



Policy Prototyping for the Future of Work

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Executive Summary

The future of work will require massive re-skilling of the American workforce for which current policy “toolboxes” for economics, labor, technology, workforce development and education are often siloed and antiquated. To meet the needs of tomorrow’s workers, today’s policy makers must grapple with these interdisciplinary policy issues.

This report describes a novel design-driven approach we developed to create policy “prototype” solutions that are inherently interdisciplinary, human-centered, and inclusive for the future of work. Using our design-driven approach, we collaborated with more than 40 interdisciplinary and cross-sector thinkers and doers to generate 8 distinct policy prototypes to support the future of work.

This approach shows significant potential to refine and test existing policy making processes, stimulate the development of new ideas for further development, build strong coalitions for implementation, and increase the likelihood that solutions are built with the impacted end-users in mind. Thus, we believe that such approaches should be incorporated into policy making processes more broadly.

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1. The Future of Work and the Important Role of Policy Prototyping

Over the next decade, the macro-trends of new technologies, evolving workforce needs, and increasingly flexible workplaces will drive the necessity of massive re-skilling of the American workforce. In addition, secondary macro-trends such as environmental sustainability, urbanization, increasing inequality, political uncertainty, technological change (including automation), globalization and demographic change will further complicate the future of work.³ Simply put, our society—including employees, employers, government, and education and workforce training professionals—is not prepared for this scale of change. Society is also not prepared for the scale of changes that may disproportionately affect low-wage groups, that historically are in a more precarious position with benefits and economic security.



Figure 1: Policy Prototyping in Action.
Photo Credit: Benn Craig, Harvard Kennedy School

The workforce transformation will be fundamentally different from previous revolutions in agriculture and industry because of the faster time scale and greater complexity. These previous transformations happened at a generational pace, whereas the rapid development of today’s emerging technologies (including automation-related technologies) will likely require much faster reskilling of large numbers of people as the United States adapts to a more blended workforce of human and machine labor. Furthermore, the United States’ existing policy “toolboxes” for economics, labor, technology, workforce development and education are antiquated and do not match the new needs of today’s workers, including life-long learning, flexible jobs and workspaces, and portable benefits.

This “collision of demographics, automation and inequality”⁴ will precipitate the need for modern government policies and programs to meet the expansive needs of diverse

3 Bakhshi H. et al. (2017). The future of skills: Employment in 2030. Retrieved from Pearson’s website: <https://futureskills.pearson.com/research/assets/pdfs/technical-report.pdf>

4 Harris, K, Kimson, A & Schwedel, A (2018). Labor 2030: The Collision of Demographics, Automation and Inequality. Retrieved from Bain & Company website: <https://www.bain.com/insights/labor-2030-the-collision-of-demographics-automation-and-inequality/>

stakeholders. For the United States to flourish in the future of work, policy makers need a roadmap for the interdisciplinary policy issues that must be explored and addressed now and into the future. In fact, a growing number of state-level commissions and task forces focused on the future of work^{5,6,7} are already demanding such ideas^{8,9,10,11,12}.

This report describes the develop and implementation of a novel design-driven approach to develop policy solutions that are inherently interdisciplinary, human-centered, and inclusive for the future of work. This effort is anchored in three shared beliefs and hypotheses (described further in this section):

- The future of work is a particularly ripe area for creative, design-driven policy solutions.
- Design thinking principles can and should be applied to developing policy solutions in high priority policy areas.
- Policy solutions can take many shapes and aren't limited to a new legislative action or other written policy documents.

This thinking drove the development of desired outcomes (section 2), which in turn resulted in the customized methods, processes, and activities to achieve these outcomes (section 3). The policy prototypes resulting from our design-driven policy making process are shared in section 4. Lessons learned from this approach and considerations for future policy prototypers (including policy makers) are discussed in section 5.

1.1 Challenges for Policy Makers in the Future of Work

Policy makers will need to consider several challenges in shaping the future of work: **Policy makers must cope with the pace of technology change and an accelerating abundance of data.** Technology is accelerating past government's ability to grasp the full

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- 5 Washington Workforce Training & Education Coordinating Board. (2020). Future of Work. Retrieved from: http://www.wtb.wa.gov/futureofwork_taskforce.asp
 - 6 California Governor. (2019). Governor Gavin Newsom Announces Members of the Future of Work Commission. Retrieved from: <https://www.gov.ca.gov/2019/08/30/governor-gavin-newsom-announces-members-of-the-future-of-work-commission/>
 - 7 Office of the Governor. (2018). Governor Murphy's Future of Work Task Force Issues Call for Research to Help prepare NJ's Workforce for Innovations in Technology and Automation. Retrieved from: <https://nj.gov/governor/news/news/562018/approved/20181105a.shtml>
 - 8 Council on Foreign Relations. (2018). The Work Ahead: Machines, Skills, and U.S. Leadership in the Twenty-First Century. Retrieved from: <https://www.cfr.org/event/work-ahead-machines-skills-and-us-leadership-twenty-first-century>
 - 9 Pollack, E., Fitzpayne, A & McKay, C. (2019). Automation and a Changing Economy: The Case for Action. Retrieved from Aspen Institute's website: <https://www.aspeninstitute.org/programs/future-of-work/automation/>; Aspen Institute, Future of Work Initiative. (2019). Future of Work Initiative State Policy Agenda. Retrieved from: <https://www.aspeninstitute.org/publications/future-of-work-initiative-state-policy-agenda-february-2019/>
 - 10 Manyika, J., Lund, S., Chui, M., Bughin, J., Woetzel, J., Batra, P., Ko, R. & Sanghvi, S.. (2017). Jobs Lost, Jobs Gained: Workforce Transitions in a Time of Automation. Retrieved from McKinsey & Company's website: <https://shorturl.at/qCEOQ>
 - 11 Harris, K, Kimson, A & Schwedel, A (2018). Labor 2030: The Collision of Demographics, Automation and Inequality. Retrieved from Bain & Company website: <https://www.bain.com/insights/labor-2030-the-collision-of-demographics-automation-and-inequality/>
 - 12 MIT, Task Force on the Work of the Future (2019). The Work of the Future: Shaping Technology and Institutions. Retrieved from: https://workofthefuture.mit.edu/sites/default/files/2019-09/WorkoftheFuture_Report_Shaping_Technology_and_Institutions.pdf

implications of that change. Further, the proliferation of machine learning, automation, robotics and other emerging technologies across industries are already having a profound effect on jobs. In 2017, Brookings found 740 out of the 769 occupational descriptions analyzed contain a “task [that] could potentially be exposed to, complemented by, or completed by AI”¹³. The general applicability of this technology demonstrates the broad reach and impact it could have on jobs in the United States.

The answer will not be to overly regulate the growth of these technologies in the United States—the winners of this new technology arms race will just occur elsewhere, negatively impact future competitiveness in the industries of the future¹⁴. Instead, policy makers must play a role: for example, protecting consumer privacy as citizens share data that powers automation and machine learning, developing guardianship models for artificial intelligence that augments human decision making, and incentivizing a healthy balance the choices between human and machine capital in the workplace.

Policy makers will need to contend with the large scale need and costs for retraining, as well as its effectiveness. By 2022, at least 54% of all employees globally will require significant re- and upskilling, nearly a third of which will require between three months to over a year to obtain the needed new skills¹⁵. Due to technology advancement, 14 percent of the global workforce may need to switch occupational categories entirely¹⁶.

But who might pay for the massive reskilling for tens of millions of mid-career, middle-age workers? The bill is estimated to cost \$34 billion to reskill all 1.37 million American workers whose jobs are at risk¹⁷. Both society and employers benefit from reskilling—society sees reduced social welfare costs and increased tax income, while employers get more adept employees. Further, public-private partnerships improve the cost-benefit analysis, reducing the cost of retraining by 30%. This is especially important as both public and private budgets for these activities are declining. In the United States, public funding for workforce training programs fell from 0.08 percent to 0.03 percent as a percent of GDP between 1993 and 2015¹⁸. Compounding this urgent need, there is mixed evidence about the effectiveness of job training programs currently provided by the public and private sector. An intensive study commissioned by the Department of Labor to rigorously understand the impact of worker

13 Muro, M., Whiton, J. & Maxim, R. (2019). What Jobs are Affected By AI?. Retrieved from Brookings’ website: https://www.brookings.edu/wp-content/uploads/2019/11/2019.11.20_BrookingsMetro_What-jobs-are-affected-by-AI_Report_Muro-Whiton-Maxim.pdf, p. 11.

14 MIT, Task Force on the Work of the Future (2019). The Work of the Future: Shaping Technology and Institutions. Retrieved from: https://workofthefuture.mit.edu/sites/default/files/2019-09/WorkoftheFuture_Report_Shaping_Technology_and_Institutions.pdf, p. 44.

15 World Economic Forum, Centre for the New Economy and Society. (2018). The Future of Jobs Report 2018. Retrieved from: http://www3.weforum.org/docs/WEF_Future_of_Jobs_2018.pdf

16 Manyika, J., Lund, S., Chui, M., Bughin, J., Woetzel, J., Batra, P., Ko, R. & Sanghvi, S.. (2017). Jobs Lost, Jobs Gained: Workforce Transitions in a Time of Automation. Retrieved from McKinsey & Company’s website: <https://shorturl.at/qCEOQ>

17 Burning Glass Technologies. (2019). Jobs Data Analysis at Davos Shows It’s Cheaper to Reskill Than Rehire Workers Displaced by AI. Retrieved from: <https://www.burning-glass.com/blog/jobs-data-analysis-davos-shows-cheaper-reskill-rehire-workers-displaced-ai/>

18 Manyika, J., Lund, S., Chui, M., Bughin, J., Woetzel, J., Batra, P., Ko, R. & Sanghvi, S.. (2017). Jobs Lost, Jobs Gained: Workforce Transitions in a Time of Automation. Retrieved from McKinsey & Company’s website: <https://shorturl.at/qCEOQ>, p. 116.

services on the outcomes of earnings and net cost (to the trainee and taxpayers) found inconclusive evidence of the impact of these services¹⁹. The study looked at combinations of core, intensive, and training services, where “core” includes light-touch assistance such as orientations and online assessments, “intensive” includes career counseling and job search assistance, and “training” includes classroom-based occupational skills training and on-the-job training. The study found that the combination of training and intensive services do not produce sufficient statistically significant outcomes on earnings to be able to conclude their effectiveness. Individually, the results are mixed—while intensive services do improve earnings, training services do not.

Policy makers will also need to advance policies that accelerate job creation in the industries of the future, with an eye toward at-risk low-skilled and low-income occupations. The impact of automation will be felt unevenly across the workforce, with low-skilled and low-income individuals at “a high risk of being automatable.”²⁰ Already, the effects of technology to-date have not been evenly distributed across all types of jobs—for example, white collar workers have enjoyed technologies that complement their skills, whereas other types of workers have received “so-so technologies,” which “replace workers without markedly improving services or increasing productivity.”²¹

Thus, a specific focus on re-training arising from technological displacement is an important policy priority to address the inequality that may be worsened through this transformation. This is particular important to focus on in the United States, a country that is lagging significantly compared to other nations in helping those who have lost jobs find their way back into the labor market²².

