ISSUES
IN SCIENCE AND TECHNOLOGY

Infrastructure for a Stormy Future

Child Support for Complex Families

The Second Coming of
UK Industrial Strategy

US Technology Policy

The Future of
US Nuclear Energy

Knee-Capping University Excellence

Is Biomedical Innovation
Being Stifled?

8 4>

0 56698 57433 0

JENN GUSTETIC

Scaling Up Policy Innovations in the Federal Government
Lessons from the Trenches

Large bureaucracies such as those of the federal government are notoriously slow to innovate. But in recent years, new technology-enabled approaches to helping government meet its public obligations have begun to find a foothold in bureaucratic culture. Many of these approaches rely on what is called "open innovation," which means, in essence, that in today's era of distributed knowledge, an organization should look both within and to external sources for ideas and should involve both its own personnel and outside parties and communities in creative efforts. In practice, open-innovation approaches such as incentive prizes and crowdsourcing are proving to be increasingly effective for achieving policy objectives across a variety of government agencies and programs. Consider these examples:

- Thanks to a Federal Trade Commission incentive prize—the $50,000 Robocall Challenge—the Telephone Science Corporation now provides a free service called Nomorobo that blocks illegal computer-generated calls to US telephones. The service, the company says, has blocked more than 272 million robocalls since 2013.
- The Federal Communication Commission's Measuring Broadband America's Speed Test App uses smartphone-based technology to collect broadband performance data from volunteers in the collaborative, crowdsourcing initiative. With some 250,000 volunteers participating, data are collected anonymously on the Android and iOS operating systems of 13 of the largest wireline

broadband providers, and the results are helping to inform consumers, industry, and government policy makers and improve mobile broadband performance nationwide. Experts generally agree that it would have been too costly, and perhaps even impossible, to gather these data using conventional collection methods.
- The National Archives' Citizen Archivist Dashboard is increasing online access to this trove of historical records by harnessing the energy of volunteer digital archivists. For example, more than 170,000 volunteers indexed 132 million names from the 1940 US census in five months, something that the National Archives could not have done alone.
- Through the National Institutes of Health-funded EyeWire project, over 150,000 people around the world without any knowledge or experience in the field of neuroscience have helped researchers to map the human retina, simply by playing an online game that involves solving 3D visual puzzles. The results have increased understanding of how neurons process information. For example, insights from EyeWire about how brains detect motion—a mystery until recently—could lead to advances in blindness therapies and development of retinal prostheses.
- During the 2014 Ebola outbreak, the US Agency for International Development offered $2 million through the Ebola Grand Challenge to spur innovations that would help frontline health care workers in the hot, humid climates of West Africa to provide better, more timely care and to contain potential future outbreaks. The resulting innovations include protective gear that zips off like

a wetsuit, ice-cold underwear to make life inside the sweltering suits more bearable, and spray-on lotions that kill or repel lethal viruses.

Such trailblazing federal projects are demonstrating how open-innovation approaches can improve the government's capacity to deliver high-impact results across a diverse range of policy problems. Open-innovation approaches to problem solving have been in use for hundreds of years on a smaller scale by various national governments (Napoleon offered a cash prize in 1795 that led to the invention of canned food), nongovernment organizations, private companies, and individual researchers. So why are they now beginning to be scaled up in the US federal government? Part of the explanation is that new technology platforms are enabling projects to be set up more quickly and reach more people faster. But these projects don't just design themselves. All of them were championed by innovators within the government—and being an innovator in government is hard. It takes persistence, stamina, and strategy to overcome what can often seem to be insurmountable organizational, legal, and cultural barriers to implementation. Any would-be government innovator knows that ideas that threaten the status quo often carry with them high professional risk. As Tom Kalil, my former boss at the White House Office of Science and Technology Policy (OSTP), has observed, each new project can feel as if it requires "hand-to-hand combat" to pull off.

Different policy innovations may follow very different pathways to implementation and encounter very different obstacles and opportunities along the way. For example, government agency scale-up of incentive prizes and challenges had to clear a daunting set of hurdles. A number of these stand out in particular. Let's examine the timeline of actions that occurred to overcome them.

First, there have been a series of external assessments conducted, starting as far back as 1999 by the National Academies, the Congressional Research Service, the Government Accountability Office, and consulting firms such as McKinsey & Company. Next came early authorization by Congress of pilot prize programs, initially at the Department of Defense's Defense Advanced Research Projects Agency in 1999 and then at the National Aeronautics and Space Administration (NASA) and the Department of Energy in 2005. Then the White House demonstrated high-level support for prizes and challenges through the Strategy for American Innovation and the Open Government Directive, both issued in 2009, and

through specific policy guidance provided in 2010 by the Office of Management and Budget (OMB).

