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Working to Win: Rebuilding America's Workforce for an Age of Geopolitical Competition

JPMorganChase

Key Takeaways

- **America's talent shortage is a national security risk**, constraining defense production, semiconductor manufacturing, the energy transition, and technological leadership.
- **The U.S. is losing ground in the global competition for skills**, as China and key allies invest heavily in STEM and technical training while many American communities struggle to meet workforce demand.[1]
- **Workforce must be treated as strategic infrastructure**, requiring industrial-scale training systems, stronger public-private partnerships, and place-based models like Orlando, Chicago, and Houston to convert investment into real capacity.
- **Coordinated public policy across all levels of government** that expands training access and strengthens local workforce pipelines is key to addressing talent gaps in critical sectors.
    - **Federal Policy Recommendations:** The U.S. federal government should modernize and scale the nation's training ecosystem—expanding apprenticeships, strengthening employer-based programs, supporting industry partnerships, and closing the digital-skills gap—to ensure critical industries have the talent required to deliver on national priorities.
    - **State Policy Recommendations:** States must build robust regional talent pipelines—through work-based learning, employer-aligned credentials, and data-driven funding systems—to connect learners to in-demand careers and enable communities to capture strategic industry growth. Washington, Texas, and Iowa provide promising models.

America's Workforce Squeeze Has Become a National Security Threat

America's security challenges are often framed in terms of equipment and investment—strained defense production lines, efforts to re-shore critical supply chains, intensifying competition over cutting-edge technologies, and the need to rebuild core energy, manufacturing, and logistics infrastructure. Yet underpinning all of these issues is a more basic limitation: **the United States does not have enough skilled workers to meet the demand**.

The United States today faces a workforce problem that is bigger than any single sector and more strategically consequential than many realize. This is not a routine labor-market imbalance or a gap in education alone. It is a pervasive talent deficit that constrains the nation's capacity to build, compete, and protect its interests—and it is addressable.[2]

Across many fields tied to U.S. strength and resilience, the same pattern emerges:

- **Defense and aerospace:** Production lines are slowing because employers cannot find enough precision machinists, systems engineers, welders, and cyber specialists. This includes persistent gaps in depot maintenance and engineering teams that lengthen delivery schedules and extend repair timelines. Stockpile shortfalls in munitions, propulsion systems, microelectronics, and shipbuilding increasingly trace back to workforce shortages—not money or machines. The U.S. has prioritized rearmament, but rearmament without workforce is strategy without means. Nearly every major program cites labor shortages as a top constraint.[3,4]
- **Energy transmission and grid modernization:** Projects are stalling due to insufficient numbers of electricians, lineworkers, and technicians. Active apprenticeships must rise by 44% just to meet near-term demand of roughly 200,000 workers.[5]
- **Advanced manufacturing and semiconductors:** Multi-billion-dollar semiconductor fabrication plants are being completed faster than companies can hire the operators and technicians required to run them. By 2033, the sector is projected to need 3.8 million additional workers—and almost half of those roles may go unfilled.[6]
- **AI, cybersecurity, and digital infrastructure:** Skills shortages are deepening just as technological rivalry accelerates. Three-quarters of companies struggle to find qualified talent, and 40 percent of adults lack basic digital skills.[7] Meanwhile, U.S. technology workforce requirements are estimated to grow at twice the rate of the overall U.S. workforce requirements in the next decade.[8]
- **Local communities:** Many places lack the workforce capacity to take full advantage of new investment or grow small firms, or transition workers into the industries that underpin resilience. For example, Arizona's major semiconductor project has faced delays in part because there are not enough skilled construction workers and technicians to meet demand.