To counter the destructive force of technologies on jobs, we must also speed up the constructive force of new, good jobs. New labor demand can be created—if policy makers create the right policy environment. It is estimated that between 555M and 890M new workers could be generated due to current societal mega-trends (such as rising incomes and health care for aging populations), long over-due investments in our national infrastructure (such as buildings and energy), and technology development and markets for previously unpaid work. This may require a larger government role through funding or the deployment of those incentives in those sectors where the “break even point” is less clear for employers investing in retraining, especially in labor intensive service sectors such as health care, education, and construction²³. Innovation-driven growth policies such as increasing federal

19 Wilson, B. (2019). Understanding the New Evaluation of WIA: It Doesn't Say What You Might Think It Says. Retrieved from National Skills Coalition's website: <https://nationalskillscoalition.org/news/blog/understanding-the-new-evaluation-of-wia-it-doesnt-say-what-you-might-think-it-says>

20 Arntz, M., Gregory, T., & Zierahn, U.. (2016). “The Risk of Automation for Jobs in OECD Countries: A Comparative Analysis”, OECD Social, Employment and Migration Working Papers, No. 189, OECD Publishing, Paris. doi: 10.1787/5j1z9h56dvq7-en.

21 MIT News. (2019). MIT Report Examines How to Make Technology Work for Society. Retrieved from: <https://news.mit.edu/2019/work-future-report-technology-jobs-society-0904>

22 Pollack, E., Fitzpayne, A & McKay, C. (2019). Automation and a Changing Economy: The Case for Action. Retrieved from Aspen's website: <https://www.aspeninstitute.org/programs/future-of-work/automation/>, p. 88.

23 Manyika, J., Lund, S., Chui, M., Bughin, J., Woetzel, J., Batra, P., Ko, R. & Sanghvi, S..

investment in research and development in the industries of the future, boosting access to STEM education, and addressing barriers to entrepreneurship are also critical to fueling the jobs of the future²⁴.

Lastly, policy makers will need to redesign the social contract for the workforce. Over the recent decades, workers have been gradually losing power and influence as stakeholders in negotiations around work, pay, and employee relations²⁵. Unions, once an extensive bastion for collective organizing for workers, currently represent only 7% of all private sector employees²⁶. However, where workers are still unionized, the impacts are automation are starting to make their way into labor negotiations. When Marriott workers went on strike in 2018, their new contracts not only included higher wages, but also “a plan to bring union and hotel representatives together to discuss the impact of automation on employees”²⁷ and transition assistance for those displaced by technology²⁸.

The outdated social contract for collective bargaining, adopted during the Great Depression, must be reformed. Rather than the current adversarial approach, workers deserve “new institutions that bend the arc of innovation toward making workers more productive rather than less necessary,²⁹” from reformed unions to sectorial bargaining, workers on corporate boards, and other forms of worker voice. Many business leaders are also publicly acknowledging this need for change, including 181 CEOs that recently committed their companies to benefit all stakeholders, not just shareholders, including customers, employers, suppliers and communities³⁰.

There is an urgent need for the development of scalable solutions to equip Americans with the right skills to thrive in this emerging, dynamic work environment. Furthermore, those solutions must be designed for real people since the future of work has individual people, not a generic “workforce”, at the core. Solutions will involve federal, state and local governments, corporations, educators and individual workers. Current government efforts, such as job training, apprenticeships, standardized skills data, and unemployment insurance, should be modernized, expanded, and/or improved. Policy makers may also need to complement

(2017). Jobs Lost, Jobs Gained: Workforce Transitions in a Time of Automation. Retrieved from McKinsey & Company’s website: <https://shorturl.at/qCEOQ>, p. 116.

24 Hourihan, M & and Correa, D. (2020). Ambitious, Achievable, and Sustainable: A Blueprint for Reclaiming American Research Leadership. Retrieved from Day One Project’s website: <https://www.dayoneproject.org/ablueprinttoaccelerateamericanrd>

25 Kochan, T. (2015). Shaping the Future of Work: What Future Worker, Business, Government, and Education Leaders Need To Do For All To Prosper: Business Expert Press.

26 MIT Task Force On The Work Of The Future. (2019, September 10). Comments from Liz Shuler, Secretary-Treasurer, AFL-CIO. Retrieved from: <https://www.youtube.com/watch?v=Qj6NbasV7Jk>.

27 Marriott workers just ended the largest hotel strike in US history. (2018, December 4). Vox. Retrieved from: <https://www.vox.com/policy-and-politics/2018/12/4/18125505/marriott-workers-end-strike-wage-raise>

28 MIT Task Force On The Work Of The Future. (2019, September 10). Comments from Liz Shuler, Secretary-Treasurer, AFL-CIO. Retrieved from: <https://www.youtube.com/watch?v=Qj6NbasV7Jk>.

29 MIT News. (2019). MIT Report Examines How to Make Technology Work for Society. Retrieved from: <https://news.mit.edu/2019/work-future-report-technology-jobs-society-0904>

30 Business Roundtable. (2019). Business Roundtable Redefines the Purpose of a Corporation to Promote ‘An Economy That Serves All Americans’. Retrieved from: <https://www.businessroundtable.org/business-roundtable-redefines-the-purpose-of-a-corporation-to-promote-an-economy-that-serves-all-americans>

current policy design efforts with policy design approaches that coordinate stakeholder networks and prioritize the needs of workers. Such an approach is the subject of this report.

1.2 A Design-Driven Approach Towards Policy Design

Key Terms Defined In This Report

- *Policy Design*: A deliberative process that frames a public policy challenge around user/citizen needs and focuses on developing new insights through research, analysis and iteration on key questions, yielding new solution approaches.
- *Policy Design Brief*: a problem statement rooted in user and organizational needs that inspire new solutions. Design briefs frame problems in situational contexts and specify user(s) who are affected by those problems. Design briefs are starting points: they represent questions and hypotheses to be explored and prototyped against, versus proposed solutions.
- *Policy Prototype*: A candidate solution to a public policy challenge that answers key questions, suitable for testing assumptions. A prototype includes some proposed change in the status quo of government action (or in-action), often framed as a pilot. This may include a program design change, new policy, process change, etc.
- *Policy Solution*: A refined proposal for government action developed through a design and prototyping process.

Figure 2: Key New Terms

Harvard’s digital Kennedy School Initiative, Stanford’s Cyber Initiative and IDEO CoLab (heretoforth referred to as “we”) partnered in 2019 to develop a novel design process to drive the identification and prototyping of policy solutions for the future of work using design tools. These three organizations shared a sense of the importance of this particular policy area:

- The Harvard Kennedy School supports research in this policy area not only through faculty and students, but also through fellowships. The digitalHKS fellowship in particular supported a fellow and research assistant—Jenn Gustetic and Carlos Teixeira—in 2018-2019 to explore the future of work.
- The Stanford Cyber Initiative is supporting the development of actional proposals for current and future policy makers, including in the area of the future of work, through their Technology and Public Policy project led by fellow Dan Correa.
- IDEO CoLab works at the intersection of industries to create systemic change. They convene networks of corporations, startups and NGOs around key research themes and opportunities, and prototype tangible solutions with paths toward market. Their current focus areas are the circular economy, collaborative cities, dynamic workforce, and open financial systems. Dynamic Workforce and Collaborative Cities have particular relevance to Future of Work policy.

We believe that **policy designers** can be—and are—more than civil servants, elected representatives, and people working at think tanks. Industry partners, startups, and impacted citizens can also be policy designers. While there exists a broad range of policy instruments available to address high priority, cross-sector problems (see section 1.3 and Appendix 1), these instruments may not be easily accessible or obvious to potential policy designers trying to make progress against a particular problem. Also, the skills of applying design thinking principles to a policy prototyping process are not immediately intuitive.

Design thinking seeks to give a voice to the end user of a potential solution before the solution’s inception, utilizing tools such as empathy and experimentation. In this way, the end user’s wants and needs are “baked into” solutions, rather than relying on historical data³¹. The ultimate goal is to design solutions that are desirable to end users, economically viable and sustainable, and feasible to implement.

We believe “**policy prototypes**” differ from more traditional “product prototypes” in that policy prototypes may face significant challenges to feasibility—substantial market failures or policy barriers impeding their implementation, or they may require significant public-sector led vision to accomplish. A near-term product prototype is focused on what is feasible/achievable today, whereas a policy prototype highlights the feasibility gaps for which policymakers should design. Figure 2 provides definitions for the terms used in this report.

1.3 A More Expansive View of Policy Solutions

We believe that **policy solutions** can take many shapes—they are not limited to a new legislative action or other written policy documents, nor are they necessarily limited to the domain of traditional policymakers. Consider the problem of the high cost of solar energy: policy solutions have included an ambitious public goal to make solar energy as affordable as coal³², stimulating new startup businesses to address the soft costs of adopting this new technology, and a prize competition to create a secure, standardized, and modernized data infrastructure³³.



Figure 3: Example Prototype: Faced with the frustration of navigating parking signs due to unclear information, a citizen took it on themselves to resign parking signs in Los Angeles. <https://www.wired.com/2014/07/a-redesigned-parking-sign-so-simple-youll-never-get-towed-again/>

Notably, complex problems, such as reducing the cost of solar, benefit from a combination of policy instruments³⁴. Although it is natural to assume that combining policy instruments

31 IDEO. (2020). Design Thinking. Retrieved from: <https://www.ideo.com/pages/design-thinking>

32 US Department of Energy, Office of Energy Efficiency & Renewable Energy. (2020). Retrieved from: <https://www.energy.gov/eere/solar/sunshot-initiative>

33 Gustetic, J. (2019). Innovation for Every American. In Wisnioski, M., Hintz, E., & Kleine, M. (2019). Does America need more innovators? (Lemelson Center Studies in Invention and Innovation) (pp. 106-130). Cambridge, Massachusetts: The MIT Press.

34 Kalil, T.. (2017). Policy Entrepreneurship at the White House. Innovations: Technology, Governance, Globalization, 11(3-4), p. 5.

requires a hyper-specialized skill set and prior experience in policy design, through this work we proved this is not the case by establishing a common language that supported a collaborative policy design process. To develop that common language, we provided a list of examples (See Appendix 1) of ways that policymakers can advance progress on a particular issue through diverse tools, including:

- Seed New Industries and Business Models through Government Procurement & Open Data
- Hire World-Class Experts into Government
- Organize a High-Impact Commission or Brainstorm
- Set Ambitious Cross-Sector Goals and Catalyze Commitments to Action

2. Approach and Outcomes

Select Policy Approach Examples from Appendix 1

Develop or Reimagine Government Services

Summary: Government provides critical workforce-related services for the American public.

