Creating an Advanced Research Projects Agency (ARPA-L) for the Department of Labor

Joshua Schoop
Arati Prabhakar
Jeff Kaplan
Andrew Sosanya

March 2021

Summary

To create fresh and powerful new approaches to the complex challenges that America's workers face, Congress and the Biden-Harris Administration should invest $100 million per year for 5 years to launch an Advanced Research Projects Agency for Labor (ARPA-L). ARPA-L's mission will be to conduct high-impact R&D programs that create breakthroughs to meet America's workforce challenges.

The COVID-19 pandemic has deeply exacerbated longstanding problems for America's workers. Mismatches between workers' skills and employers' needs alongside persistent racial and gender inequities have long undercut opportunity. Moreover, work has continued to change due to technology and automation, globalization, and shifting relationships between workers and employers. Even before the COVID-19 crisis, many millions of Americans were not earning enough to support themselves and their families. These Americans are missing out on gainful work, while our economy and our society are missing out on their full contribution.

With current advances in information technology, data science, applied social sciences, and learning science, this moment calls for an ambitious initiative to tackle the longstanding challenges for America's workers. The Federal Government should launch an ARPA-L to research, develop, and test breakthrough approaches that boost workers' skills and harness data to open new opportunities. By drawing from the operating model of prior ARPA organizations and adapting it to these challenges, ARPA-L's programs can make it possible to ameliorate underemployment and unemployment and transform the future of work.

To initiate ARPA-L, Congress should provide a budget of $100 million per year over a five-year period. The Biden-Harris Administration and the Secretary of Labor should appoint a highly qualified director and provide that individual with the support needed to succeed. By creating this independent agency at the Department of Labor (DOL), Congress, the White House, and DOL can create opportunity for the U.S. workforce for decades to come.

The Challenge

The COVID-19 pandemic has exposed and deepened labor market problems that had already been compounding over decades.

A *mismatch* between workers' education, skills, and training and the shifting needs of employers has led to shortages in high-demand occupations. The demand for digital skills has increased. In addition, local and regional economies across the country are experiencing shortages of workers in emerging and evolving trades vital to economic activity -- such as clean energy and manufacturing -- that increasingly require new technical capacities. And in some cases, a worker has the skill to succeed in a job but doesn't have the credentials that the company has tied to

that position. Without intervention, the skills gap will continue to grow larger within the labor market. For millions of Americans displaced from traditionally high-employment sectors such as light manufacturing and data processing, the need for reskilling and relocation to emerging sectors requires rethinking traditional models and experimenting with new approaches. To break the cycle of long-term unemployment and underemployment, new approaches to skills training, education, and credentialing are needed.

Although existing policies and practices have made progress in addressing *inequity*, these problems continue to plague the U.S. workforce, precluding many from gainful, meaningful employment. Today, women still earn less than men on average, while Black and Latina women experience even greater disparities. Men without college degrees, and especially men of color, have been disproportionately impacted by decades of shifts in the labor market compared to men with college degrees. Challenges in traditional education reinforce barriers to obtaining well-paying jobs with upward mobility for young people of color and those from low-income backgrounds. Inequities only persist as workers age, adding pressure when rapid upskilling and retraining is needed and leaving displaced workers even further behind. These communities of workers cannot continue to be left behind.

The term *"future of work"* encapsulates the anticipated disruption to jobs and the workforce from emerging technologies, global economic change, and the changing relationship between employer and worker. In reality, this disruption is already occurring, and U.S. workers in every sector of economy are feeling its effects. To save on labor costs, employers continue to outsource jobs to overseas workers and automate any task that a machine can handle. As computing technology and artificial intelligence proliferate and mature, this disruption will spread to more and more different types of jobs. Non-traditional workers, such as rideshare and delivery drivers, now form a significant percentage of the workforce, but antiquated labor practices and policies do not address the uncertainty of their work lives. As more and more Americans participate in the gig economy, we must change our approach to solving workforce issues and diversify how we craft solutions to solve them.

The COVID-19 pandemic has both illuminated and exacerbated these challenges. Service sector industries such as retail, tourism, restaurants, and hotels have been decimated by the pandemic, and many of these jobs will be slow to return. Other jobs can be done remotely, but many workers lack the digital skills to thrive while working from home. Furthermore, barriers to the digital economy stand tall: across America, too many workers lack reliable broadband or even a personal computer. Already at a disadvantage, underserved communities are falling further behind in their education and career development, undermining their opportunities in the years to come.