Projected Workforce Shortages and Demands that May Impact Industries Critical to U.S. Security and Resilience (representative)

Cyber specialists

Current 265,000 skilled cybersecurity workers shortage[9]

Microelectronics/Semiconductors jobs

67,000 jobs will go unfilled by 2030[10]

Shipbuilding workers

Demand for 250,000 new skilled shipbuilding workers is expected over the next decade[11]

Electricians

81,000 openings for electricians, on average, annually from 2024-34[12]

Precision mechanics

34,200 openings for machinists and tool and die makers are projected each year, on average, from 2024-34[13]

Welders

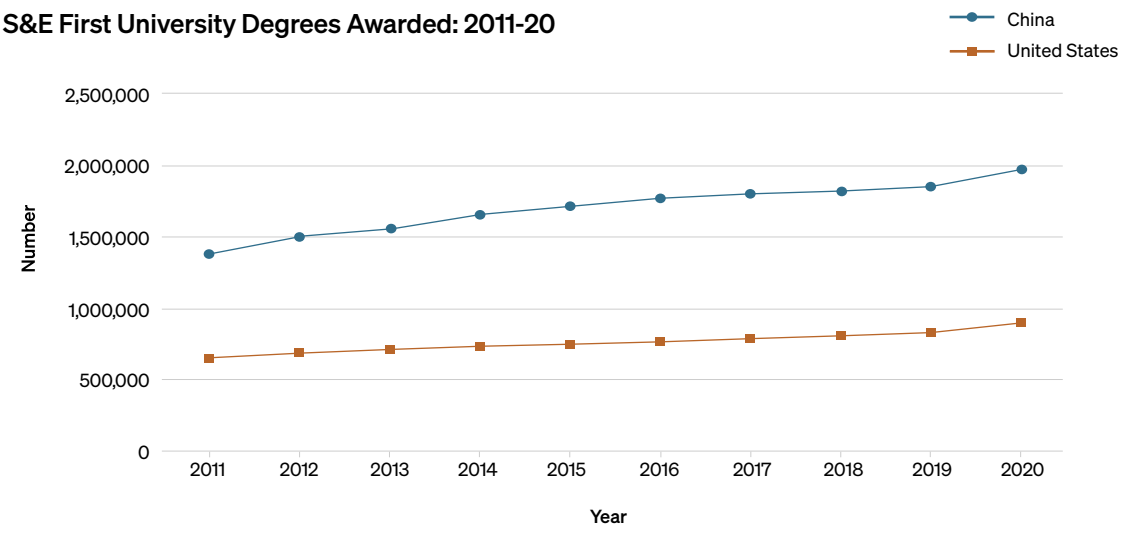
320,500 new welding professionals are projected to be needed in the U.S. by 2029[14]

The result is a distinct and emerging strategic risk: the U.S. can allocate funds, craft ambitious industrial strategies, and pass legislation to expand supply chains—but without sufficient talent, execution will fall short. In practice, this means that America's geopolitical posture increasingly depends on the sophistication and right-sizing of its approach to workforce development, and by extension the strength of its education and training institutions—secondary and post-secondary education, including community colleges, technical high schools, and business leadership and regional industry partnerships—as much as on federal spending.

In any competition, talent ultimately determines advantage—how it is cultivated, where it is located, and how effectively it is mobilized. The U.S. can no longer assume it will remain the world's primary magnet for highly skilled workers. China is producing far more engineers, technicians, and STEM graduates each year than the U.S. *(see figure 1)*. Meanwhile, allies such as South Korea, Japan, Singapore, and Germany are investing heavily in apprenticeships, AI fluency, and applied technical education. Global companies can now place advanced R&D, production, and testing in jurisdictions where talent pools are deepest—giving those locations outsized geopolitical influence.

A dynamic and innovative workforce is the backbone of U.S. competitiveness. Talent shortages weigh on productivity, discourage reshoring, and reduce the economy's ability to absorb shocks. This matters not only for great power competition but for the long-term strength of American communities.