Following on, OSTP convened in 2010 an informal community of practice that would later be led by the General Services Administration (GSA). Congress granted explicit government-wide prize authority through the America COMPETES Reauthorization Act in 2010. Various groups started to develop common program infrastructure (through the free online platform challenge.gov and NASA's fee-for-service Center of Excellence for Collaborative Innovation) and to develop processes to meet congressionally mandated reporting requirements. And finally, over several years various agencies and groups collected information about what had been learned about innovations such as prize implementation and posted "toolkits" online for others to use.

This journey to scale leads to the present day. During the time I served as the assistant director for open innovation at OSTP, the use of prizes as incentives to solve problems doubled, from 350 prizes prior to 2014 to nearly 700 when I left the office in May 2016.

Another open-innovation approach that I worked on at OSTP was citizen science and crowdsourcing. Whereas the government's use of prizes scaled up mostly through a top-down process, citizen science and crowdsourcing were catalyzed by the unique passion and commitment of a grassroots community working outside of government, well before there was support at higher levels in government. In 2011, the Woodrow Wilson International Center for Scholars began hosting monthly roundtables on citizen science, crowdsourcing, and social media, connecting government with academic researchers. In 2012, a small number of federal employees and representatives of outside groups who had attended these roundtables convened at the first meeting of an informal Federal Community of Practice for Citizen Science and Crowdsourcing (conveniently shortened to CCS). This group would eventually grow to more than 350 members.

Starting in 2013, OSTP noticed the energy of the community and the effectiveness of the approaches, and the office began supporting these policy innovations through national strategies and plans, such as the second Open Government National Action Plan. Subsequently, the community partnered with OSTP in 2014-15 to develop a toolkit. These efforts catalyzed the formation in 2015 of a formal group of Agency Citizen Science and Crowdsourcing Coordinators; the development of centralized infrastructure at the GSA, including a project catalog developed in 2016 in collaboration with the Wilson Center that appears online at citizenscience.gov (which now lists more than

400 community citizen science and crowdsourcing initiatives); and passage in 2017 of explicit legal authority to pursue innovations through the America COMPETES reauthorization.

During my time at OSTP, as well as my years at several federal agencies and in the private sector as a management consultant to various federal agencies, I have struggled with bureaucratic obstacles to innovation again and again, while designing and implementing dozens of policy approaches, including, among others, incentive prizes, public dialogues, and "design thinking" education projects that take students through the five stages—empathize, define, ideate, prototype, and test—of design. Based on these 10-plus years of experience, I have identified eight lessons for program and project managers who want to expand and scale up innovative approaches to problem solving in government.

Legal and policy frameworks. Without a clear legal basis for a policy innovation, the road to implementation can be bumpy. Explicit legal authority is not necessarily required for an approach to be used, but it can be extremely helpful for scaling. For example, the federal government has offered prizes since the early 2000s. Early innovators figured out how to implement prizes under either existing legal authorities or previously passed laws that could be interpreted (on legal review) as applying to prizes. The March 2010 OMB policy memo summarized those existing legal authorities and helped empower other innovators who were trying to find a legal path to implementation. Having a clear summary and general interpretation to point to helps encourage new projects. The 2010 America COMPETES Reauthorization Act, providing all federal agencies broad and explicit authority to conduct prize competitions, set the stage for rapid expansion of prize programs.

Shared infrastructure and common platforms. Programs provided by the GSA have been critical in scaling up many innovative efforts. These programs provide a focal point for federal efforts on an approach-by-approach basis. The website data.gov, launched in 2009, now lists over 170,000 open data sets. Upwards of one hundred agencies have used challenge.gov since its debut in September 2010, launching more than 740 prizes totaling over $250 million. These programs are more than just websites for listing data sets and prizes. They provide shared services and infrastructure free to agencies that, in turn, allow individual innovators to launch early pilot projects without having to develop all of the supporting online infrastructure and resources. Data.gov and challenge.gov also employ small teams of full-time federal employees to provide critical government-wide policy support, training, community of practice management, metrics, and public outreach for anyone in the federal community interested in launching an open data or prize initiative.

Emergence and sustainability of communities of practice. Being an innovator within government can be lonely, and connecting like-minded people to each other is critical not only to sustaining the energy of early adopters but also to attracting new converts. I've mentioned the CCS, the grassroots community that is open to all federal practitioners working on, funding, or just interested in learning more about crowdsourcing and citizen science. Other communities of practice for innovative policy have also emerged within the government, working actively in open government, prizes, open data, artificial intelligence, social media, and more. Some of these communities are chaired by agency leaders, and some are coordinated by the GSA. Some actively meet and provide training for members, whereas others act more as a list serve for sharing information and ideas. No matter the details, however, the role these communities play as social connectors can often prove critically important in scaling up policy innovations.

