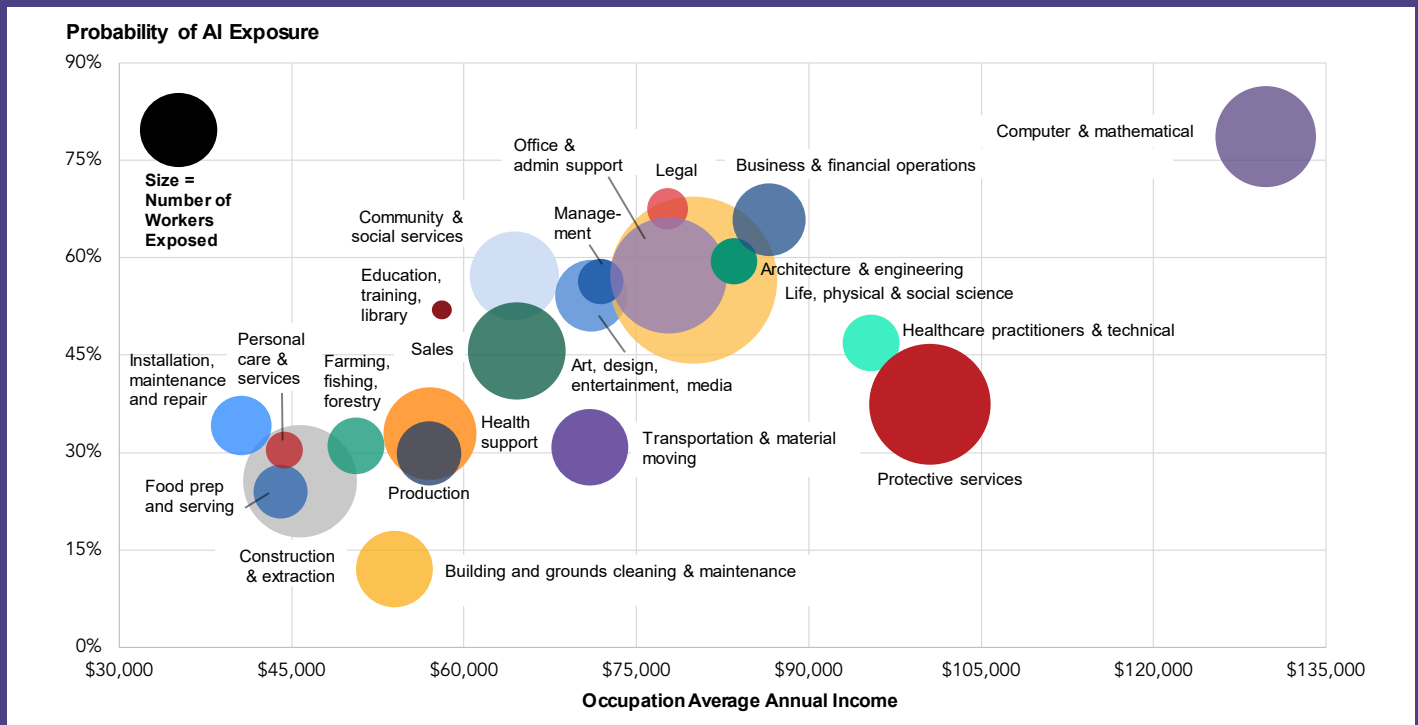
This underscores the need for strategic planning around AI-integrated job roles and for expanded training efforts to prepare workers for disruption to their mix of work activities. Still, half of CEOs believe that AI will displace labor in their organizations,<sup>32</sup> at least to some extent.

AI's impact either to augment or displace workers varies widely by occupation. Broadly, occupations with the greatest likelihood of exposure to AI involve programming, analytical skills, reading comprehension, writing, active listening, mathematics, and speaking. Occupations less likely to be replaced rely on tasks less susceptible to automation in science, learning strategies, critical thinking, monitoring, and active learning.<sup>33</sup>

Because of AI's capabilities, the impacts of AI are projected to diverge from past technologies: many of the current highest-earning occupations are among those most exposed to potential AI replacement.<sup>34</sup> Although some experts predict that AI adoption in the near term will enhance white-collar work across most STEM, creative, business, and legal professions without shedding a significant amount of jobs, a greater share of those work activities could be affected as the capabilities of AI tools continue to expand.<sup>35</sup> As shown in Figure 1, occupations in computers & math, law, business, architecture & engineering, and finance are all among the highest risk.<sup>36</sup> The IT sector is already highly exposed, with 19% of firms already using AI and 50% expected to use the technology in the next six months.