Example: Apprenticeship programs; Trade Adjustment Assistance.

Sample Prompt: If we could redesign or supplement existing government workforce services with experimental new approaches, what hypotheses would we seek to test?

Target Federal R&D on Important Societal Challenges

Summary: The federal government spends over \$140 billion on research and development, generating new innovations while enhancing our understanding of the world around us, including through catalytic prizes and challenges.

Example: Institute of Education Sciences

Sample Prompts: What research hypotheses about automation would be “important if true”? What promising technologies could dramatically lower the cost of worker retraining?

To advance the shared beliefs described in Section 1, we partnered to develop a process to create design-driven policy prototypes for the future of work. This process culminated in a one-day “makeathon” event in June 2019 with more than 40 interdisciplinary and cross-sector thinkers and doers producing 8 distinct policy prototypes. **The goal of this event was to surface new opportunities and collaborations, and policy prototypes that hold promise for refinement, not to develop robust policy solutions in one day.**

Makeathons are daylong prototyping events, typically focused on designing new products or services. The June 2019 event built on IDEO’s standard makeathon approach by adding features specific to policy design and prototyping. The event sought to explore a subset of difficult problem areas in the future of work, articulated through design briefs, that may be ripe for policy solutions prototyped using design principles (See Figure 4 for features of this process). During the day, participants applied design thinking principles to policy-making and explored how to prototype policy solutions together.

This approach sought to develop not only a draft methodology for policy prototyping but also to identify and develop content for policy solutions for future development. These desired outcomes are described in Figure 5: Desired Outcomes of Makeathon. The actual outcomes achieved are described in detail in sections 3 and 4. Section 5 provides lessons learned for future policy designers.

3. Methodology-Related Artifacts and Outcomes

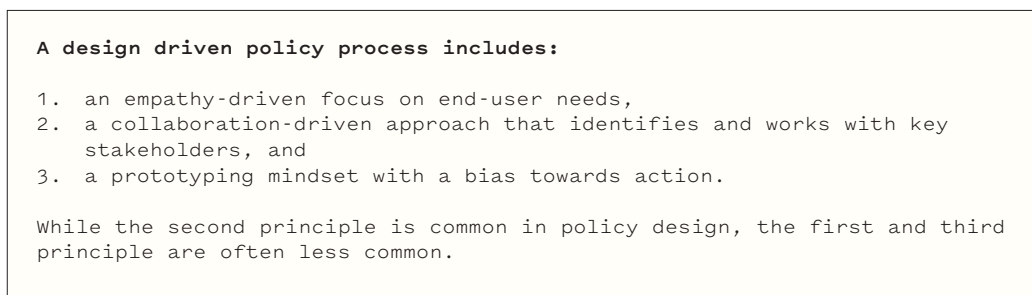


Figure 4: Features of a Design Driven Policy Process

Makeathons are inherently hands-on and collaborative, focused on rapid prototyping over the course of a few hours. Because the future of work is a complex, cross-sector and interdisciplinary problem, we expect solutions that are similarly complex, cross-sector and interdisciplinary. Thus, the event size and the participants themselves were highly curated in order to achieve the right conditions for creativity during the event and action after the event.

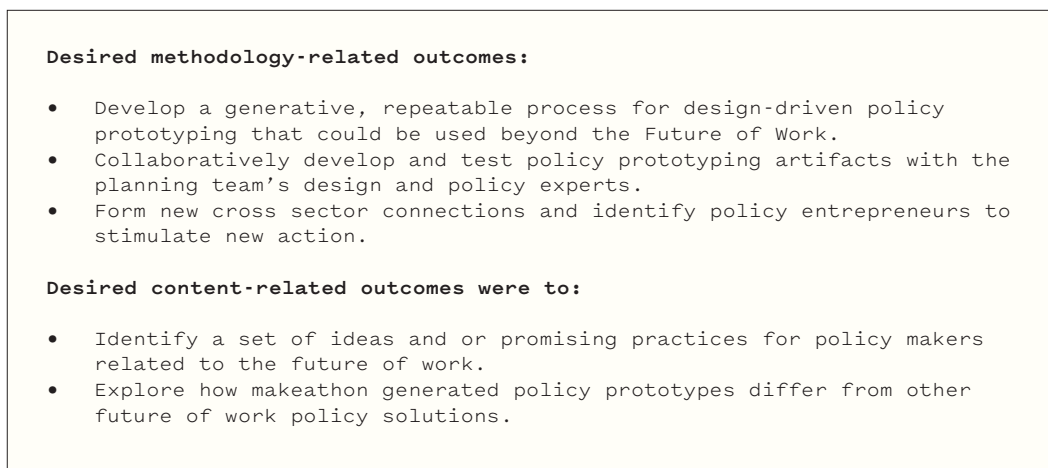


Figure 5: Desired Outcomes of Makeathon

This section describes in detail the artifacts and activities developed to achieve the methodology related outcomes depicted in Figure 5. These artifacts and methods are being released in the public domain to assist current and future policy designers to continue to iterate on this design thinking-inspired methodology.

3.1 Developing a Design-Driven Policy Prototyping Process

We developed an approach to policy prototyping that leveraged the three relevant design thinking principles (Figure 4).

Overview of the event design: We brainstormed a number of potential design brief topics, informed by Harvard and IDEO research on the future of work (See Appendix 2). Potential design brief topics were sent as a pre-event survey to the thirty invitees from academia, the private sector, government and the non-profit sector. The survey sought to collect initial feedback on the potential design briefs, including whether participants had interest or prior experience in specific design briefs, as well as their suggestions for other design briefs and their overall perceptions about the future of work. The survey results were used to finalize four design briefs and assign the attendees to six groups, each of which assigned a design brief (note that two groups were duplicates). The group assignments were curated to prioritize diversity (gender, sector, etc.) while also considering the particular individuals’ expertise and interest in the assigned design brief, as guided by the pre-event survey results. The size of the group was intentionally kept small to promote collaboration amongst its members. Each group was also assigned an IDEO design process guide and an experienced policy designer to work with them throughout the event.

Before the event: Participants were primed for the discussion by (1) distributing a pre-read packet (see Appendix 3) prior to the event, to set expectations for the event and to spur early thinking about their assigned design briefs; and (2) sharing a high level analysis of results of the pre-event survey, so participants could familiarize themselves with the viewpoints of the other participants with whom they’d be collaborating.

At the event: The participants experienced a design process consistent with a typical IDEO CoLab prototyping makeathon (see Figure 6), with activities and artifacts modified to suit a policy prototyping process with the outcomes described in Section 2. Specifically, we developed or customized a number of novel artifacts (see Figure 7). A selection of these artifacts will be discussed in detail in the following section 3.1, with the original documents available in the appendices.

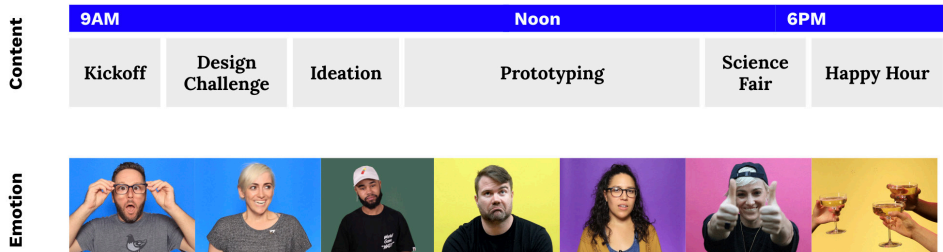


Figure 6: Event High Level Agenda

After the event: A post-event survey was sent to participants to gauge their interest in participating in follow-on activities regarding their policy prototypes. We also shared resources compiled before and during the event and created a LinkedIn group so that participants could remain professionally connected after the event.

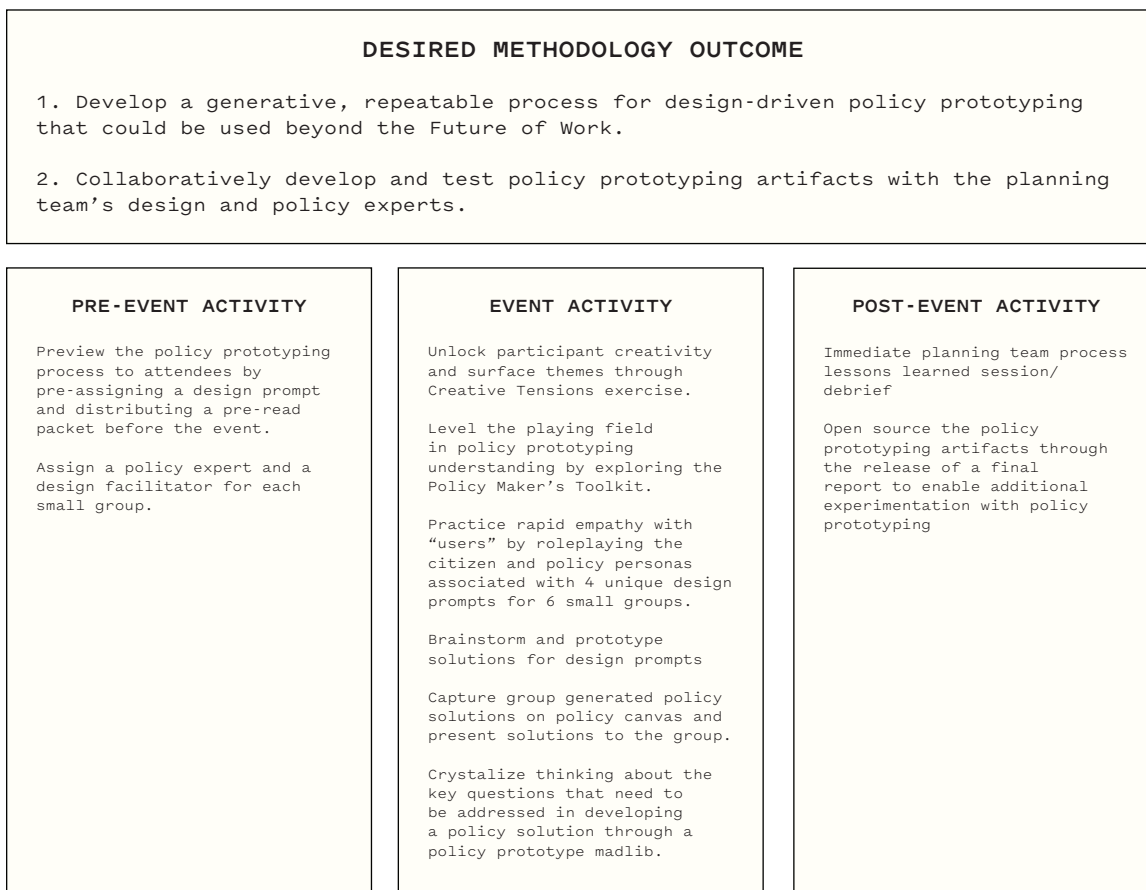


Figure 7: Design Process Desired Outcomes and Associated Activities

3.1.1 Curated Future of Work Design Briefs

- To enhance the depth, focus, and quality of discussions at the event, we developed four Design Briefs. Through empathetic storytelling, these briefs provided key background information that participants referenced as they sought to answer foundational questions necessary for policy design, including:
 - What is the problem we are exploring? (Background/Challenge)
 - What is a clear description of the problem or opportunity?
 - What are the drivers of the problem? (a very light root cause analysis)
 - Are there any potential prototypes we could be inspired by in developing our prototypes? (Further Inspiration/Reading)
 - What can we learn from past efforts to address the problem? If they have not been successful, what's different now?
 - Who are we trying to impact or influence with this policy solution?