So where has all this left us? A failure to address long-standing labor problems has led to job instability and prolonged underemployment and unemployment that can be seen in the labor market today. Efforts to improve worker outcomes have met with only limited success. To

address today's pressing labor issues, the Federal Government must invest in the capacity to create powerful new solutions that can scale to reach the broad population of workers.

The Opportunity

Today, advances in information technology, data science, and the behavioral and social sciences provide new hope for these kinds of hard problems. Further, numerous regional and pilot projects are showing results from new approaches to training, certification, and matching workers to jobs. These are promising signs, but we are not turning the tide of national-scale labor problems. The purpose of an Advanced Research Projects Agency for Labor (ARPA-L) is to weave research advances together with lessons from the real world to create fresh, potent, broadly scalable new approaches for our workers' challenges.

ARPA-L would be fully responsible for identifying promising opportunities and then designing and executing its programs. These are some examples of the types of high-impact programs it could undertake.

Next-generation Skills Assessment and Training. An ARPA-L would take a creative, experimental approach to closing the skills gaps. For example, ARPA-L programs could:

- Develop and validate diagnostic systems to improve skills assessment and enable workers to better understand how their skillset matches with the needs of employers.
- Demonstrate accelerated skill development that uses information about an individual—e.g., age, initial skill level, and prior experience—to devise an optimized training regimen that best fits them.
- Explore and evaluate new ways to personalize and accelerate the training process by building on advances in learning science and neuroscience.
- Advance and test the effectiveness of emerging innovations like human-computer interaction and mixed reality for training for complex tasks.
- Experiment with and assess alternative certifications and micro-credentialing programs to train and upskill youth and displaced adult workers around the country and connect participants directly to employers.

Such advancements would not only improve the effectiveness of training and skills assessment. They can also dramatically reduce the time and cost for workers to gain new skills and connect to good jobs, directly addressing major barriers to scale.

Information to Illuminate Better Decision Making. Today, all kinds of data about workers and jobs is everywhere: rigorously collected labor statistics, employee ratings of employers on crowd-sourced websites, internal company data about employment, the records of community colleges and other service providers, and administrative data such as tax and census records. We have barely begun to use this data tsunami to address workforce challenges. ARPA-L could transform

data into clear information that allows workers, employers, training providers, and policymakers to find new pathways and make better decisions. For example, ARPA-L programs could:

- Experiment with and test data tools personalized for each worker, combining information on local job postings, wages, and training requirements with information about available credentialing and training services—giving workers the most meaningful and actionable information for their career goals in real time.
- Assemble data from public and private sources on regional labor trends and test its effectiveness in enabling employers to make more impactful, targeted, and timely investments in workforce development opportunities in their area.
- Collect and analyze diverse datasets to identify targeted, effective leverage points for innovative labor policy interventions.
- Develop and validate data analysis tools for policymakers to directly assess the progress of pilot workforce policy initiatives, tailor them to different regional and demographic needs, and then scale the initiatives to meet the needs of workers across the country.

Armed with a data-driven and experimental mindset, an ARPA-L would develop prototypes, conduct demonstrations, and rigorously evaluate their effectiveness, resulting in breakthrough methods targeted at solving workforce problems. The agency will perform this work by contracting with companies, universities, nonprofits, and other government organizations to harness and integrate their different capabilities. ARPA-L will also engage with a broad community of actors so that these solutions are ultimately implemented and scaled by a combination of commercialization by the private sector, policies created by federal state and local actors, and new practices adopted by other stakeholders such as employers and community colleges.

Plan of Action

The Biden-Harris Administration should work with Congress to establish ARPA-L as an independent agency in the Department of Labor. To institute ARPA-L, Congress should appropriate an initial investment of $100M per year for the first five fiscal years. ARPA-L's mission will be to conduct high-impact R&D programs that create breakthroughs to meet America's workforce challenges. To this end, ARPA-L will adopt and adapt the core elements of the ARPA model (see Frequently Asked Questions for more details).

To succeed in its unique mission, ARPA-L should be led by a Senate-confirmed Director who reports to the Secretary of Labor as well as a career civil servant Deputy Director. Within DOL, ARPA-L would need to be an independent organization. ARPA-L would collaborate with other parts of DOL, as well as federal, state, and local agencies. ARPA-L would draw on their expertise and that of other labor market ecosystem actors to understand workforce issues and current practices. These organizations will often be ideal partners to fully implement and scale successful ARPA-L program results.