Figure 1. **America is vastly underperforming China in science and engineering undergraduate degrees.**



Notes: To facilitate international comparison, data for the United States are those reported to the Organisation for Economic Co-operation and Development; these data vary from the National Center for Science and Engineering Statistics classification of fields presented in other sections of the report. Data for Japan are not available prior to 2014.

Source: Organisation for Economic Co-operation and Development (OECD), Education at a Glance; National Bureau of Statistics of China, China Statistical Yearbook; People's Republic of China, Ministry of Education data; Government of India, Ministry of Education, Department of Higher Education, All India Survey on Higher Education. National Center for Science and Engineering Statistics, November 2023.

National Center for Science and Engineering Statistics, November 2023.

Federal Steps Underway to Address the Problem

The United States has begun to move. Policymakers have advanced legislation that tie federal dollars to workforce planning; the Administration has launched initiatives on apprenticeships, AI talent, and Workforce Pell Grants; and states are expanding training partnerships and outcomes-based funding to align education and training to labor market needs.

- The "Winning the Race: America's AI Action Plan" report released by the Administration highlights strategies to train a skilled workforce for AI infrastructure and empower American workers in the age of AI.[15]
- The "Advancing Artificial Intelligence Education for American Youth" Executive Order focuses on promoting AI literacy.[16]
- In response to the "Preparing Americans for High-Paying Skilled Trade Jobs of the Future" Executive Order, which established a goal for the U.S. to surpass one million new active apprentices, the U.S. Departments of Labor, Commerce, and Education released "America's Talent Strategy: Building the Workforce for the Golden Age."[17,18] The plan focuses on modernizing the federal workforce system across five strategic pillars, including industry-driven strategies.

These efforts, while laudable, must be scaled and aligned with the reality of a strategic competition. **What is needed is a framing shift: from workforce development as a cost to workforce development as a strategic asset**, central to America's ability to sustain deterrence, modernize industry, and deliver economic growth.

This is the gap JPMorganChase is helping to address.

JPMorganChase Efforts to Boost Workforce in the United States

The firm's Security and Resiliency Initiative (SRI) is a $1.5 trillion, 10 year plan to finance, facilitate, and invest in industries foundational to national economic security and resiliency.[19] But financing strategic industries is only part of the equation. **Without a talent pipeline, capital cannot translate into production**. This is why SRI integrates workforce deeply into its strategy—not as an adjunct program, but as a core driver of national resilience.

Our firm brings a unique combination of scale, local presence, and deep industry partnerships with an approach that rests on three pillars:

1. **Deploying Capital to Strategic Industries**. Through SRI, the firm will invest up to $10B in direct equity and venture capital to scale companies in advanced manufacturing, defense, energy, and emerging technologies—paired with long-term financing for infrastructure, supply chains, and production capacity. Workforce will be a key consideration for the deal calculus.

2. **Policy and Research Leadership**. JPMC's workforce experts are identifying federal and state reforms to modernize training systems, strengthen apprenticeships, expand industry partnerships, and close the digital-skills gap (see policy recommendations below).

3. **Building Local Models:** Workforce development efforts in Orlando, Chicago, and Houston demonstrate what a comprehensive workforce strategy can enable when combined with place-based investment. Lessons learned from these models can be applied in communities where there are critical industry workforce needs.

    - In **Orlando**, **Florida**, with support from JPMorganChase, CareerSource Central Florida is addressing a critical skills need in Osceola County's burgeoning semiconductor industry by providing training to 100 individuals by the end of 2026. This builds off the firm's commitment to the Orlando Economic Partnership to produce a report on Orlando's opportunity to grow its semiconductor manufacturing ecosystem and outline how a skills-based approach to hiring and talent development creates a broader talent pool to draw from.[20]