- Who is the customer? (User Persona)
- Who is the policy maker who is looking for solutions and what is motivating them? What is the rationale for government involvement and policy change? (Policy Persona)

The Background and Further Inspiration/Reading content was shared with the teams before the event in their pre-read packet, while the Challenge and User and Policy Personas were unveiled at the event (see Appendix 3).

We believe this process is novel compared to traditional policy making because the inclusion of User and Policy Personas encouraged participants to empathize with impacted people before generating potential solutions. At the event, teams were asked specifically to consider users in both their ideation and prototyping of policy solutions.

Let's explore a particular example of how this was done. One design brief focused on the human impact of automation by asking the question "how might we protect the rights and well-being of workers working alongside intelligent machines?" In developing policy prototypes for this prompt, the small group was guided through a process to empathize with both the user and policy personas.

User Persona:



Wayne Scott, a supermarket cashier in Nashville at Harris Teeter used to scan groceries and interact with customers at eye-level, processing their payment. Today, he stands servicing twelve 'smart' self-service check-out registers, moving on his feet for a 10 hour shift at a time. While Wayne enjoys being up and about, he finds it exhausting to have to listen to the constant chirping of beeps and the flashing of red lights, calling his attention to the various machines within his zone. While there are sometimes long stretches when there is little to do (and he can sometimes chat to his friends), most of the time he is inundated with exception requests and errors from the machines. The two most common issues which he has to resolve are (i) a customer's recycled bag is mis-detected by the machine (ii) he needs to check customer I.D. for an alcohol purchase. Because the customers typically get frustrated with these requests, Wayne has a far less enjoyable interaction with them than

when he was helping them with the end-to-end process of scanning and paying for their groceries.

Recently, Wayne's girlfriend mentioned that he has been restless in his sleep, and has flown off the handle when their carbon monoxide alarm made a beeping sound at home. Wayne went to talk to his manager about moving into another role, maybe back onto the old registers and away from the endless beeps and alerts, but was told that even more of the registers will be replaced by the new system.

Policymaker Persona:

Amy Adams, Deputy Assistant Secretary of Labor for Occupational Safety and Health (OSHA) is interested in understanding the evidence behind the impacts of automation on mental health to determine if a new OSHA regulatory framework may be desirable to explore.

The user is the person impacted by the unaddressed problem. The policy maker is the person that may need to take action to address the problem. Thus policy solutions that are feasible and effective will need to consider both sets of people. Both persona types are meant to be evocative of larger subgroups, but specific enough to enable policy designers to build empathy for the needs of an individual.



Figure 8: Brainstorming Policy Solutions.
Photo Credit: Benn Craig, HKS



Figure 9: Example of a Policy Prototype Built at the Event.
Photo Credit: Benn Craig, HKS

3.1.2 Policy Maker's Toolkit

The policy approaches presented in the Policy Maker's Toolkit (see Section 1 and Appendix 1 for more information) were made more tangible to participants over the course of the day through several activities:

- Organizers provided examples relevant to the future of work, as well as real-world examples of the policy approaches in action.
- These examples were explored through a panel presentation with experienced policy designers in the morning of the event.
- Participants were given visual examples of policy prototypes in action through a presentation of example policy solutions to inspire them during the prototyping 101 session in the afternoon
- Experienced policy designers were included in each small group to help coach participants in real time about a more expansive definition of policy solutions.

These examples and resources offered inspiration for the policy prototypes that would be built during the event (See Figure 9).

3.1.3 Policy Canvas

The Policy Canvas co-locates the key scoping questions that teams must answer when developing design-driven policy solutions. The policy canvas sought to build on the questions initially explored in the design briefs, including:

- What is the prototype seeking to accomplish?
- Who is the customer?
- What are the modest and ambitious versions of this idea?
- How will the prototype accomplish that goal?

- Who needs to take primary and supporting actions to make this prototype a reality? Who would execute the prototype? Who are potential champions and advocates?
- What are the possible challenges and execution risks?

THE PROBLEM	EXISTING SOLUTIONS Landscape + Inspiration	PROTOTYPE Name + Tagline		
	TAKING ACTION Madlib _____ is a big, multi-year problem that we need to start working on now. Specifically, this is impacting _____ (person(s) in the world) by _____ (symptom). We envision a future in which _____ and _____ To get started, we should _____ an _____		SURFACE ASSUMPTIONS	
DESCRIBE YOUR POLICY PERSONA Persona Posters + Discussion	BRAINSTORM HIGHLIGHTS		NEXT STEPS	

Figure 10: Policy Canvas

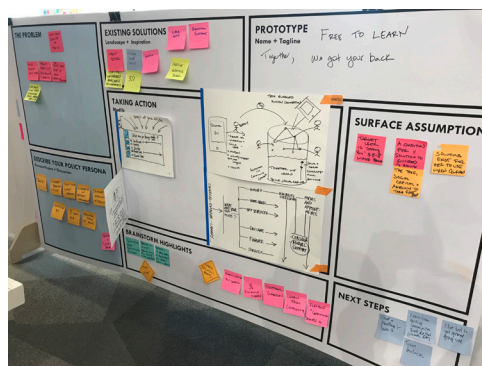


Figure 11: Sample Policy Canvas Developed at the Event

Teams filled in the Policy Canvas as they prototyped over the course of the day, iterating and homing in on their solution as they re-stated the design brief in their own words, incorporated highlights from the brainstorming exercise, discovered existing solutions/inspirations, identified assumptions made, and surfaced key considerations for taking actions and next steps.

3.1.4 Policy Madlib

Mad Libs is a phrasal template word game that requires players to “fill in the blank.” This policy Mad Lib sought to help small groups crystalize their thinking about the key questions

that need to be addressed in developing their policy solution. It was provided as an aid for the “taking action” section of the policy canvas. An example of the Mad Libs is provided in Figure 14: Good Jobs Index MadLib .

3.2 Building Cross Sector Connections

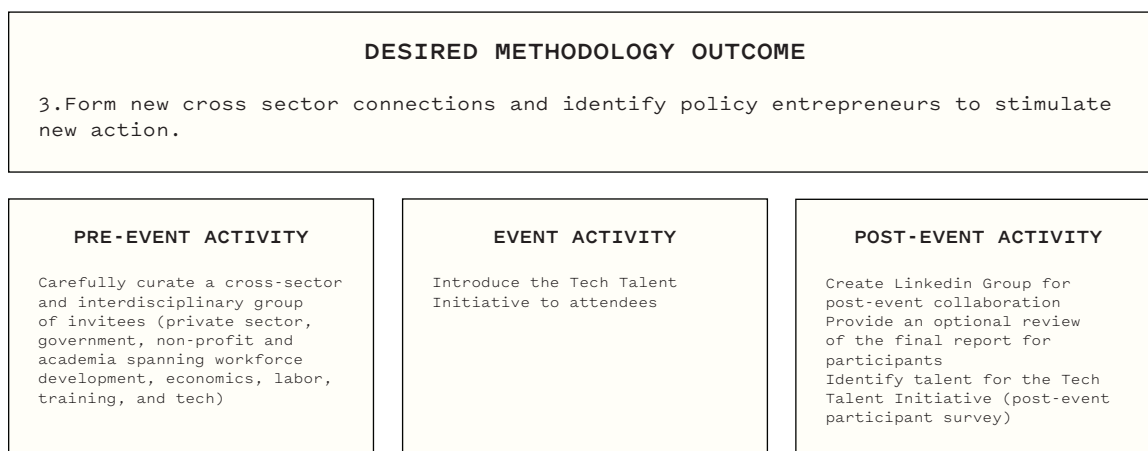


Figure 12: Stimulating Action Associated Activities

Our work also sought to explore this approach as a catalyzing event for new relationships, partnership and action. We carefully curated a cross-sector mix of doers and thinkers passionate about the same topic to facilitate real-time networking. To support follow-on action, we asked participants for their willingness to remain connected and be activated if an organizing entity with that capacity remained after the event. Finally, we introduced participants to opportunities to serve as a policy maker in the future³⁵. The full set of actions taken for this desired outcome are described in Figure 12.

4. Content Outcomes and Policy Solutions for the Future of Work

This section describes the full set of policy solutions identified as a result of pre-event research and the makeathon event itself. Section 4.1 focuses on the policy prototypes developed by the teams at the event, with examples from two of the teams described in detail. Section 4.2 provides a high level analysis of the ideas generated or discussed at the event as compared to those identified from other sources.

It is important to note that makeathon events are short sprints, focused on prototyping over the course of a few hours. Thus, it is unrealistic expect polished final policy solutions or proposals. The content outcomes for this effort were focused on determining if cross-

35 The Tech Talent Project is a nonpartisan effort seeking to increase the ability of the U.S. government to recruit modern technical leaders in order to achieve critical economic, policy, and human outcomes.

sector, interdisciplinary and design-driven perspectives on future of work policy might surface any interesting insights for policy makers—and if this method could and should be complementary to their other policy research and development activities.

4.1 Identifying and Developing Future of Work Policy Prototypes



Figure 13: Desired Outcomes for Generated Policy Prototypes and Associated Activities

This process described in Section 3 surfaced numerous policy ideas and potential solutions related to the future of work through the pre-event survey, preparatory research, event discussion, and post-event follow-up activities. The activities conducted to support this content discovery are depicted in Figure 13.

The pre-event survey surfaced participant’s existing views on policy solutions. The pre-event survey had a higher response rate (75% participation rate of confirmed attendees) than the post-event survey (33% of attendees) but both were a source for barriers, risks, and drivers that informed the development of the design briefs and the identification of potential policy solutions. In the pre-event survey, participants were asked to indicate which of 9 potential design brief topics they found the most interesting to collaboratively design policy solutions, and if there were other topics we should consider for design briefs. See Appendix 2 for both the 9 provided potential design brief topics, as well as additional design brief topics provided by participants.

Any of these design brief topics could have benefited from an in-depth policy design prototyping session; however, for the purpose of this first event, we limited the number of briefs to be explored at the event in the small groups to the following, based on participant and organizer interest:

- Good Jobs in the Future of Work: How might we understand the health and strength of the workforce beyond the number of jobs? How might we empower people to find high quality jobs?