Conclusion

An ARPA-L at DOL would conduct solutions-oriented R&D to create fresh, powerful approaches to the pressing workforce problems of today and tomorrow, such as market disruption, unemployment, and worker reskilling/upskilling. With the support of Congress, the White House, and the Department of Labor, this new organization can deliver bold advances that ultimately change what's possible for America's workers.

Frequently Asked Questions

What are Advanced Research Projects Agencies (ARPAs), and how do they function?

ARPAs are known for their success in creating radically better approaches to hard problems by conducting solutions-oriented R&D. DOD's Defense Advanced Research Projects Agency (DARPA), now in its seventh decade, conducted the pivotal R&D for new military capabilities such as stealth and precision strike and, more broadly, for new information technologies from the internet to artificial intelligence. DARPA's track record inspired the establishment of the Department of Energy's ARPA-E and the Office of the Director of National Intelligence's IARPA. Both of these new ARPAs are well underway, with robust portfolios of R&D programs and encouraging results. They demonstrate that it is possible to adapt the DARPA model for different public purposes.

The ARPA model is rooted in the following factors:
- **The objective of an ARPA is to create breakthroughs for the mission of its parent organization.**
- **ARPAs generate major advances through intelligently managed risk-taking.** They conduct solutions-oriented R&D programs that reach for previously unimaginable goals. The programs provide rigorous evidence for whether an innovation works, how it works in certain environments, and how it can be scaled.
- **ARPAs attract extraordinary talent.** Success with the ARPA model hinges on its program managers, who are hired on fixed terms to design, manage, and transition high-impact programs. ARPAs have flexible hiring mechanisms that allow them to attract the rare combination of expertise, vision, and execution required for these positions.
- **An ARPA requires a dedicated budget and autonomous operations.** To develop a portfolio of programs with the potential for high impact, an ARPA requires funding that is sufficient to achieve its programs' objectives, while operating independently. ARPA programs are sized not just to generate a new result but to convincingly demonstrate a new approach, often across a variety of circumstances, in order to prove that the method can succeed and scale. The ARPA organization holds the responsibility for designing, selecting, managing, and transitioning its programs. The agency's chain of command and Congressional authorizers and appropriators provide oversight.
- **ARPAs build partnerships of many sorts.** ARPA program managers execute their programs by contracting with the best talents for the R&D their program needs: universities, companies of various sizes and types, nonprofits, and other government agencies. Over the course of a 3-5-year ARPA program, these participants become a community that not only understands the program vision but can drive it forward to full implementation beyond the program's term. ARPA program managers also build close ties with the decision makers who, if convinced, can allocate resources and establish policies and practices to carry the program's results forward. For example, a hypothetical future ARPA-L program aimed at a new training approach might fund (1) a handful of

university and company teams to advance promising research, (2) a company to develop a prototype that integrates research results into a practical system, and (3) a nonprofit to conduct and evaluate trials with people seeking to upgrade their skills. In parallel, the program manager would engage other agencies at DOL and other levels of government, both to learn from their perspectives and, as the program develops, to show them the progress and possibilities if the program is successful. The program manager might also engage companies and investors that can commercialize tools coming from the program. A fully successful program ends with a convincing demonstration of a new capability; a community that can carry it forward; and decision makers who are ready to support implementation in products, services, policies, and practices.

- **ARPAs actively manage their programs to achieve results.** ARPA program managers set out to show the world that a powerful new approach can work, despite the risk inherent in trying something that is radically different from today's methods. This requires actively managing the multiple efforts within the ARPA program. ARPA program managers accelerate lines of work that are showing great promise, and they redirect or stop work that isn't panning out. They are nimble in reallocating funding to keep wringing out risk and driving to the program's objective.

Why is an ARPA-L needed now?

The United States has not traditionally thought of workforce issues as a subject for innovation. Federal and state R&D budgets in this area are effectively zero.

This has a damaging effect on the job readiness and skills of American workers, business competitiveness, and economic growth – as the disruptions of automation and now COVID make clear. Too many Americans are underemployed or unemployed, and U.S. productivity has weakened. A notable part of this is the shortage of the technical skills that increasingly drive our economy.