    - In **Chicago**, **Illinois**, P33, a nonprofit organization that seeks to transform the city into a leader in technology innovation, established the Tech Talent Alliance (TAA), a coalition of technology and human resources leaders from more than 50 Chicago companies, focused on addressing tech talent shortages. With philanthropic support from JPMorganChase, TAA guidance led to employer-driven solutions such as Xchange Chicago, an onshore IT delivery center aiming to reshore $1B of the $16.5B that Chicago companies spend on outsourced IT. With participation from large Chicago employers, Xchange is expected to drive 8,000+ family sustaining wage tech jobs for Chicago residents over the next 10 years, while increasing commercial activity in the south-side Grand Crossing neighborhood.[21]

    - In **Houston**, **Texas**, JPMorganChase supported Houston Community College to establish the Workforce Resiliency Collaborative, which brings together more than 40 community partners across the public, private, educational, and nonprofit sectors to train residents for high-demand jobs in energy, AI, manufacturing, and disaster response. Through these efforts, over 1,000 individuals secured employment.[22,23]

These examples demonstrate the potential for how workforce can be treated as economic infrastructure, communities can absorb investment, employers can expand, and national competitiveness can be strengthened.

Policy Recommendations

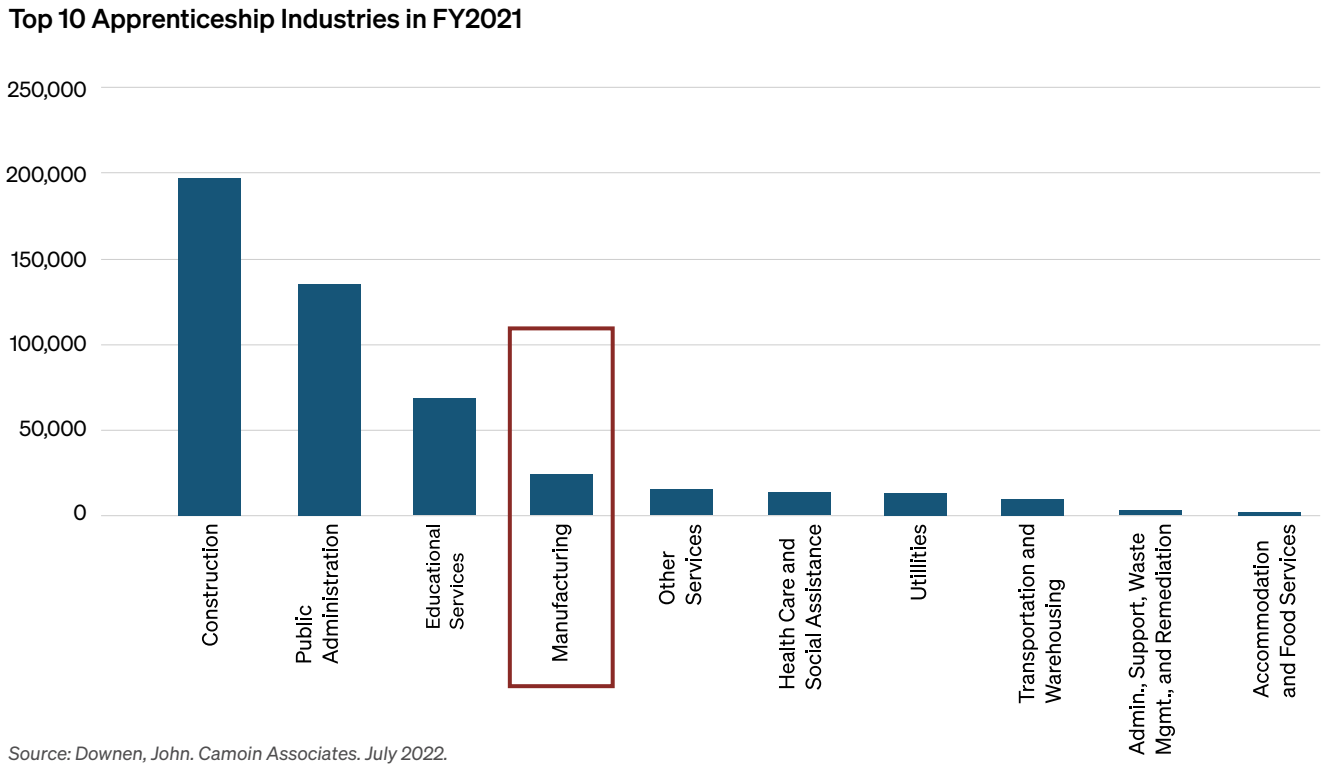
A growing body of research and policy analysis points to the need to treat workforce development as a strategic infrastructure- a long-run investment essential to national security and economic competitiveness.[24] Changes to public policy are central to building the robust talent pipelines needed to power the critical industries that keep America competitive.