- Instrumenting the Workforce: How might we leverage timely workforce and skills data enable more inclusive economic growth?
- Reducing Opportunity Cost of Learning: How might we reduce the opportunity cost of learning for adult workers to make skill acquisition quicker and less risky?
- Human Impact of Automation: How might we protect the rights and well-being of workers working alongside intelligent machines?

To develop these four topics into full design briefs (described in section 3.1.1), we conducted additional research to further understand the challenges and identify existing policy solutions. Some of our research was provided to participants in the design briefs during the event to enable participants to build off of existing research and ideas. The full inventory of the policy solutions and prototypes, including those (1) identified as a result of our research that were not discussed at the makeathon and (2) discussed or generated at the makeathon event, are listed in Appendix 5³⁶. The ideas presented in the appendix are binned by relevance to a common problem they are trying to address. The range of policy ideas, prototypes and solutions identified and discussed through this process are at vastly different levels of maturity and many need more development and refinement.

Here are two examples of the design-driven policy prototypes generated at the makeathon.

Example 1: Community-based ratings of job quality by workers

Associated Design Prompt: Good Jobs in the Future of Work

Summary of the design-driven prototype idea: Create an online system where workers can rate the quality of their specific job. To focus on the workers that are most vulnerable in the future of work, this ratings system should initially target jobs that are commonly found across the country, require basic skills, and will change significantly with the introduction of automation (e.g., warehouse associate, grocery clerk, etc.). Critically, this ratings system is based on job type, which is fundamentally different than current systems which allow workers to rate their employer.

Why this idea is interesting for policy makers: A nation-wide job quality database will provide trends about how the quality of a specific job varies over time, by employer, and by geographic region. Policymakers will have access to insights such as: (1) how the quality of a specific job is changing nation-wide over time (hypothetical example: welders across the nation are on average more satisfied over the last 5 years, with qualitative anecdotes from raters indicating this is due to the introduction of technology automating the ability to find welding imperfections), (2) which employers or geographic localities are best-in-class for a specific job (e.g., warehouse associates at company A or in town B are in general more satisfied with the quality of their job than workers with the same job at company C or in town D), and (3)

³⁶ We recognize Appendix 5 does not contain a comprehensive list of all possible Future of Work ideas. The Appendix lists ideas we were able to catalogue though there are likely other ideas we didn't find in our research and we encourage other policy ideas to be added to the catalogue.

which jobs require the same skillset but are rated as higher quality (e.g., job seekers with requisite skills for multiple jobs can choose the job that has a higher quality rating).

Why design was useful to generate/refine this idea: By tackling this prompt from the points of view of the worker and the policy maker, the team was able to quickly identify why current solutions were insufficient for these specific stakeholders. Quickly iterating on the policy prototype through real-time feedback from diverse teammates with cross-sector insights enabled the team to surface the unique differentiator of this solution and how it might be used by workers and policymakers.



Figure 14: Good Jobs Index Factors.
Photo Credit: Benn Craig, HKS

HARD PROBLEMS MAD LIB

Identifying opportunities for workers is a big, multi-year problem that we need to start working on now.

Specifically, this problem is impacting vulnerable workers (person(s) in the world) by limiting access to security and growth (symptom).

We envision a future in which job qualities are improving and workers are empowered.

To get started, communities (actor) should implement a platform for exchange of job quality information by 2021. To have impact at national scale by 2025 (timeline), states (actor) should adopt pilot and scale statewide (action).

COJ LAB digitalHKS Stanford Cyber Initiative

Figure 15: Good Jobs Index MadLib

Example 2: Understanding worker-values in the occupational health challenges posed by humans working alongside intelligent machines through a nation-wide listening tour.

Associated Design Prompt: Human impact of automation

Summary of the design-driven prototype idea: The working group came up with a number of prototype ideas for how we might better design both machine interfaces, as well as the “contract” between workers and machines to protect the rights and wellbeing of workers who are engaging with intelligent machines. The overarching prototype idea however was less about any one of these specific interventions and focused on the idea of having a “listening tour” across U.S. businesses and institutions to raise awareness among employers and policymakers. Starting with a prototype in North America, the design solution proposed that such an initiative could (i) promote “10 laws of intelligent machines” which employers are encouraged to commit to when there is a human-machine interaction and (ii) discuss the efficacy of generated ideas to counter occupational health threats emerging from working with intelligent systems. Ethnographers or design researchers would work with an organization with a charter akin to what OSHA does today to explore the impact of advanced

intelligent systems on worker health. The group suggested working with organizations such as The Partnership on AI, the Expert and Citizen Assessment of Technology Network, or the Stanford Institute for Human-Centered Artificial Intelligence to provide public engagement methods and access to expertise, employers and workers.

Why this idea is interesting for policy makers: The motivation and incentive to tackle such a broad topic as human and machine interaction may be challenging for any one employer or sector to tackle on their own. Thus, it will be even more difficult for the government to oversee to protect public health. This effort is a good first step to convene relevant parties around this complex issue. It would allow many employer and worker types to participate, not just those with the technical or financial wherewithal to engage with this topic meaningfully on their own. It would also enable the identification of cross-cutting impacts that are observed in many (or all) industries, and which are consistent across many or all types of intelligent systems. There is potential for significant asymmetries of information to exist between workers and those designing or implementing intelligent systems when it comes to technical understanding of what is going on inside what may be perceived to be a “black box”. This policy solution could present an opportunity for worker voices to be considered in exploring a spectrum of oversight regime options where humans and intelligent machines work alongside one another. With the opportunity to execute this through external partners, the cost to the federal government to implement need not be excessive.

Why design was useful to generate/refine this idea: The topic of health and well-being as experienced by a worker is one where the role of empathy and human factors research can play a huge role. The working group found it particularly helpful to consider the vivid detail in the policy persona of Wayne to help the OSHA officer to “design for” this particular case. Just as design and human factors research was a key tool used in the early 20th century in the development of mechanical systems, vehicles and airplanes, so too should it play a role in making systems which are emerging today as a potential new normal in the workplace. The need for empathy is high.

Participants in the group raised the point that having supervisors or executives at companies understand what it is like to work alongside machines would be useful, perhaps by designing behind a Rawlsian “Veil of Ignorance”³⁷ which might help design policies and rules that safeguard the health of workers. Lastly, analogous inspiration, which is often used in the design process to learn from ideas in different but relevant areas of life, also provided a rich line of enquiry. Some of the practical ideas suggested concerned the use of plaques and place markers (from the field of environmental sustainability with LEED-style building markers to invite) to the use of smart watches (from the field of healthcare and fitness technology) to monitor stress levels after hostile interactions with machines.

While these examples illustrate the types of cross-sector, interdisciplinary ideas that can be generated through this process, they would all need to be substantially developed in order to become strong policy proposals. The Day One Project provides one such means to develop science and technology policy-relevant ideas through their policy accelerator³⁸.

37 <https://ethicsunwrapped.utexas.edu/glossary/veil-of-ignorance>

38 <https://www.dayoneproject.org/day-one-accelerator>

For policymakers addressing complex socio-economic issues like the future of work, why is a design-driven policy prototyping process valuable compared to other traditional public policy making processes³⁹? Traditional public policy making is seen as a six step process involving issue identification, agenda setting, policy formulation, policy adoption, policy implementation and the policy evaluation. This process can lack iteration, a prototyping mindset, and empathy with the impacted stakeholders. We have already demonstrated how cross-sector teams utilizing a common language for collaborative policy design can yield diverse and innovative policy ideas to complement traditional policy levers such as legislation and regulation. In this section, we explore how the policy prototypes generated during the makeathon are different from other future of work policy solutions in ways that could provide better outcomes for all stakeholders. (Figure 16)



Figure 16: Listening Tours Outbrief.
Photo Credit: Benn Craig, HKS

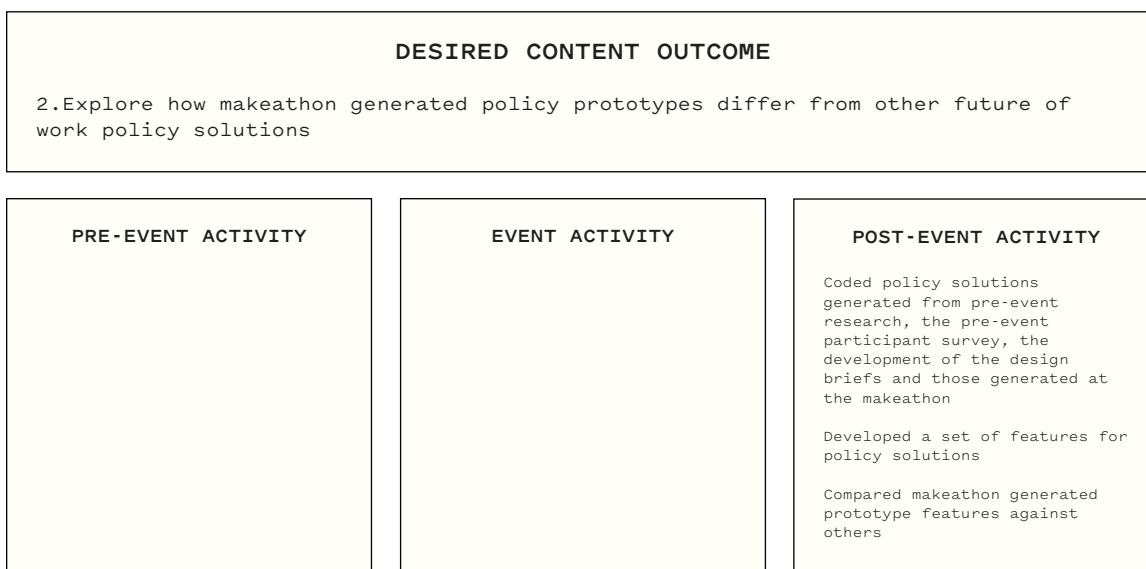


Figure 16: Comparative Analysis Desired Outcomes and Associated Activities

39 For a general introduction to the policymaking process as well as examples drawn from specific policy areas, see Clarke E. Cochran et al., *American Public Policy: An Introduction*, 10th ed. (Belmont, CA: Wadsworth Cengage Learning, 2011)

4.2 Data Analysis Methodology

To conduct this analysis, we organized a full inventory of policy solutions identified through research, the pre-survey, and the makeathon event. Thirty-nine unique policy solutions were organized based on common problems they were trying to address:

- **Good Jobs in the Future of Work:** How might we understand the health and strength of the workforce beyond the number of jobs? How might we empower people to find high quality jobs?
- **Local Economics:** How might we stimulate the creation of more place-based and industry-based efforts to reduce gaps between labor supply and labor demand?
- **Instrumenting the Workforce:** How might we leverage timely workforce and skills data enable more inclusive economic growth?
- **Reducing Opportunity Cost of Learning:** How might we reduce the opportunity cost of learning for adult workers to make skill acquisition quicker and less risky? (Figure 17)