Figure 1

### Occupation Exposure to AI by Annual Income and Number of Workers Exposed



Source: AI: Savior or Destroyer of Global Labor Markets? The Conference Board, 2023

Conversely, many jobs that have traditionally required less education are among those least exposed to AI, including construction, manufacturing, maintenance, care work, and food services.<sup>37</sup> Yet continued advances in AI tools do not guarantee that these types of work will be immune from future changes, particularly with advances in robotics. Recent examples include Amazon's deployment of 750,000 robots to operate its warehouses or the recent investment by OpenAI and NVIDIA into Figure, a company aiming to infuse cutting-edge AI into humanoid robots.<sup>38</sup>

These wide-ranging impacts are reshaping the demand for skills across the economy. The US must address its current STEM workforce shortage to ensure leadership in new technologies as demand continues to grow in data science, machine learning, and other advanced technical fields. However, AI is most likely to impact data and programming roles immediately, highlighting the potential for augmentation of work as long as workers are prepared to utilize new tools. Workers who have greater education and familiarity with AI report being more optimistic about AI in the workplace, with a higher share of workers in the most AI-exposed sectors of technology and in professional, scientific, and technical services reporting that AI would help them personally than any other sectors.<sup>39</sup>

Meanwhile, AI will lead to changes in workplaces in occupations that use fundamental skills in reading and math. AI will not replace the need for those skills; in fact, they are needed now more than ever simply because foundational skills remain critical even as specialized skills change over time. Broadly, the spread of AI technologies has the potential to raise the importance of human-specific skills that AI systems cannot replicate, such as critical thinking and active learning that help workers leverage AI tools effectively and allow for adaptation to new technologies.<sup>40</sup> Indeed, in an IBM report comparing 2016 and 2023 surveys on the most critical workforce skills, business leaders reported that proficiency in STEM and computer skills had fallen from their first and second rankings in 2016 to the bottom of the 12 top in-demand skills. In their place, skills such as time management, communication, and adaptability to change have risen to be most valuable for employers.<sup>41</sup>

In line with these trends, surveys show that company-sponsored training initiatives focus on two core areas: analytical and creative thinking. Training workers to utilize AI and big data ranked third.<sup>42</sup> However, employees' own perceptions are different: while businesses increasingly prioritize soft skills, individuals seeking career development opportunities continue to focus on developing the technical skills they associate with future-proofed careers. The most popular online courses today center around skills such as programming, data analytics, cybersecurity, and user experience design.<sup>43</sup>

In this current environment of uncertainty, the future workforce must be prepared with foundational learning skills, baseline computer and AI literacy, and skills that enhance flexibility to adapt to a fast-changing workplace. The public and private sectors must collaborate to establish and expand flexible, affordable reskilling pathways for workers who need to upgrade their skills and smooth the transition for individuals and the broader economy.

## The Role of Business Leaders

First, any business leaders who have not already done so should increase their understanding of AI and its impact on their industry to be able to develop operating policies that will best ensure successful implementation. Change management will be an even

more essential skill for business leaders in the AI era—and those leaders will need to help their employees embrace change.

Second, as the private sector strategizes to implement AI, business leaders recognize that their workforce is as important as the technology itself. Businesses should invest in employees through training and support, enabling them to work alongside AI effectively. The urgent need for a strategic approach is clear: almost half of CEOs (48%) and 44% of C-Suite executives in our recent survey, *C-Suite Outlook 2024*, say their organizations are not doing a good job of addressing employee and business unit use of AI.<sup>44</sup> A strategic approach will require the majority of companies to review their organizational structure and workflow to strategize around future AI-enabled roles.<sup>45</sup> A key aspect of that strategy should be conducting a skills-gap analysis of the workforce to determine competencies to be achieved through upskilling workers or targeted recruitment.

As AI brings changes to the workplace, workflow strategies will redesign work to better use humans for tasks at which they excel, leaving humans with more complex tasks,<sup>46</sup> while redirecting other work processes to AI tools for greater efficiency. One study showed how AI increased the productivity of consumer support agents, with the highest productivity gains for workers new to the field, leading to higher satisfaction for both the workers and customers calling consumer support lines; in the authors' view, there is "suggestive evidence that the AI model disseminates the best practices of more able workers"<sup>47</sup> by enabling more rapid learning.

