November 2021

Staying Ahead

Strengthening Tomorrow's U.S. AI and AI-Enabled Workforce

CSET Research Agenda

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Executive Summary

The acceleration of artificial intelligence adoption has profoundly changed how businesses, individuals, and governments conduct their daily lives. As this trend continues, having a globally competitive AI and AI-ready workforce is essential to future U.S. national security and economic competitiveness. This includes both adequately training America's workforce for AI jobs and preparing youth and adults for the changing nature of jobs resulting from AI and other emerging technologies.

This research agenda provides a roadmap for the next phase of CSET's line of research on the U.S. AI workforce. Our goal is to help policymakers and other stakeholders in the national security community to create policies that will ensure the United States maintains its competitive advantage in AI talent.

Specifically, this next phase of research will:

1. Explore ways the United States can secure, strengthen, and maintain global leadership in AI talent; and

2. Offer a path forward to ensure the prosperity of all U.S. workers in a world where economic growth and security is dependent on leadership in AI and other emerging technologies.

This is a full vision for the research we believe is needed. We hope to address as much of this work as possible over the next two years.

Introduction

Leading in AI is an important national strategic priority. In a time of global geopolitical insecurity, we are rapidly moving toward a world where AI is ubiquitous. That makes it more important than ever to lead the world in AI talent, secure the strength and prosperity of our nation's workforce, and ensure the responsible and safe deployment of AI across the economy. As AI-enabled tools, systems, and devices increasingly become part of daily life, the future of this discussion must not only include the AI workforce, but the entire U.S. workforce.

However, having the world's leading AI and AI-ready workforce is not assured. What was once the exclusive domain of domestic policy, education and workforce development policy, is now a national security priority with global importance. We must think bigger and more proactively in addressing the challenges posed by our existing policies, while leveraging the opportunities inherent in our educational infrastructure. We must also think ahead and put the right policies in place now to secure the future. The stakes of not achieving these goals are high, and have long-lasting implications.

This second phase of research will target the need for policies that ensure U.S. leadership in AI talent and workforce competitiveness. CSET's initial research on the U.S. AI workforce set the foundation, covering the following topics:

- Defining the U.S. AI workforce (14 million workers, or 9% of total U.S. employed);[1]
- Describing and characterizing the supply of AI talent;[2]
- Understanding AI workforce labor market dynamics;[3]
- Comparing and assessing AI education in China and the United States;[4]
- Examining the hype of AI and AI-related certifications as a pathway into AI jobs;[5]
- Better leveraging AI talent in the U.S. Department of Defense;[6] and
- Proposing U.S. AI workforce policy recommendations.[7]

Research Agenda

Three research questions will guide our effort to help the national security community and other policy stakeholders create and maintain a globally competitive AI and AI-ready workforce:

1. How can we secure a globally competitive U.S. workforce that is on the leading edge of AI design, development, and deployment?

2. How can the United States leverage its competitive advantage of having a highly diverse U.S. and foreign-born workforce by ensuring equity in access and opportunity to AI careers?

3. How can we effectively train and equip the U.S. workforce to operate responsible and safe AI, and to succeed in an economy characterized by widespread AI adoption?

Our work will advance the policy discussion in several ways:

- Forward-looking strategic thinking: addressing what education, training, and workforce policy over the next decade must accomplish, and what policies will help achieve those goals.

- Assessing global talent competition: understanding AI education, training and workforce outcomes in peer and adversary nations, especially China.

- Leveraging existing institutional infrastructure: shining light on components of the education system typically not considered in such policy discussions.

- Emphasizing our competitive strengths: promoting and encouraging workforce diversity at all levels by creating new opportunities for pathways into AI jobs.

We will approach this new phase of AI workforce research in three parts as outlined in the questions above. We consider each in turn.

Securing a Globally Competitive U.S. AI Workforce

Securing world-class AI talent is critical for ensuring our national security, but it requires forward-looking policies. It also requires research that accounts for rising global competition in AI workforce training and recruitment, rather than myopically looking at U.S. education and workforce policy as a domestic challenge.