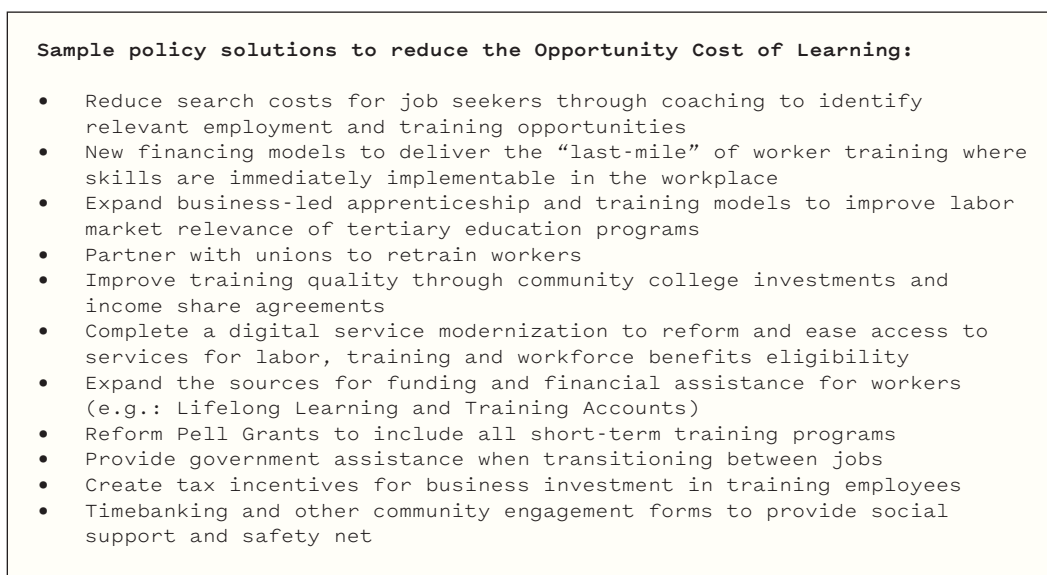


Figure 17: Inventoried and Coded Policy Solutions Example

- **Generative Learning:** How might we help people build skills and competency profiles that are portable, user-owned, keep up in real-time with employers’ needs and are useful in career planning?
- **Perks vs Tablestakes:** What protections do we get as members of a society – and what protections are obligations of employers? What can we consider perks that differentiate competitor firms?
- **Independent Benefits:** How might we enable people to access traditional workforce benefits, like health insurance and retirement savings, regardless of their employer or how often they switch employers?
- **Sharing Productivity Gains:** How might we share the prosperity from productivity gains with workers?
- **Human Impact of Automation:** How might we protect the rights and well-being of workers working alongside intelligent machines?

- **Future of Skillbuilding:** How might we help more people and organizations prepare for jobs with new technical skill requirements for human/machine collaboration?
- **Scaling Design Driven Policy Design:** How might we scale using design driven policy approaches to develop solutions for the future of work?

Once all policy solutions were captured and organized, we coded them according to 8 attributes shown in Figure 18 and defined in detail in Appendix 5.

Coding these policy solutions required that we make judgement calls about how to code each idea (see Appendix 5 for an interactive version of the policy solutions and our coding). Thus, we encourage policy makers to explore our assumptions when analyzing these potential solutions for themselves. Notably, we can't be sure about the process followed by ideas that were not generated at the makeathon. We were able to derive Type 2 and 3 solution attributes (see Figure 18) from the way policy solution was presented, but when solution generation information was not clearly provided by its authors, we were unable to code Type 1 attributes. For attributes we were unable to code we labeled them "unclear".

<p>Type 1: Key attributes of design-driven policy ideas</p> <ul style="list-style-type: none"> • Interdisciplinary • Empathy-driven with a focus on end-user needs • Displays a prototyping approach with a bias towards action <p>Type 2: Characteristics of ideas suitable for further development</p> <ul style="list-style-type: none"> • Approach to addressing public policy challenge <p>Type 3: Other characteristics of ideas (for Exploring Full Inventory)</p> <ul style="list-style-type: none"> • Cross-Sector Implementation • Level of Government • Primary Source of Idea • Commonality of Idea
--

Figure 18: Key Policy Solution Attributes

4.3 Insights about Design -Driven Policy Solutions for the Future of Work

This section analyzes the unique nature of the policy ideas generated or discussed by prototyping processes such as our makeathon, compared to those generated through other processes. We find that this process offers unique solution attributes with some improvements over traditional processes. We believe applying the treatment of this makeathon approach to policy design processes creates policy solutions that are more likely to be:

- cross-sector in their implementation,
- tactical in nature and thus potentially more implementable in the near term,
- capable of prototyping, and
- interdisciplinary.

We found that our design-driven process resulted in policy solutions that were (1) more cross-sector in their implementation and (2) tactical in nature, which could result in

solutions that may be more easily implemented in the near term. This is in stark contrast to policy ideas that are strategic, top-down government interventions.

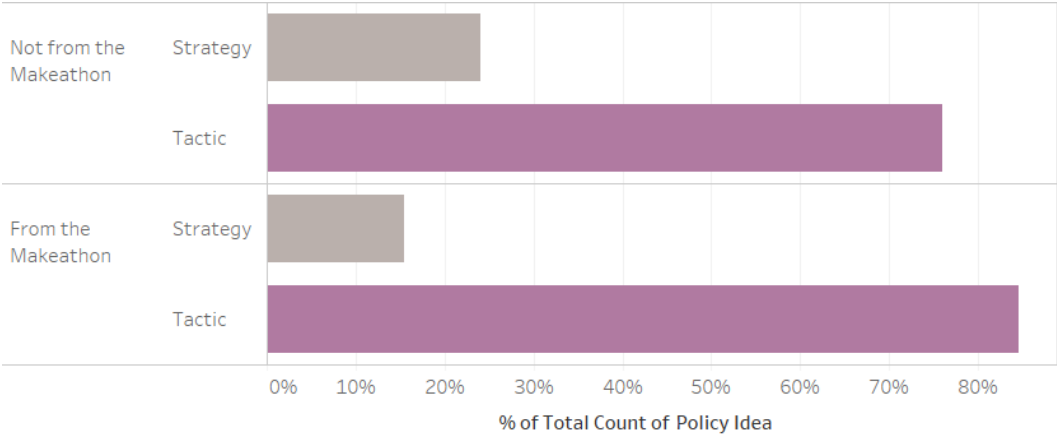


Figure 19: Design Attributes, Makeathon vs Not Makeathon

First, we found ideas developed through a design-driven approach were slightly more likely to be tactical in nature, compared to ideas generated through approaches that did not emphasize design (Figure 19; see definitions in Appendix 4). We believe this is due to the empathy-building and prototyping processes which challenged participants to consider in detail who might benefit from their solution, as well as when, why, and how. This insight deserves attention for future policy prototyping activities—specifically, policy designers should be aware that prototyping approaches may be limited in their ability to generate strategic ideas.

Second, our design-driven process influenced the cross-sector nature of the ideas, increasing the role of educators, employers and workers in solving challenges associated with the future of work (Figure 20). Nearly 80% of the ideas that were not explored at the makeathon involved the government in implementation—this is no surprise, as policy solutions are often conceptualized with the government as a key implementer. We believe that our approach increased the role of non-government stakeholders in implementation because (1) the policy toolkit illustrated to makeathon participants that policy solutions are not only in the realm of the government to pursue, (2) empathy-building exercises helped participants consider how a variety of stakeholders have “skin in the game” of solving these challenges and (3) the groups working on each challenge were constructed to reflect a wider, cross-sector, interdisciplinary set of skills and ideas. By participating in a design-driven policy prototyping process, we find that policy makers tend to identify policy solutions that engage a broader set of implementing partners than what a traditional policy analysis and development process might produce. This is potentially beneficial to policy areas where solutions should be customized to local needs. Further, this approach empowers non-government entities to solve their own problems, speeding implementation and allowing for custom solutions that meet the specific needs of that locality.

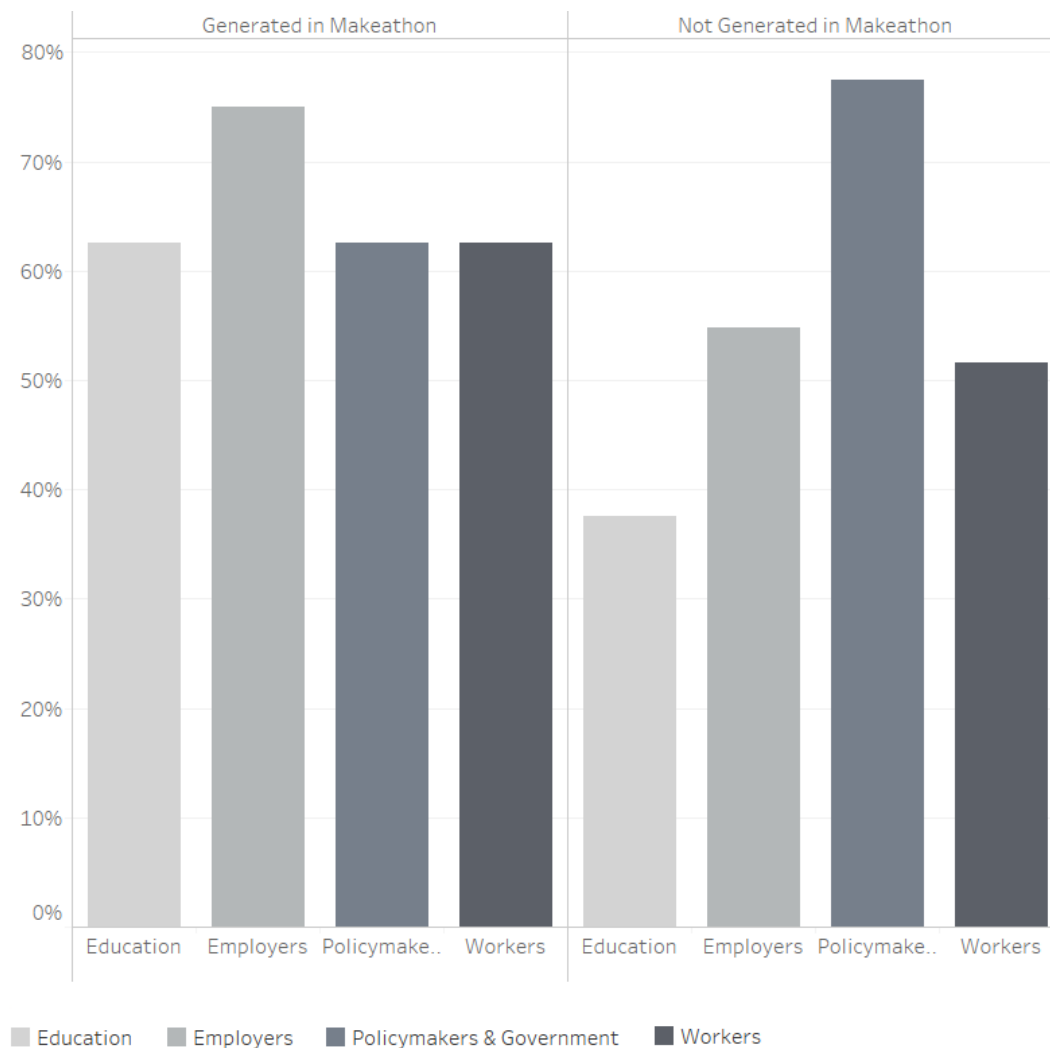


Figure 20: Sectors Involved in Implementation of Policy Solutions

While we also believe that our treatment creates ideas that are more likely to be capable of prototyping and interdisciplinary, we are unable to conclusively determine this. This is because (1) we can't be certain we have (and didn't strive to develop) a comprehensive catalogue of all possible Future of Work ideas to which we may compare our generated policy solutions; (2) our population of ideas is small so our analytical results are likely statistically insignificant; and (3) unless described by the author, we can't be confident of the process used to develop their policy ideas, as described in section 4.2.1. Our analysis in this section is based on the ideas we were able to catalogue though there are most certainly other ideas we didn't find in our research.