Ultimately, businesses that invest in their employees, adapt organizational models for AI, and cultivate a culture of continuous learning and adaptation will be better poised to navigate the AI transformation, turning their initial investments into long-term productivity and innovation gains. Leaders should engage their employees throughout the development and implementation of AI plans, communicating openly about the changes that AI will bring, addressing workers' concerns, and emphasizing AI's role in enhancing work rather than displacing jobs. Companies may also wish to think about appointing a C-level officer to lead these reorganization and workforce efforts to bridge business strategy with specific technical implementation across the organization.<sup>48</sup>

More broadly, the private sector should expand upskilling training initiatives, working with other stakeholders to share practices and resources across companies, labor organizations, and sector-specific training programs. Offering continuous learning opportunities to improve technical competencies as well as nontechnical skills can help prepare employees to use AI technology tools effectively and remain adaptable in the changing job landscape. An important part of training is simply understanding AI better to navigate potential challenges, such as overconfidence in the capabilities of AI tools, which can lead to security and quality risks.<sup>49</sup> Critical steps include proper training on AI's use within specific job functions and emphasizing the importance of data quality.

Promising examples of training initiatives to build pipelines of job-ready workers involve partnerships between companies or sectors and educational platforms or universities. For example, a partnership between Royal Dutch Shell and Udacity, first announced in 2020, has offered Shell's 82,000 employees voluntary training to upgrade their skills with courses on Python programming and training neural networks.<sup>50</sup> This partnership



continues to expand with Shell and Udacity cosponsoring an AI hackathon in 2023 with the challenge of optimizing the supply chain of agricultural waste collection.<sup>51</sup>

## Solutions for Policy Leaders

As both public and private sector leaders think about solutions to address the impact of AI on the workforce, a note of caution is warranted. In an era of such rapid advances, it is important not to be too prescriptive in assigning specific solutions lest technological change render the solution obsolete. For instance, while the US continues to face a shortage of cybersecurity workers, it is also true that cybersecurity will increasingly be powered by AI in response to AI challenges to cybersecurity. Workers alone simply cannot keep up with these new threats. Thus, cybersecurity workers will need AI skills—and the US may need fewer cybersecurity workers overall, in contrast to earlier projections. Therefore, both policymakers and business leaders must respond to the transformations AI brings in a spirit of agility and flexibility, relying on enduring principles such as training and continuous learning.

## Expand Education and Workforce Development

Successfully navigating the AI transition requires bolstering education and workforce development initiatives. Automated systems will change the nature of job roles and in-demand skills, resulting in significant (and likely more rapid) labor market changes and the need to retrain affected workers.<sup>52</sup>

### Workforce Development

For those already in the workforce, policymakers and business leaders must prioritize strengthening workforce development and training frameworks. With engagement from private-sector leaders who are best positioned to determine in-demand skills, these programs should correlate curricula with needed skills and scale current initiatives to address workforce shortages today as well as those expected in the near future. Scaling successful initiatives requires fostering collaborations among employers, educational institutions, labor unions, nonprofits, and other stakeholders to support workers in adapting to this evolving landscape. Training curricula must become agile, allowing for iterative learning to match the pace of change, ideally through short, inexpensive courses that will help workers learn new skills rapidly.

Importantly, federal policymakers must clear hurdles to expanding successful initiatives. The Department of Labor's (DOL) Registered Apprenticeship Program (RAP) is underutilized and currently fails to attract sufficient business participation. Two-thirds of employers cite high costs as a barrier to starting an RAP program, while one-third point to a lack of clarity around registration requirements.<sup>53</sup> Beyond regulatory barriers, the current system suffers from a lack of reciprocity across states; rules related to training instruction, wages, and reporting deter multistate employers.<sup>54</sup> Further, the program has traditionally catered primarily to trades occupations; DOL has approved relatively few apprenticeships in growing industries. Roughly 50% of active apprentices are pursuing job training in construction, manufacturing, and utilities, while fewer than 1% are pursuing technology fields.<sup>55</sup>

One pathway to expedite expansion is to embrace sector-based training models. However, the elimination of the Industry-Recognized Apprenticeship Program (IRAP) in 2022 restricts that option.<sup>56</sup> IRAPs were designed to offer more flexible employer-led apprenticeships that could quickly extend into new industry areas, including technology, healthcare, and hospitality. When the first selections were announced in 2020, program leaders hoped it would lead to 2,000,000 apprentices over its first 10 years.<sup>57</sup> However, leaders in sectors outside technology expressed concerns over the quality of training,<sup>58</sup> resulting in the program's termination.<sup>59</sup> Policymakers should review the ability of industry-led apprenticeships to expand employer participation and determine what provisions would allow industry-led programs to be implemented effectively.