Federal Policy Recommendations

To address workforce shortages in critical industries, federal policymakers should focus on advancing policies that:

- ***Strengthen and scale apprenticeships:*** Apprenticeships provide on-the-job training with formal classroom or online instruction to help workers master knowledge, skills, and competencies needed for career success.[25] Apprenticeships are frequent pathways into skilled trades and, increasingly, to careers in technology and other industries.[26] To incentivize employer participation in Registered Apprenticeship programs- approved and validated by the U.S. Department of Labor or a State Apprenticeship Agency- the registration process for employers can be simplified and streamlined to address administrative barriers, such as having to re-register programs in multiple states. Also, standards for programs can be modernized without sacrificing quality to recognize different industry approaches to skilling.

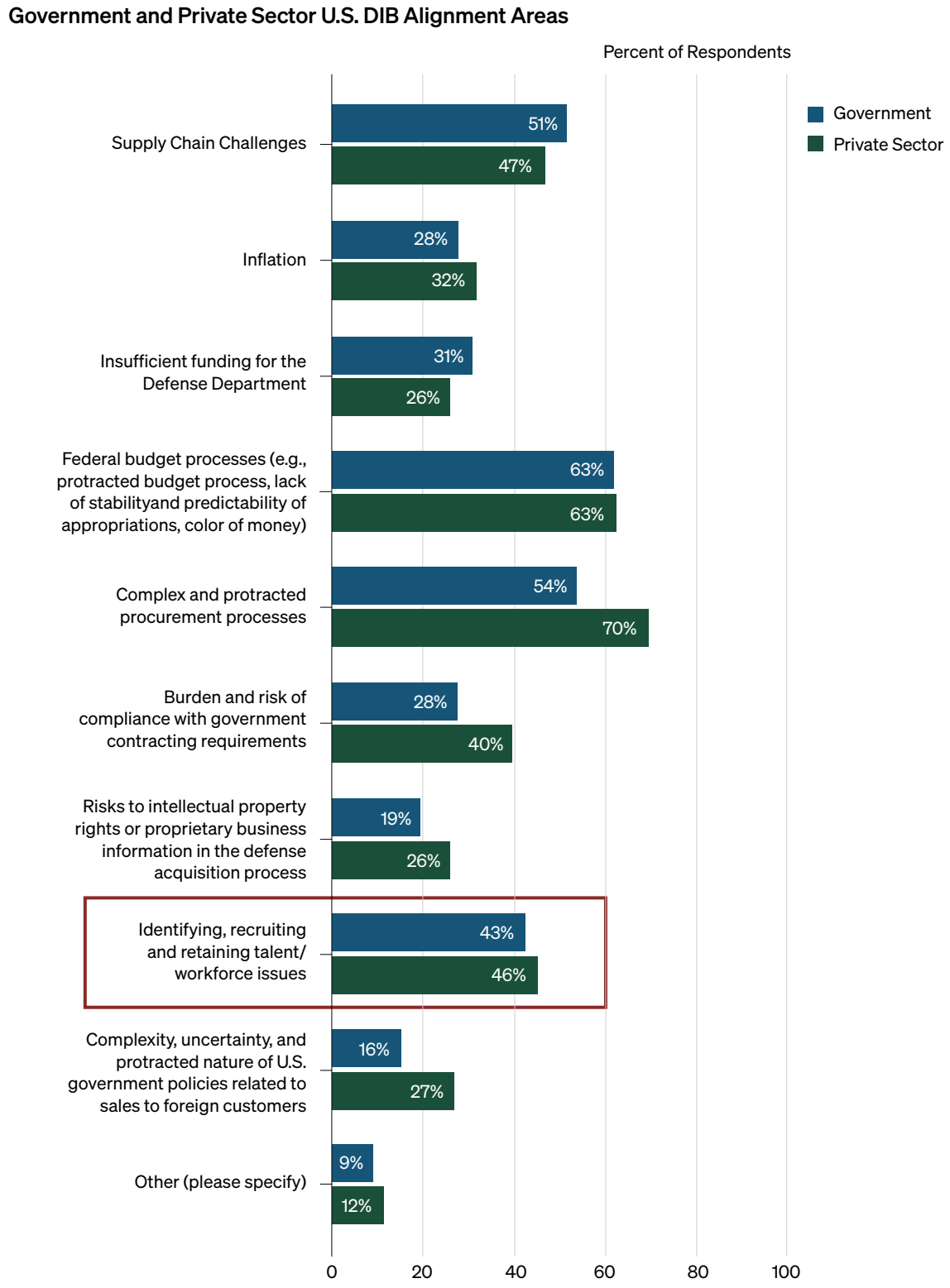
Figure 2: **The vast majority of U.S. apprenticeships are in construction; critical manufacturing—including defense industrial base, pharmaceuticals, and other national security-adjacent industries lack sufficient apprenticeship pipelines.**