Knowledge capture and sharing. Over the years that I spent encouraging people to use prizes, I often wished that I had available a "Prizes for Dummies" book. Sharing knowledge is fundamental for success, and the process often requires numerous meetings. To aid in such efforts, the second Open Government National Action Plan, issued in 2013, committed the government to developing open innovation toolkits that document best practices, case studies, and relevant policy and law and provide step-by-step instructions for creating open-innovation programs. The first toolkit, for citizen science and crowdsourcing, was launched in September 2015. The second, for prizes, went live in October 2016. Both toolkits were developed by federal employees experienced with implementing these approaches.

Budgets. Policy innovations at the project level I'm concerned with here can only rarely be funded by specifically appropriated funds, and lack of dedicated programmatic funds is a recurring obstacle to scaling up new approaches. Sometimes finding resources means identifying appropriate pots of funds that can be leveraged through the annual federal budget process; other times it is necessary to persuade a program manager who controls funds to try something new. Both paths for securing new budgets

are difficult, but the former especially requires sophistication and experience and works best if the aspiring innovator is strategically located in the White House, at OMB or another high-level policy council, or within some agency's front office that is developing budget requests. Most federal employees are thus forced to rely on the second path for finding resources. Budgeting for innovative programs is made even more challenging by the annual budget planning process, which starts three years before funds are actually to be spent by the implementing agency. It takes patience and persistence not only to find resources but to maintain focus throughout the lengthy budget process. I saw colleagues "lose" resources after working hard to secure them up front because they didn't continue to track and advocate for them throughout the entire multiyear budget cycle.

Agency processes. Standard protocols and processes for program management in federal agencies—in a word, bureaucracy—often represent huge barriers to scaling up policy innovations. Many innovative approaches to addressing policy needs require program and project managers to think fundamentally differently about what their problem is, who could possibly solve it, and what success would look like. At the program and project level, policy innovation may require a much greater focus on problem definition and user research than is needed when going through a typical contracting or grant-making approach. For example, the way many information technology contracts are written makes collaborative, iterative software development—agile software development, in Silicon Valley parlance— nearly impossible. The US Digital Service, a government team that uses technology and design to help a number of federal agencies deliver better services to the public, has confronted this barrier by providing comprehensive online support services— through the TechFAR Hub—aimed at correcting procurement misconceptions across the government.

Reporting requirements. Under the America COMPETES reauthorization, OSTP is required to report regularly to Congress on the use of incentive prizes. To gather this information, OSTP from 2010 to 2016 collected reports annually from each federal agency. (Starting in 2017, the reporting period is now every other year.) As a result, there are now available rich narratives and qualitative data sets for hundreds of prizes that not only explore the impact of each individual prize, but also enable the study of prize practices more generally to improve their use. These stories and data also show the public how the government is working to improve its services, use public funds wisely, and solve real problems.

External assessments and impact studies. Government officials and others looking to develop and implement policy innovations need to learn from earlier efforts. Thus, program leaders will need to regularly and rigorously assess how well their projects are working, to help in forming a data set of methods and impacts that can inform and improve future practice. External assessments of policy innovations can also help government managers make the case for continued or expanded funding and collaborative activities for scaling up successful approaches. But even as some policy innovations, such as citizen science, are already the focus of healthy interest from the academic community, other approaches, such as prize competitions, have not yet been subjected to significant academic scrutiny, despite the rich data sets available.

The strategies that I've described here for scaling up policy innovations have worked well for new open innovation approaches such as prizes, citizen science, and crowdsourcing. They also seem to be a key ingredient for scaling up other types of policy innovations, such as agile software development, user-centered design, and open data. And they could provide valuable guidance for adopting within the federal sectors some of the promising new institutional practices emerging outside of government.

Yet scaling up a policy innovation and moving it into the mainstream of practice are not the same things. If government tries to standardize best practices for policy innovation, it runs the risk of discouraging future innovation. For example, OMB circulars for grant management and its advice to agencies regarding federal acquisition regulations appropriate to some of the innovations I've discussed here have created a certain amount of caution and lack of creativity in the use of grants and contracts for other policy innovations across government. The government should try as much as possible to allow flexibility in how these and other innovative approaches are implemented. Facilitating policy innovation can help government be more responsive and effective. But efforts to standardize innovation processes in government may be counterproductive.

Jenn Gustetic is a digital Harvard Kennedy School visiting fellow and the program executive for the Small Business Innovation Research program at the National Aeronautics and Space Administration. She has worked at the White House Office of Science and Technology Policy, the Transportation Security Administration, and the Phase One Consulting Group.