We now have new tools from the convergence of information technology and the social sciences to tackle these long-standing issues and harness innovation for workers' issues. This foundation makes it possible to launch a highly effective ARPA-L now.

How much money is needed to get it off the ground?

$100 million per year for the first five fiscal years will establish ARPA-L and show what it can do. A key to ARPA-L's success will be having sufficient startup funding, as well as delineating that money as a separate, appropriated budget line from Congress. If it is dependent on competing for funding with established departments at DOL, it will never secure adequate resources to create major, breakthrough innovations.

Who will lead ARPA-L? Who will appoint that person? Who will this person report to?

ARPA-L will be led by a Director, confirmed by the Senate and reporting directly to the Secretary of Labor. A civil servant will serve as the Deputy Director.

How many staff will it need?

Staying lean will be crucial to ARPA-L's success. Like other ARPAs, it must be a flat organization with limited staff. The heart of its staff will be a small number of program managers – approximately 5-10 for the $100M/year ARPA-L budget. They will manage programs for 3-5-year terms. Beyond that, the Director and Deputy plus a few staff and support personnel will suffice, as in the organizational setups in other ARPA models.

Is DOL the right place for this ARPA?

This ARPA is specifically designed to serve DOL's mission of addressing workforce challenges. It would add solutions-oriented R&D to DOL's important existing capabilities, building on and enabling other parts of DOL to help American workers.

Is it the same as DARPA or ARPA-E?

ARPA-L would serve a distinct, different mission: breakthroughs for the challenges of the U.S. workforce.

What might be some early successes and indicators of progress for ARPA-L?

With a focus on radically improved assessment and training, and better information to improve decision making, some initial milestones for ARPA-L might be:
- A demonstration of highly effective delivery of online training and tutoring that initiates improved curriculums aimed at upskilling displaced workers.
- A new partnership forged between a technology company, a learning science institute, and the Employment and Training Agency at DOL to research and develop new solutions to reskill and train older workers in using digital technology.
- A set of best practices, workforce policies, and portable benefits approaches proven to reduce uncertainty for gig and contract workers.
- Upskilling unemployed and underemployed Americans and connecting them to well-paying jobs to address shortages in emerging industry sectors using new models of skills retraining targeted towards underrepresented minority groups.

About the Authors

Joshua Schoop is the Deputy Director for the Day One Project. Dr. Schoop has worked with various public sector and international organizations developing innovation strategies, conducting mixed methods program and impact evaluations, and researching and developing innovation policy. He holds a M.S. and Ph.D. in International Development from Tulane Law School.

Arati Prabhakar is the founder and CEO of Actuate, a nonprofit organization to research and demonstrate breakthrough solutions for societal challenges. Dr. Prabhakar has been a fellow at the Center for Advanced Study in the Behavioral Sciences at Stanford University, director of the Defense Advanced Research Projects Agency (DARPA), a partner at U.S. Venture Partners, and director of the National Institute of Standards and Technology (NIST). She holds a B.S. in electrical engineering from Texas Tech University and an M.S. in electrical engineering and a Ph.D. in applied physics from the California Institute of Technology. She is a member of the National Academy of Engineering.

Jeff Kaplan an executive at Coursera, a leading online learning platform serving over 77 million learners around the world. As one of its leads on government partnerships, he spearheaded a Workforce Recovery Initiative with labor departments and workforce boards across the U.S. that helped upskill over 1.1 million unemployed and dislocated workers. Previously, Jeff led business and technical teams at two data platform companies, CARTO and Socrata, and was a senior technology advisor at the World Bank guiding governments on open data, skill development, emerging technology policies, and entrepreneurship. For most of 2020 Jeff was a member of candidate Joe Biden's Innovation Policy Committee. He led the Working Group on Skills, Work-Based Learning, and Apprenticeships in its work to generate policies to drive a national skills mobilization, expand equitable access to training and entrepreneurship education, and finance R&D for skill development.

Andrew Sosanya is a Policy Analyst for the Day One Project. He also works as an artificial intelligence researcher. Prior to joining the team, he conducted astrophysics research as a fellow at Caltech. Andrew grew up in Newark, NJ and holds a B.A. in Physics & Government from Dartmouth College.

About the Day One Project

The Day One Project is dedicated to democratizing the policymaking process by working with new and expert voices across the science and technology community, helping to develop actionable policies that can improve the lives of all Americans, and readying them for Day One of the next presidential term. For more about the Day One Project, visit **dayoneproject.org**.