The Manufacturing Intermediary Apprenticeship Program (MIAP) in New York State supports public-private coalitions applying this model to advanced technology sectors. MIAP, led by Central New York's economic development organization, brings together companies with state colleges and universities to combine funding and training guidance for apprenticeships in manufacturing-related positions. With growing demand in technology fields, MIAP has expanded its curriculum pathways to include computer technicians and data analysts and recently partnered with the Commerce Department's National Institute of Science and Technology to tailor a curriculum to prepare workers for the semiconductor industry<sup>60</sup> to take advantage of opportunities under the CHIPS and Science Act.

Today, workers seeking skill development must comb through a complex web of training offerings that may or may not offer a true pathway to their intended career goals. After completing these programs, many trainees are left without a credential or with one that is not recognized across companies and regions. For instance, the largest federal workforce program under the Workforce Innovation and Opportunity Act (WIOA) does not require training providers to confer any credential. Additionally, for digital training platforms that have grown to nearly 3,000 course offerings, badges and certificates of completion are not guaranteed to be transferable or recognized by employers.<sup>61</sup> Yet the private sector is already beginning to recognize the importance and utility of this avenue for skill development; 72% of employers report they are more likely to hire a candidate with an industry microcredential.<sup>62</sup>

As the training landscape expands, policymakers and business leaders should embrace a system of "stackable" microcredentials. These modular pathways would allow workers progressively to acquire and document their attainment of skills and work experience, increasing the adaptability of the workforce, while allowing certifications to align flexibly to industry needs. An example of policymakers fortifying these pathways is Pennsylvania's recent partnership with regional employers to launch a work-based learning pilot to expand internship and apprenticeship opportunities for state university students.<sup>63</sup> Establishing the state's first credential registry is a key piece of that effort, including a user-friendly online tool for students and workers to access information on available credential programs and the skills needed for in-demand jobs. The registry also clearly defines the sequence in which credentials should be obtained, allowing for "stackable" credits that can be earned toward industry certification or applied toward a growing number of two-year and four-year state degree programs.<sup>64</sup>

Greater standardization of training certifications by industry associations and greater acceptance by businesses will help drive adoption. Federal officials could leverage this framework as a model for a national registry that could help standardize training and credentials across regions to drive adoption.

Further, training should also expand to serve independent contractors and “gig” workers, an important segment of the workforce, more fully. These workers need to rely on public retraining through WIOA. However, the decentralized WIOA system operated by 550 local workforce boards gives local officials wide discretion to define available services and eligibility requirements.<sup>65</sup> As a result, there is wide variation in how local boards treat individuals in nontraditional work arrangements, often leading to barriers to eligibility.<sup>66</sup> A key factor is the lack of available data for self-employed and contract workers. To document WIOA-required performance outcomes for traditional workers, states leverage unemployment insurance (UI) records to verify employment and wages. A lack of documentation for self-employed workers can inhibit eligibility as well as act as a potential disincentive for local boards to serve this population due to consequences for failing to meet outcome targets.<sup>67</sup> To address this issue, lawmakers could explore ways to provide workforce boards with additional criteria to help determine eligibility, with a goal of outlining how WIOA formula dollars can be used to serve this population.

### **Education to Prepare Workforce Pipelines**

While US companies lead in AI innovation today, the shortfall in workers with STEM qualifications threatens our ability to capitalize on AI’s promising potential and puts US competitiveness at risk.

STEM education will remain a foundational pillar of the technical skills necessary for many important fields. A recent letter from leading executives at OpenAI, Google, Apple, and NVIDIA, among others, urged the imperative of educating our future workforce with the foundational knowledge to build and deploy AI technology, highlighting that “concepts from algebra, calculus, and probability lie at the heart of modern AI innovation.”<sup>68</sup> Business leaders believe a strong command of math remains necessary for careers in this field. As the technology landscape continues evolving, these technology leaders state that “we would much rather hire students who have mastered fundamentals than those who have a shallow familiarity with the latest tools or software.”<sup>69</sup> Policymakers and educators must also reinvigorate efforts to grow the pipeline of well-trained teachers and professors in STEM and computer science, while strengthening students’ awareness of and access to career pathways in those fields.