This line of effort will explore what is needed to grow and cultivate a globally competitive domestic AI workforce, and what policies will facilitate this outcome. It will consider different dimensions currently understudied but extremely important if we are to effectively address the challenges we face while leveraging existing opportunities.

For example, to stay out ahead, our education and workforce policies should consider how U.S. AI workforce preparedness and competitiveness compares to other countries actively training and recruiting AI talent. Our work will include a specific focus on China, building off our previous work comparing AI education in China to the United States. The next phase will explore demand for AI talent in China, the ecosystem of companies and regions associated with hiring AI talent, employment patterns of recent PhD graduates with an AI-related concentration, and key developments in training AI and AI-adjacent talent at all educational levels. In collaboration with a leading AI/ML company, AMPLYFI, we have collected data on almost seven million unique Chinese job postings, and trained a model to classify these postings into AI and AI-related occupations. We will also do a deep dive into the newly established AI institutes at postsecondary institutions, and their role in advancing China's standing in cultivating and recruiting AI talent.

This work will also examine under-discussed components of our nation's education ecosystem, with the goal of better leveraging the system to educate and train AI talent. While most education and training research focuses on the K-12 and postsecondary systems, little focuses on the integration with DOD's education system, or on non-profit organizations and private sector corporations as shadow educators. For example, while DOD's need for AI talent is often discussed, far less is known about the AI-

related education and training available for uniformed service members and civilians.[i] Moreover, far too little attention is given to the latent potential for our community and technical colleges to train underrepresented youth and adults in technical and non-technical AI careers. Our work will examine the potential role of these components, interconnections with the rest of the education system, and how we may better leverage the entire educational infrastructure.

Another dimension critical to national security, but less firmly understood, is the national security community's access to AI and AI-adjacent talent. This work will build on previous CSET research on DOD's AI workforce by looking at broader geographic and industry migration trends of AI talent. Using longitudinal data on individuals defined to be in the AI workforce, we will examine their career trajectories for evidence of cross-pollination between the defense industrial base and private industry. This will inform the degree to which the national security community can access AI talent through the defense industrial base, the degree to which it needs to engage directly with the private technology sector, and the degree to which it can continue to rely on its own cadre of civilian talent.

Similarly, since it is also critical for all of government to have access to the necessary AI talent, we will assess the state of the federal civilian AI workforce. This will include a characterization of current civilian AI personnel along with recommendations for how to better identify this talent given the challenges with existing occupation taxonomies. It will also landscape the current maze of federal AI and AI-related talent recruitment, fellowship, internship, and scholarship programs, to help policymakers better understand what is already offered, which programs have demonstrated

[i] This includes the military education and training system, third party online education agreements, and partnerships with non-defense universities and private industry.

promising results, and how these programs might be better leveraged and coordinated.

We note this research is distinct from other research on AI talent in that it recognizes that a globally competitive AI workforce includes policies that target technical and non-technical AI talent. Our research shows that safe, responsible, and effective AI design, development, and deployment is a team sport. Many roles and responsibilities are included in this process, and all of these roles will be a critical part of growing and cultivating tomorrow's U.S. AI workforce. Our research will continue to advance the discussion on education and workforce policy that considers the full range of technical and non-technical AI occupations.

Leveraging U.S. Diversity as a Competitive Advantage

The United States has one of the most diverse workforces in the world. Not only is our population's diversity a competitive strength, but the United States remains a beacon internationally for top-tier AI talent. This is a fundamental U.S. advantage, as research shows the tremendous importance of foreign-born talent to creating innovation ecosystems.

Continued dominance in AI will require not only leveraging the diversity inherent in our population, but also attracting the best and brightest AI researchers from around the world. However, today's policies are not sufficient to address current challenges. Domestically, disparities in educational access in our current system pose a major risk in lost opportunity for many under-represented groups. Internationally, uncertainty around U.S. immigration reform and policies and visa restrictions, and the threat of rising domestic societal intolerance all pose serious challenges for recruiting top-tier foreign born talent.

This line of effort will also advance the conversations surrounding domestic workforce diversity across the AI workforce. It will study educational disparities in AI education, particularly in low-income and rural communities, and how to address these inequities by leveraging all parts of the educational ecosystem.

