



National Commission on Innovation & Competitiveness Frontiers

Key Takeaways from Fall 2023 Working Groups



Working Group 2

The Future of Technology: Developing and Deploying Disruptive Technologies at Scale

Session 2: October 16th, 2023

Discussion during this session focused on enhancing the national innovation workforce in critical industries.

I. KEY THEMES

Working Group discussion identified several key themes during the first session:

- 1) **Providing social supports and easing workforce barriers** to broaden participation in the innovation economy.
- 2) **Utilizing partnerships to fill critical workforce gaps** and improve skill-matching between industry needs and workforce development efforts.
- 3) **Prioritizing workforce development in key areas** to quickly fill important gaps and take advantage of opportunities.
- 4) **Investing in automation and robotics** to fill workforce gaps in sectors with existing or future acute shortages.
- 5) **Transforming the educational model** to support multi-disciplinary approaches, re-engage technical schools and community colleges, and support lifelong learning.

II. PRELIMINARY IDEAS & POTENTIAL RECOMMENDATIONS

Providing social supports and easing workforce barriers

- Recognize and address barriers specific to certain segments of the workforce. For example, elderly people have few assets to finance their lives, which deprioritizes skill-

building for this population in favor of immediate income; meanwhile, many young people are struggling with malnutrition, limiting their ability to concentrate on academics.

- Create mechanisms to reduce the burden of educational costs. As costs skyrocket and the wage premium for STEM workers falls, overall college attendance has fallen, and a decreasing number of people are obtaining STEM graduate degrees. Lowering educational costs will make entering the innovation workforce more accessible and attractive.
- Consider the impacts of lingering COVID effects and other social equity issues on workforce development. Better addressing these issues could be an efficacious avenue to broadening workforce participation.
- Increase targeted programs at vulnerable people to re-engage them in the workforce. For example, single mothers with older children could enter the innovation workforce, but often lack the funds for education and training; people coming out of prison face similar resource constraints but could be valuable workforce additions if re-engaged.
- Ease immigration barriers for high-skilled workers to enter the country. Foreign workers can be extremely valuable in filling high-skill workforce gaps, but face onerous immigration processes and unreasonable timelines.

Utilizing partnerships to fill critical workforce gaps

- Increase collaboration and coordination between economic development authorities and workforce development boards. Currently, these actors are often disconnected, leading to poor planning and gaps between industry needs and workforce realities. Better connecting these players, and deeply engaging with industry representatives, will improve skill-matching and encourage innovation-focused planning.
- Engage in partnerships that connect civilian communities to the national security apparatus. The military has the resources, facilities, and personnel to provide training in areas of national security and technology, and should be leveraged to strengthen the workforce in critical areas and national security contexts. This national security angle also holds significant bipartisan support, making new investments and programs possible.
- Partner with labor unions in workforce development efforts to better understand workforce needs and engage underutilized workers. As a trusted partner for workers across many sectors, labor unions can play an important role in providing the people and facilities for workforce development efforts.
- Support technology de-risking activities, such as piloting and demonstration, through increased partnerships. Facility and resource sharing between industry, academia, and

government institutions can multiply capacity, fill skills gaps, and ultimately accelerate de-risking and eventual technology deployment.

Prioritizing workforce development in key areas

- Repackage innovation and workforce issues as a national competitiveness imperative. Moving quickly to develop workforces across critical areas requires a compelling national narrative, and we must stress the importance of a robust innovation workforce to competing in the global economy.
- Target certain sectors, especially those with acute gaps and significant implications, for additional workforce development efforts. For example, advanced manufacturing, digital security and verification, photonics, aerospace, and semiconductors are all facing severe workforce shortages but remain critically important to innovation leadership. Focusing workforce efforts on these areas will maximize impact on global competitiveness.
- Boost workforce development efforts for roles that require citizenship and security clearances. These roles are currently facing extreme shortages, and employers have few options to fill positions with these requirements. Domestic workforce development is necessary for filling gaps in sensitive areas and national security contexts.
- Avoid limiting workforce development efforts to roles that require a high level of education. In fact, more openings exist at the associate level and below than at the baccalaureate level and above. Addressing shortages in roles like assembly workers will be a large part of workforce development for innovation ecosystems.

Investing in automation and robotics

- Strategically deploy automation in industries with existing or expected workforce gaps; for example, in batteries, an estimated 100k workers are needed by 2030 – a moonshot goal that workforce development will likely not fill. Automation can play a crucial role in filling shortages across technical and knowledge positions.
- Consider future capabilities when planning deployment of automation. Technology is advancing such that robotics and automation capabilities will be significantly improved in the coming years; planning efforts should take into account these expected capabilities.
- Develop compelling public narratives around the benefits of automation, including the role of automation in global competitiveness. As displayed by the Tesla super-factory in Austin, Texas, automation can actually create more jobs than it displaces. However, reskilling and upskilling are necessary if these job gains are to be realized; robust workforce development requires better public knowledge around the shift to automation.

- Proactively prepare for job displacement and immediate disruptions in the labor market; for example, truck driving is one of the most common occupations, but could be displaced by autonomous trucking. Sectors prone to displacement require special attention and investments; engaging labor unions in these efforts will be important.

Transforming the educational model

- Invest in polytechnic institutions to bolster workforces in skilled professional trades. There are not enough polytechnics, and almost no well-funded ones. They need better mechanisms for gaining grant funding for hiring faculty and building and improving facilities. Community colleges are similarly adept at quickly providing deeply skilled training; better engaging community colleges is absolutely essential.
- Reorganize university systems to emphasize multi-disciplinary approaches. While deeply educating in single disciplines is still critical for leadership in cutting-edge research, innovation requires a multi-disciplinary approach that most universities lack. Increasing opportunities for cross-discipline collaboration and incentivizing these educational approaches will be important for long-term competitiveness.
- Commit to lifelong learning approaches to encourage skill-building and education for workers of all ages. Older workers often have the motivation to upskill, but lack the resources or opportunities to do so. Keeping these older workers engaged in the workforce will be pivotal for passing on historical experience and institutional knowledge.
- Consider the role of the National Science Foundation (NSF) and other federal funders in changing university approaches and filling workforce gaps. Through grant programs, these actors can incentivize transformational shifts towards multi-disciplinary education and support skilled professional trades. Additionally, NSF and federal funders need to create mechanisms to magnify influence at the K-12 level.
- Establish a national university on competitiveness where people can quickly gain needed innovation skills, without necessarily having to gain a bachelor's degree or certificate; provide educational opportunities that are on-demand and bi-directional.