5. Recommendations for Future Policy Prototypers and Future of Work Policy Development

Key Take-Away: Design-driven policy prototyping approaches should be incorporated into policy making processes more broadly. These approaches show significant potential to refine and test existing policy making processes, stimulate the development of new ideas for further development, build strong coalitions for implementation, and increase the likelihood that cross-sector solutions are built with the impacted end-users in mind.

Specifically, for Future of Work Policy, policy makers may need to complement current policy design efforts with policy design approaches that coordinate stakeholder networks and prioritize the needs of workers.

The design process used in this work is useful to stakeholders and policymakers seeking to catalyze constructive input and feedback around complex socioeconomic challenges, be it the Future of Work or other critical topics. The organizers believe that this approach should be used to complement other policy making activities for important and complex social-economic issues that affect individual people. This section captures best practices and key lessons learned from this work that the organizers believe are critical to the success of future policy prototyping efforts from a content, process, and after-action perspective.

5.1 Content Considerations

Feedback from a participant: “I hadn’t applied a design- thinking to the topic yet and thought it really enriched the discussion by focusing attention on possible solutions (rather than ‘just’ on identifying the problems).”

Refine existing solutions. Rather than using the makeathon event format to generate new ideas, organizers and participants found that the most productive way to construct policy prototypes was to build on existing solutions that address potential blind spots. Knowing the cross-sector complexity of the solution space, even a team of thought leaders are still likely to have some knowledge gaps across disciplines and stakeholder groups when seeking to generate a novel and holistic solution that is suitable for prototyping and responsive to user needs. This is also a natural part of the design process: prototypes by definition are imperfect solutions, as teams must make progress in the absence of perfect information.

Start with strong design briefs. Well-researched, thought-provoking design briefs gave the teams a robust starting point for discussion. The narratives provided the qualitative and quantitative evidence necessary to convince teams that these were problems worth solving. Strong briefs also compelled teams to spend time focusing on and deeply understanding the problem itself and build empathy for the end users, before diving in to brainstorming potential solutions. Our design briefs utilize a template for the development of policy-relevant design briefs in other topic areas.

A design brief that is not well crafted, along with lack of key perspectives on a team, could impede a team’s prototyping success. For example, despite the healthy number of policy solutions identified under “Instrumenting the Workforce” in the inventory, none of the listed policy solutions came from the team at the makeathon. We believe this is because this design prompt could have been more clearly explained, and that there was key private sector training perspectives missing from that group to help focus the discussion.

Introduce the Policy Maker’s Toolkit. At the event, participants were briefed on the Policy Maker’s Toolkit to quickly introduce participants on the myriad of forms that policy actions can take and provide an expansive view of what actions teams might take during prototyping. The toolkit also provided a common language so that any participant, regardless of level of policy expertise, could participate.

Be intentional with artifacts. As organizers, we took care to think through each artifact (e.g., Policy Canvas, Policy Mad Lib, etc.) and how it might serve participants. While each artifact was used differently by each team in their unique prototyping process, the quality of these artifacts and their staging made tangible the intentionality of this event, impressing and challenging participants to do their best work during the event. Further, the defined structure of the artifacts, especially the design brief, provides a reusable template for other topics that could be explored through policy prototyping to ensure that the work is grounded in empathy for both citizens and policy users.

5.2 Process Considerations

Feedback from a participant: “Creating a design persona for a policymaker as well as a beneficiary is a powerful technique.” “We need to learn a lot more about what users actually need.”

Build empathy upfront. The event started by encouraging participants to build empathy for the User and Policy Personas that were the intended recipients of the teams’ eventual prototypes. This was achieved through a variety of exercises, such as strong narrations told from the point of view of the stakeholders and role-playing interviews where participants could directly ask questions of the stakeholders. We found that, by building empathy early in the prototyping process, participants felt empowered to humbly explore their core assumptions more deeply. We also believe that empathy-driven ideas enhances the likelihood that solutions will be adopted by end users, as these stakeholders were represented throughout the development process. By increasing the population of ideas that can be prototyped, we generate a bias towards action that enables early deployments which can evolve based on real-world evidence.

Feedback from a participant: “It’s very important to develop a shared vision for RACI early in the discussion to establish alignment.” “Solutions should be developed using a multi- perspective, interdisciplinary approach.”

Form diverse teams of experts with an eye towards ownership and accountability. We strived to achieve a diversity of participants across sectors, backgrounds, age groups, gender, and race/ethnicity with domain expertise and policy experience. Then, teams were carefully and intentionally curated to ensure a range of relevant domain and policy knowledge within each group, and to balance optimism about the future of work with skeptical realism. As teams developed their prototypes, their diverse backgrounds helped them discover which stakeholders would be responsible, accountable, consulted, and informed. We also sought to ensure that each participant knew at least one other participant within the overall group, introducing a sense of accountability. Admittedly, on some measures of diversity, we could have done better. While we achieved near parity in gender diversity, we would encourage future policy prototypers to relentlessly pursue other measures of diversity including: cultural, racial, age and sexual orientation and disability.

Facilitate actively and openly. To enable rapid prototyping of viable policy prototypes, teams required the right level of guidance at the right time. We assigned two guides to each group: one IDEO guide to help teams understand and leverage their design tools, and stay on time, and a policy expert to help teams to shape their discussions into policy prototypes that actively leveraged the Policy Maker’s Toolkit. Providing clear descriptions of the roles and responsibilities of the IDEO guides and policy experts in advance for overall facilitation, content push-back, capturing key assumptions, and other critical feedback for teams may have supported more seamless facilitation. Critically, guides must actively capture their teams’ assumptions while simultaneously encouraging teams to continue building with imperfect information. This role requires walking a fine line and allowing for creative tension while channeling the group’s energy. Alternatively, policy experts could have provided the relevant expertise at the exact moment that teams needed it by dropping in during the prototyping exercise or mandatory team check-ins with their role-playing stakeholders. Facilitators must also allow team discussions to wander, trusting that the generative nature of this type of forum enables teams to home in on the topics of greatest interest to those participants, even if this means developing a policy prototype that answers a different prompt than what was assigned by organizers.

Prototype early, iterate often. Teams had limited time to build their policy prototypes, and additional time likely would have resulted in higher-fidelity ideas and prototypes. Small teams (we recommend no more than five participants per team, with 15-20 participants at the event overall) should be encouraged to start prototyping early, iterate on their prototypes often, and not be afraid of making major changes (or even starting over entirely) as they proceed with their building. Depending on the time available, some templates may need a reduction in scope—for example, a number of teams were unable to fully explore the policy canvas or fill in the policy Mad Libs during the time allotted during our makeathon.

Feedback from a participant: “You can actually craft good first drafts of policy actions in a session like this.” “We were visioning and only had one day to get a lot in.”

5.3 Stimulating Action

Feedback from a participant: “1. Prototyping is hard. 2. We can make change happen.” “This convening COULD serve as a formative moment to maintain cohesion and alignment of the thinking, effort and funding of the involved parties and their extended networks.” “There is [a] network of talented individuals interested in advancing the future of work.”

Policymakers can benefit from design thinking. A core hypothesis of this work is that design thinking can be applied to the policy making process to produce better outcomes for society. Through this work, we found that policymakers can and should learn the basics of the design thinking process. One key opportunity to engage policymakers in the design thinking process is during the creation of design briefs: for example, policy makers would have the opportunity to articulate the point of view of the end user their policies intend to help, building empathy for these stakeholders and enabling the policymaker to discover core assumptions made in the process.

Prototyping creates coalitions. Through the act of prototyping, participants invested their time and expertise, inevitably building their stake in the solution. This “sweat equity” has a measurable benefit, as participants surface ideas they care about and create a common sense of momentum across the team. In addition to producing viable policy prototypes, the act of prototyping may itself serve as a galvanizing exercise for nascent teams—for example, one-third of our participants indicated interest in staying actively involved and wanting to join a working group to move an idea forward. For organizers seeking this outcome, time and effort must be allotted to post-event community building.

Prototyping develops fledgling ideas. Our makeathon sought to generate policy prototypes that held promise for future refinement, knowing that additional effort would be required to bring these prototypes to fruition. As expected, the range of policy ideas, prototypes and solutions surfaced through this process were at vastly different levels of maturity. While the 8 prototypes illustrate the types of cross-sector, interdisciplinary ideas that can be generated through this process to address complex socio-economic policy issues, they would all need to be substantially developed in order to become strong policy proposals.

Feedback from a participant: “A lot of the activities we discussed might be better aligned with private sector leadership & execution, in very close collaboration with public sector partners.”

Engage diverse stakeholders for hand-off. Just as event participants must be diverse to make progress on complex challenges, so must the group of stakeholders who will carry the resulting prototypes forward. Because we as organizers could not anticipate in advance the types of prototypes that would result from the event, organizers must assemble a broad group of potential stakeholders to receive the prototypes after the event. Furthermore, the implementation strategy for any resulting prototype is likely be as complex as the original problem itself, again justifying the need for a diversity of stakeholders for hand-off. Further,

showcasing the diverse group of capable stakeholders that will take the next step on teams' prototypes gives participants confidence that their hard work will move forward.

5.4 Advancing the Practice of Policy Prototyping

Our results, while preliminary, show that a design-driven prototyping process may deliver better outcomes by developing ideas that are more empathetic, interdisciplinary, and actionable. Future work should directly test the effectiveness of this approach, as compared to traditional policy development processes.