Yet AI’s potential to disrupt work and society more broadly raises the question of how education should react to emerging technologies, equipping students with an understanding of the capabilities and limitations of AI tools and teaching them to use tools effectively. States and school districts must drive this effort proactively. AI literacy should become a part of learning foundational skills, not a replacement for it. It should be designed to nurture students’ critical thinking and adaptability. Encouraging students to engage critically with AI fosters essential soft skills like problem-solving and creativity, complementing AI’s data capabilities with human ingenuity. For instance, students could be asked to think critically to evaluate the accuracy of an argument prepared by AI or

submit their assignments to an AI platform to work through probing questions that strengthen their understanding.

The expansion of AI and computer science curricula in higher education is vital to cultivate a skilled workforce prepared to maintain US competitiveness. Given AI's ability to assist students across disciplines, AI literacy should be integrated across academic disciplines with guidelines provided for educators on how best to leverage AI in the classroom, regardless of the intended occupations of students. Universities and community colleges should work with AI experts in the private sector and academia to develop specialized programs in fields including machine learning, natural language processing, robotics, and data analytics. Arizona State University is a leader in this effort, announcing in January the first higher education collaboration with OpenAI.<sup>70</sup> To encourage faculty to explore generative AI's applications, the university has opened an AI challenge for staff to submit best-use scenarios around AI-integrated teaching, enhancing student performance, AI tools that can aid innovative research, and methods to streamline organizational processes.<sup>71</sup>

India has embraced AI after decades of focused and coordinated investment by business and government in building its pool of technology talent. India is expected to be the only country globally to have a surplus of skilled talent by 2030.<sup>72</sup> In the past four years, the number of Indian workers with expertise in AI, big data, cloud computer, and the Internet of Things has grown by 35% annually.<sup>73</sup> India built this pipeline through a comprehensive set of programs, including providing children hands-on computing and design experience in new Atal Tinkering Labs in 10,000 schools,<sup>74</sup> its National Education Policy 2020 refocusing curricula on core skills to open space for additional experiment-based learning,<sup>75</sup> and its industrial initiatives for which expansion of STEM and innovation training programs are critical components.<sup>76</sup> Rising international competition highlights the urgent need to modernize US education and career pathways in advanced fields to ensure a capable American workforce is able to continue leading in AI and advanced technologies.

Policymakers, educators, and training professionals should embrace AI's potential to positively transform education and training. AI can customize learning to individual needs, an increasingly critical asset to address the nation's pandemic-driven educational setbacks.<sup>77</sup> Leveraging AI presents the opportunity to improve the design and delivery of training programs—such as the highly fragmented WIOA programs—that can be modelled after successful initiatives.

## Retraining Workers

Retraining workers is an essential challenge in responding to AI-driven changes in the workforce. As AI drives companies and sectors to reorganize their work, policymakers must prepare for higher turnover in the labor market, directing targeted retraining support to workers, ensuring they can access training and career supports to match them with new opportunities. At the same time, policymakers should also focus on expanding the range and flexibility of training supports to help all workers who need retraining engage in high-quality programs.

Initiatives such as New York State's collaboration with the learning platform Coursera is one example of opening training access to displaced workers. Leveraging funds from the

US Department of Labor, unemployed workers in New York can access nearly 4,000 of Coursera's training programs that provide fundamental skills for high-growth industries, including data science, business, and technology. Many of these programs offer pathways to certifications and professional certificates to connect workers' acquisition of skills to employer qualifications.<sup>78</sup>

Policymakers could also consider ways of expanding the existing framework of individual training accounts (ITA),<sup>79</sup> targeting them for changes AI drives in the workforce. ITAs are available to job seekers and workers through American Job Centers in the form of vouchers that can be used to pay for training from a variety of state-approved programs and training providers. A recent DOL study on the effects of training vouchers found that they generally increase the employment rates and salaries of participants while reducing negative impacts on families and communities with extended unemployment and without retraining assistance.<sup>80</sup> The ITA program also provides states and localities with broad flexibility for setting the value of vouchers and selecting approved training providers, allowing for calibration to meet local workforce needs.<sup>81</sup>

In other contexts, ITAs have proven effective means of providing support for retraining. There seems to be no reason these vehicles could not be equally effective for those displaced by AI at any point in their career. Because ITAs are available to the majority of adults over 18,<sup>82</sup> ITAs can provide workers with the flexibility to seek to change roles within a company or to switch companies or careers. However, states, which have discretion to select approved training providers, should ensure the provision of effective training pathways for workers seeking to upskill in computer science and technology literacy. Doing so in cooperation with the private sector will guarantee that training pathways will match the skills private employers need. In addition, as with other types of worker assistance programs, coordination with other government grants will make ITAs more effective. Predictable funding schemes and coordination with employers' own training programs are other lessons the OECD drew has drawn from an international study of these types of accounts.<sup>83</sup>