Source: Downen, John. Camoin Associates. July 2022.

- ***Support employer-based training programs:*** Employer-based training programs, such as apprenticeships and incumbent worker training programs, allow workers to upskill and reskill to meet the evolving needs of critical industries. To scale such programs, policymakers can reauthorize the Workforce Innovation and Opportunity Act (WIOA), which focuses on strengthening the nation's public workforce system, to increase the percentage of WIOA Adult and Dislocated Worker funds that may be used for incumbent worker training and on-the-job training.
- ***Advance industry/sector partnerships:*** Industry/sector partnerships can help address the skills mismatch by convening multiple employers in an industry with education, training, labor, and community-based organizations to develop strategies to respond to an industry's workforce needs.[27,28] Policymakers can provide support for industry/sector partnerships and include performance measures to ensure high-quality industry partnerships are developed that meet industry needs.[29]
- ***Support public-private partnerships:*** Public-private partnerships help ensure that educational programs available to students and workers are aligned with in-demand industries. Policymakers can incentivize higher education institutions to partner with industry to develop programs that simultaneously allow students and workers to gain college credits and training aligned with in-demand jobs.
- ***Address the digital skills divide:*** Ninety-two percent of jobs- including those in industries critical to security and resiliency- require digital skills,[30] yet one-third of manufacturing workers and half of all construction, transportation, and storage workers lack digital skills.[31,32] Policymakers can promote American leadership in emerging industries by amending WIOA to expand the definition of basic skills deficiency to include digital literacy and incentivize states and local workforce boards to expand the availability of digital literacy programs.[33,34]

Figure 3: **46% of U.S. defense industrial base leaders surveyed cited an inability to recruit, train, and retain skilled manufacturing workers as a major issue facing the U.S. defense industrial base.**