We believe that process matters: the methodology by which policy ideas are generated effects the quality and content of those ideas, and thus the success of those ideas once implemented. We sought to test this hypothesis using the library of ideas discovered through our preliminary research; however, we were limited by the lack of methodology descriptions in these references. Thus, we strongly recommend that the publishers of policy ideas provide a description of the process by which the ideas were generated—for example, who was involved in the formulation of the idea, what sectors were represented, and how were discussions seeded (i.e., through empathy-focused design briefs). By knowing more about how ideas were generated, future policy makers will be able to more accurately assess the potential effectiveness of the idea.

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Appendix

Appendix 1: Top Tools in the Policymaker's Toolkit

Policymakers can do much more than pass legislation and engage in formal policy rulemaking. The below list is intended to offer some examples of ways that policymakers can advance progress on a particular issue through diverse tools.

Take Legislative Action

Summary: Legislation underpins new programs and regulatory authorities, along with funds for government actions.

Example: Workforce Innovation and Opportunity Act

Sample Prompt: How might we meet help more Americans meaningfully participate in the 21st century economy through new federal programs, spending or regulatory authorities?

Create or Update Regulations, Rules, or Standards

Summary: Formal instruments through which agencies use delegated authority to create policy.

Example: OSHA regulations

Sample Prompt: How might we update existing regulations to reflect changing labor market needs?

Develop or Reimagine Government Services

Summary: Government provides critical workforce-related services for the American public.

Examples: Apprenticeship programs; Trade Adjustment Assistance.

Sample Prompt: If we could redesign or supplement existing government workforce services with experimental new approaches, what hypotheses would we seek to test?

Target Federal R&D on Important Societal Challenges

Summary: The federal government spends over \$140 billion on research and development - generating new innovations while enhancing our understanding of the world around us, including through catalytic prizes and challenges.

Example: Institute of Education Sciences

Sample Prompts: What research hypotheses about automation would be “important if true”?
What promising technologies could dramatically lower the cost of worker retraining?

Use Oversight Authority to Support Federal Implementation

Summary: Congress, the Government Accountability Office, and Inspectors General have a mandate to ensure the proper implementation of existing statutes.

Example: The U.S. Senate Committee on Health, Education, Labor, and Pensions asks the Secretary of Labor for an update on apprenticeships.

Sample Prompt: For which government functions relevant to the future of work should we expect better performance or different approaches?

Seed New Industries and Business Models through Government Procurement & Open Data

Summary: The scale of federal buying - and the scope of federal data - gives the government significant market-shaping power, including the ability to catalyze the creation of new business models and even entire industries.

Example: NASA procurement the private sector space industry (e.g., SpaceX)

Sample Prompt: How might government become an early customer of promising new models for continuing education and retraining?

Articulate a National Strategy with Corresponding Ambitious Goals

Summary: Identifying an ambitious goal and a strategy to achieve it can help build a coalition of public sector entities to pursue it.

Example: Moonshots; National Innovation Strategy

Sample Prompt: What goals might government aspire to accomplish in five years to unlock a future of work that ensures broadly shared prosperity?

Hire World-Class Experts into Government

Summary: Government can recruit, hire, and empower world-class domain experts to work on pressing societal challenges at scale.

Example: HHS Entrepreneurs-in-Residence; Presidential Innovation Fellows

Sample Prompt: What are the key skill sets that government would need to design and implement a national strategy on the future of work?

Organize a High-Impact Commission or Brainstorm

Summary: Convening experts and key stakeholders for focused discussions - or charging them to study and report on a topic - can produce a viable path forward, along with a coalition of support.

Example: National Security Commission for Artificial Intelligence

Sample Prompt: What elements of the future of work policy agenda would benefit from a broader coalition of stakeholder support?

Set Ambitious Cross-Sector Goals and Catalyze Commitments to Action

Summary: Convene and challenge cross-sector leaders to take action, including through joint initiatives and, where necessary, new nonprofit organizations. Government prize challenges can also spur progress through new approaches, including innovative startups.

Examples: The Brain Initiative articulated an ambitious goal to map the brain, challenging the philanthropic community to invest hundreds of millions in research funding to help achieve it. DOE prize competition to lower solar costs.

Sample Prompt: If we could ask a community of cross-sector leaders to take collective action to unlock a more equitable future of work, what would we ask them to do?

Showcase What Works

Summary: Deliver speeches and hold high-profile events to spotlight successes and encourage replication of what works, including by non-governmental actors.

Example: National Apprenticeship Week

Sample Prompt: Where might a spotlight on innovative approaches to [job retraining, local workforce programs, state policy] help ensure the replication of success?

Build a Community of Practice

Summary: To enable to proliferation of expertise in key domains inside and outside of government, policymakers can facilitate the creation of communities of practice.

Example: Federal Prizes and Challenges Community of Practice

Sample Prompt: What expertise needs to become the norm rather than the exception to facilitate a transition to an equitable 21st century labor market?

Appendix 2: Pre-Event Survey Questions

1. What's the first thing that comes to mind when you think of the Future of Work (max: 140 characters)?
2. What role is your organization playing (or what role could they play) in the Future of Work? (if applicable) (max. 300 characters)
3. What are the problems or risks you see in the Future of Work which concerns you the most that you believe are addressable problems? List up to three.
4. What opportunities to improve to the human condition does the Future of Work unlock that public policy should seek to proactively advance? List up to three.
5. What are the major drivers of the problems or the barriers to the opportunities you identified that you believe might be addressable with the right people focused on them?
6. Which, if any, of the following prompts interest to you to explore further?
 - a. How might we help people build skills and competency profiles that are portable, user owned, move at a pace that keeps in line with real-time employer needs and are useful in career planning?
 - b. How might we enable workers to learn new skills on the job, around projects they're already working on, and increase the portability of those skills?
 - c. How might we reduce the opportunity cost of learning to enable more people to position themselves for the jobs of the future?
 - d. How might a data architecture for timely workforce and skills data enable more meaningful and equitable economic development?
 - e. How might we stimulate the creation of more place-based and industry-based efforts to reduce gaps between labor supply and labor demand?
 - f. If the jobs of the future will likely require increasing amounts of human/machine collaboration, and thus technical skills in industries that typically may not have considered those essential, how do we build solutions to help more people and organizations prepare?
 - g. Since wages have not been equitably increasing with productivity gains, how might we explore scaling solutions to share prosperity with workers?
 - h. How might we enable people in nontraditional careers to access traditional workforce benefits, like health insurance and retirement savings?
 - i. How might we enable people who work for project-based platforms to access some level of income stability?
 - j. Other (please specify)
7. What promising practices are you aware of for addressing the problems or opportunities you identified? (if applicable)
8. Have you given any thought to public policy responses and if so, are there actions you think government should be taking but isn't? (if applicable)
9. If there are any relevant resources you'd like to share with other participants, please provide links and a description of the resource.

In response to survey question 6, participants provided the following additional ideas for design briefs:

- Since wages have not been equitably increasing with productivity gains, how might we explore scaling solutions to share prosperity with workers?
- How might we enable people in non-traditional careers to access traditional workforce benefits, like health insurance and retirement savings?
- How might we enable people who work for project-based platforms to access some level of income stability?
- How can we ensure users of a workplace (both employers and consumers) understand the human cost of their choices?
- What protections do we get as members of a society – and what protections are obligations of employers? What can we consider perks on which competition between firms relies upon and not?

Appendix 3: Pre-Read Packets and Full Design Briefs

Pre-read packets distributed a week before the event:

Good Jobs in the Future of Work:

How might we understand the health and strength of the workforce beyond the number of jobs? How might we empower people to find high quality jobs?

Pre-Read: <http://bit.ly/FOWGoodJobsBrief>

Instrumenting the Workforce:

How might we leverage timely workforce and skills data enable more inclusive economic growth?

Pre-Read: <http://bit.ly/FOWDataBrief>

Reducing Opportunity Cost of Learning:

How might we reduce the opportunity cost of learning for adult workers to make skill acquisition quicker and less risky?

Pre-Read: <http://bit.ly/FOWLearningBrief>

Human Impact of Automation:

How might we protect the rights and well-being of workers working alongside intelligent machines?

Pre-Read: <http://bit.ly/FOWHealthBrief>

Full packet distributed on the day of the event: <http://bit.ly/FOWDesignBriefs>

Appendix 4: Attributes of Policy Solutions

ATTRIBUTE	ATTRIBUTE DESCRIPTION
Key attributes of design-driven policy ideas	
Interdisciplinary	The idea/solution is developed from the vantage point of multiple disciplines/expertise - as opposed to being a solution that only considers the perspective or lens of one discipline in addressing such problem. (Sample Disciplines: Data and Emerging Technologies; Economics; Workforce Development; Job Placement and Training; Labor, Law and Employment; Business Management; Education and Learning; Workplace and Architecture; Economic Development and Urbanization; Individual Psychology/ Public Awareness/ Individual Behavior Change)
Empathy-driven with a focus on end-user needs	Idea articulates an understanding of its intended end user and sought to understand user needs in its development.
Displays a prototyping approach with a bias towards action	Idea developed through a deliberative process that focuses on developing new insights through research, prototyping analysis and iteration on key questions, yielding solutions suitable for testing assumptions early.
Characteristics of ideas suitable for further development	
Approach to addressing public policy challenge	Is the idea more of a strategy that furthers broad principles / addresses macro-opportunities / requires structural reform or a tactical implementation that is something we might start doing today?*
Other characteristics of ideas (for Exploring Full Inventory)	
Cross-Sector Implementation	Solution anticipated to be implemented through cross-sector coalitions/ partnerships
Level of Government	What level of government is the expected, natural champion of this idea? What level of government does this policy require action from in the first place?
Primary Source of Idea	Where was the policy idea primarily identified, refined or discussed? This field is used to compare the attributes of non-makeathon ideas to makeathon ideas.
Commonality of Idea	Where was the policy idea identified, refined or discussed? This field is used to understand how frequently an idea appears in research, survey, the design briefs or the makethon discussions as a proxy for how widespread/ common it is.

*We also sought to explore several other attributes, to help identify of policy ideas that should be further developed. However, these attributes proved to be much more difficult to code for. For the makeathon generated ideas, these attributes were not sufficiently explored (largely given to time and expertise limitations) to allow coding. Also, many of the other policy ideas generated through research and the pre-survey also did not allow these factors to be considered. We do believe however that to prioritize policy solutions for further development, more would need to be known about the following attributes:

- Potential for Impact (incremental, disruptive) and scale of impact (local, regional, national, etc)
- Level of Effort (High, medium, low)

Appendix 5: Inventory of Policy Prototypes Solutions

The full coded-inventory can be found at <http://bit.ly/FOWPolicyInventory>. It provides:

- A framework for attributes to classify these solutions for the data analysis in this report (Tab 1)
- A full list of policy solutions identified in this work (Tab 2)
- References for each policy solution (Tab 2, Column O)

Making the inventory available will enable policy makers to sort policy solutions based on the specific attributes for which they have interest, making the inventory more useful for potential policy customers.

Appendix 6: Participants in Makeathon

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