## Bolster Federal Research Funding

To ensure the US navigates the AI labor market transition successfully, both the public and private sectors should continue a significant commitment to research funding, expanding federal AI research initiatives through agencies such as the National Science Foundation (NSF) and National Institute of Health (NIH). Those initiatives should include a focus on human-complementary technology, in which AI can be leveraged to augment tasks to boost productivity and improve conditions for workers. This is particularly important in complex sectors such as education and healthcare, in which AI-enabled tools should be evaluated for their ability to improve the delivery of learning and care.<sup>84</sup> These investments could be modelled on past programs. For example, the Defense Advanced Research Projects Agency (DARPA) orchestrated competitions that induced investment and development of new technologies that laid the foundation for GPS technology and the Internet.<sup>85</sup> A similar framework could enable rapid development from researchers on AI applications pairing tools with human expertise to improve vital economic sectors in the nation's interest. Deepening research into algorithmic properties, fairness, machine

learning algorithms with provable attributes, and the economic implications of human-AI collaboration is also essential to developing and deploying AI models responsibly.

The push for research must be a collaboration involving government and business. Both will need to move at a faster pace in responding to AI. Established by a 2023 Executive Order, the National AI Research Resource (NAIRR) piloted this year could offer AI researchers and students access to key resources, including data, testbeds, testing tools, and computational resources to promote innovation and share best practices to advance trustworthy AI deployment.<sup>86</sup> Bringing together 11 federal agencies and 25 leading US technology companies, this two-year pilot will act as a proof of concept to inform the development of a full-scale resource.<sup>87</sup> Policymakers should evaluate the performance of this pilot and consider ways to enhance it as a centerpiece of a collaborative AI effort.

In addition, the CHIPS and Science Act authorized a Regional Tech Hub program; the Commerce Department designated 31 hubs in October 2023.<sup>88</sup> Federal investments in AI research should be distributed across all regions to further the Hub program's goal of fostering new technology clusters for advanced technologies that can offer job opportunities for workers at risk of displacement.<sup>89</sup>

## Enhance Government's AI Expertise

To facilitate an effective AI transition and improve delivery of public services, the federal government should enhance its own AI expertise and capabilities substantially. With the Executive Order's call for federal agencies to establish new standards for AI safety and security, agencies must step up their own AI expertise.<sup>90</sup> The Administration's FY2025 budget proposal included funds for chief AI officers in a number of agencies, while establishing new AI offices in the Departments of Homeland Security (DHS) and Labor.<sup>91</sup> Given the long-term challenge of attracting top talent to government roles, the Administration has also announced an AI Talent Surge, to hire new AI workers. In support of this, the Office of Personnel Management has published guidance for new pay flexibilities to support the hiring of workers in AI and other technical roles.<sup>92</sup>

Federal departments and agencies should construct strategic workforce plans to build internal AI talent quickly to improve delivery of services to the public and drive internal efficiency. DHS can be a model for other agencies; the Department launched a hiring sprint in February with the goal of building an "AI Corps" this year through hiring 50 experts in AI, machine learning, and cybersecurity using new streamlined hiring authorities.<sup>93</sup> This plan stemmed from DHS's Artificial Intelligence Task Force, in which the chief AI officer identified areas where AI could improve the Department's work.<sup>94</sup> These measures would not only strengthen the government's capacity to navigate the economic changes driven by AI but also help ensure a smoother transition for the labor market and promote the quality and appropriateness of AI applications in public services. The Food and Drug Administration, which has already approved about 700 AI-enabled devices, many in radiology, is another example of an agency moving quickly to respond to AI's impact on the broader economy.<sup>95</sup>

## Conclusion

While AI brings many economic benefits, it also presents a paradox: it will displace some jobs but also heighten productivity, with sharply varying impacts by sector. Perhaps the only thing that may be said with certainty of the future of AI is that it will be dominated by change and the uncertainty that results from change. Change management is therefore an essential task that an increasing number of employees must master, both within their companies and for their own careers. This reinforces the need for a strong policy response focusing on key principles such as training and adaptation; the issue and the impact on workers and the economy is simply too large to be ignored.

The AI transition stands at a pivotal moment as policymakers and business leaders determine the path forward as the future of work is redefined. To capitalize on this transformation, the US must commit to building a future-proof workforce poised for success and equipped with the skills and adaptability to thrive in the fast-shifting economic landscape in the AI era.

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