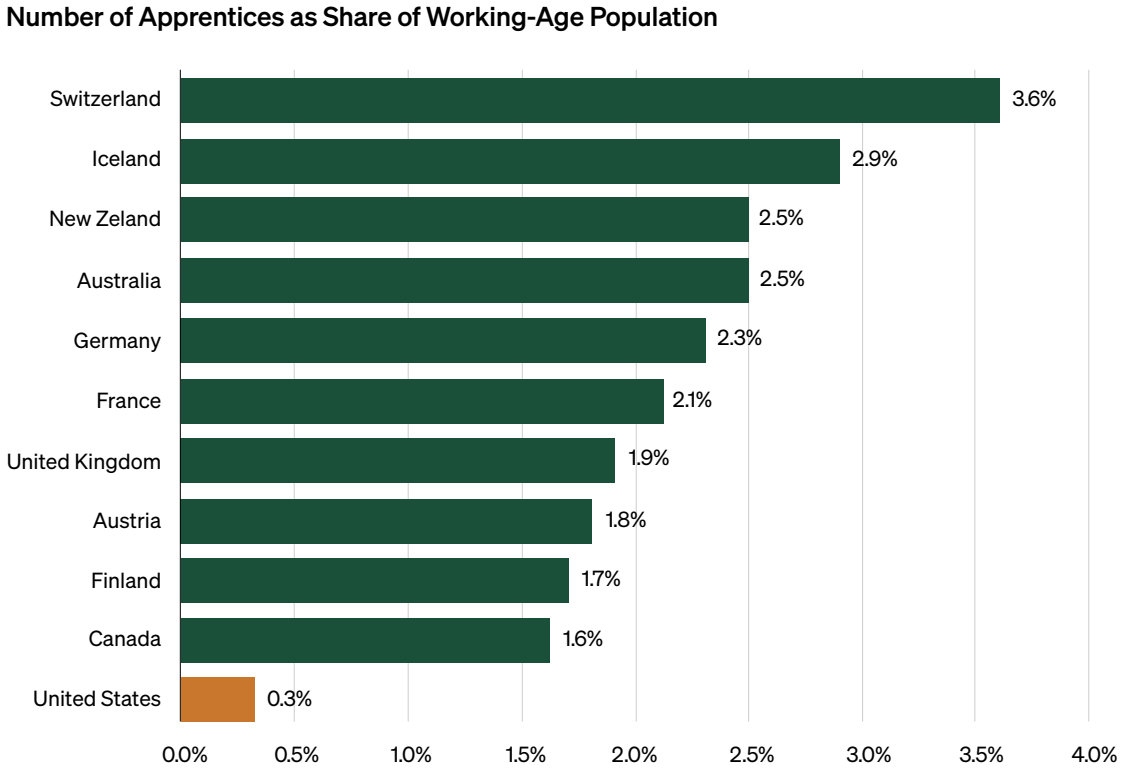
Source: National Training and Simulation Association and NDIA. April 2024

State Policy Recommendations

State policymakers can strengthen career pathways aligned to industries critical to U.S. security and resilience by advancing policies that:

- ***Expand access to work-based learning opportunities:*** In addition to setting standards for high-quality work-based learning, such as apprenticeships and internships, states can expand access to work-based learning opportunities by establishing and supporting intermediaries at the state, regional or local level to coordinate between employers and educators and broker opportunities for learners.

Figure 4: **In the U.S., apprentices make up 0.3 percent of the working-age population, lagging other countries.**



Source: Author's calculations based on the share of apprentices divided by the working age (15 to 64) population of OECD countries where data is available. Apprentice numbers are sourced either directly from a country's government website or "How Many Apprentices Are There in the EU." CEDEFOP, Office of the European Union, 2021, https://www.cedefop.europa.eu/files/4196_en.pdf. Accessed 8 Feb. 2024. Working age populations are sourced from Federal Reserve Economic Data, FRED, Federal Reserve Bank of St. Louis, 2024, https://fred.stlouisfed.org/. Accessed 8 Feb. 2024.

Third Way, February 2024

- ***Leverage employer partnerships:*** States can encourage the participation of employers in the design and implementation of training programs, as well as the establishment of credential standards to ensure workers are developing the skills and obtaining credentials aligned to in-demand industries.
- ***Advance data-driven-decision-making:*** States can align and enhance state and local data systems to connect career pathways to in-demand careers, measure student and worker outcomes, and align resources to the most effective programs.