This work will also build on previous CSET work looking at international AI talent flows and high stay-rates of foreign-born AI doctorates. For example, to maintain our standing as a beacon for international talent, we will shed light on key talent educational exchange programs with allied nations. These programs emphasize the importance of attracting not only international AI talent at the graduate level, but also undergraduate level. We are especially interested in exploring agreements with southeast Asian countries related to programs that lead to a non-degree award, certification, or two-year college degree.

Effectively Training All Workers for an AI-Enabled World

Ensuring the entire workforce is equipped to compete and succeed in an operating environment defined by AI-enabled tools, devices, and systems is just as important as securing an AI workforce. Every industry will ultimately be impacted by AI. That means U.S. economic security will depend on all citizens being adequately prepared. Our research will consider both AI education and workforce development.

For AI education, this phase of work will explore "AI literacy," or "AI acumen," as a national strategic priority. We see a future where everyone must be AI-literate, just as they must have basic literacy and digital literacy. AI education will need to be part of core course curricula at all levels. Without action we risk falling into the same trap as computer science education, which has been implemented piecemeal across states with inconsistent curriculum. We will build off of our findings about the state of AI education across America—including our catalog of AI education programs—to characterize what AI education is and how we can best integrate it into the U.S. school system.[8] It aligns with the work noted above, emphasizing equity in educational access and leveraging all parts of the education ecosystem.

For workforce development, we will approach the question of preparedness from a national security perspective. Instead of asking which jobs will be created and destroyed more generally, we will explore the national security implications of a changing labor market characterized by widespread AI adoption. We will

also assess what that means for domestic education and workforce policies, where global economic competitiveness and national security are both factors of consideration. Possible topics covered will include:

- Emerging technical and non-technical skills across occupations;
- Alternative designs to educational and workforce pathways with many entry and exit points;
- The scale and scope of future federally-funded employment and training programs to promote lifelong learning; and
- Economic policies to stabilize or leverage labor market disruptions, effects on productivity and wages, and changing employer-employee social contracts (e.g., topics such as gig work, universal basic income, and labor unions).

Importantly, we note this work is related to, but distinct from, current discussions about the "Future of Work." In the current discussions, economists, sociologists, technologists, and other scholars seek to predict tomorrow's jobs. That is, which jobs will persist, what types of jobs will be created, and which jobs will permanently disappear. To date, this work has been characterized by understanding the tasks (e.g., routine, non-routine, cognitive, non-cognitive) and occupations (e.g., high-skill, low-skill; technical, non-technical) most vulnerable to being replaced by machines or automated processes. It also explores the question of whether the rate of "creative destruction"—where outdated jobs are replaced by newer, higher-skill jobs created by technological progress—is, and will be, sufficient when it comes to AI and automation. However, even with the uncertainties inherent in this line of inquiry (e.g., the rate of technological diffusion; changes to industrial organization, stickiness in institutions and regulations, exogenous shocks or disruptions (such as the COVID-19 pandemic), or people's willingness and ability to retrain), it is already a very active and highly examined topic. Our research will instead assume a future defined by widespread AI adoption and focus on the associated implications.

Moving Forward

This research agenda provides an outline for the next phase of CSET research on the U.S. AI workforce and U.S. AI education. We believe setting the right education and workforce policies in place now is critical to lead globally in AI, but that more research is needed to understand the questions identified above.

While this agenda outlines our current research priorities in this area, we acknowledge there are still other areas that would benefit from further exploration. We are eager to collaborate with researchers and policymakers on this and related topics. We welcome comments, feedback and input on this vision for our research agenda. We invite policymakers in the national security, education, labor and workforce, and other interested policy communities to help us shape and participate in our agenda. We hope scholars in these domains will help us sharpen our analytic views and review this work.

We look forward to tackling these issues and engaging with interested stakeholders along this journey.

Author

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Acknowledgments

For feedback and assistance, the author would like to thank Igor Mikolic-Torreira, Luke Koslosky, Dahlia Peterson, Kayla Goode, Helen Toner, Margarita Konaev, and Dewey Murdick. For editorial assistance and support, the author thanks Melissa Deng and Danny Hague.

Document Identifier: doi: 10.51593/20210075

Endnotes

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