State Policy Efforts to Strengthen Career Pathways Aligned to In-demand Industries

Iowa, Washington, and Texas advanced promising workforce policies that may help to strengthen the talent pipeline for critical industries.

Expand access to work-based learning opportunities	**Iowa** established the Work-based Learning Intermediary Network, which is run by Iowa Workforce Development and consists of regional intermediaries tasked with connecting students to work-based learning experiences. In fiscal year 2022, over 3,000 industry partners collaborated with the intermediaries to provide more than 92,000 students work-based learning experiences in industry clusters such as transportation, distribution, and logistics; information technology; manufacturing; and agriculture, food, and natural resources to meet regional workforce needs.[35]
Leverage employer partnerships	The **Washington** Office of Superintendent of Public Instruction (OSPI) and the Manufacturing Industrial Council partnered with the private sector to develop Core Plus, a program that provides students with hands-on learning and transferable skills that align to career pathways in aerospace, construction, and maritime.[36,37] Core Plus is now taught in more than 10 skill centers and 25 comprehensive high schools in Washington state. Local employers have directly recruited students from participating high schools, demonstrating that the curriculum can prepare students for entry-level employment in the manufacturing field.[38]
Advance data-driven decision-making	**Texas** altered its community college funding formula to reward community colleges based on their ability to achieve positive student outcomes, such as credential of value attainment.[39] Texas was able to advance this policy in part because of its strategic investment in data systems that span education and workforce development systems. While still in its early stages of implementation, Texas' outcomes-based funding formula for community colleges has led to the development of and additional investments in programs aligned to local, in-demand industries, such as programs to train semiconductor technicians and programs in data analytics and technology.[40,41]

Workforce Pell Grants—A Potential Game Changer

The expansion of federal Pell Grants, which provide need-based grants to low-income students, to include high-quality, short-term training programs marks a significant step toward making career-focused education more accessible and responsive to workforce needs. Under this expansion—referred to as Workforce Pell Grants—the federal government will establish regulations to support implementation, and states will play a critical role in assessing program eligibility using the metrics outlined in the law.[42] Policymakers should consider whether funds can be used to support the related classroom instruction requirement for apprenticeships.[43]

The federal government can align Workforce Pell Grants with the workforce system by establishing regulations that incentivize and promote coordination among governors on policies, funding, approval processes, data collection and participant information across WIOA and Workforce Pell Grants programs to avoid duplication and siloed systems.[44]

State policymakers can look at promising practices states have previously leveraged to ensure quality implementation of state financial aid for short-term training programs to inform their approach to federal Workforce Pell Grants implementation. For example, Virginia implemented state financial aid data collection and disaggregation that includes non-degree credentials. The state leverages that data to inform decision making on whether non-degree credentials are producing outcomes that meet state priorities and help workers meet their education and career goals.[45]

Done well, Workforce Pell has the potential to rapidly scale high-quality training in AI, cybersecurity, semiconductors, logistics, and other critical fields.

America cannot win the long-game of geopolitical competition—or build a resilient economy—without a workforce system scaled to the task. This requires a national mindset shift:

- from isolated pilot programs to **industrial-scale training ecosystems**
- from slow credentialing to **rapid, high-quality, modular training**
- from fragmented local efforts to **integrated regional strategies**
- from philanthropy to **sustained public-private investment**
- from workforce programs to **workforce as a strategic capability**

In order for the United States to be more intentional about reshoring its supply chains, rearming its defenses, maintaining technological leadership, strengthening the power grid, and ensuring inclusive prosperity—**then workforce development must be elevated as a top tier national security priority.**

JPMorganChase is working with policymakers, industry leaders, educators, and communities to support these efforts. The stakes are high, the timeline is compressed, and the need is urgent. But with coordinated action, America can build the talent base that its national security—and its future—requires.

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