

Reestablishing the Congressional Office of Technology Assessment

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Executive Summary: The United States faces many science and technology issues, and Congress needs the best expert advice to create effective national policies. Unfortunately, Congress lacks institutional scientific knowledge and has limited access to science and technology expertise. This has left it woefully unprepared to keep American policy up to date. While Congress recognizes it is unprepared to address science and technology policy challenges, it has failed to realize that it once possessed an office specifically designed to address these challenges. In 1972, Congress created the Office of Technology Assessment (OTA) to act as its own in-house, on-demand science policy advisor. During its almost quarter-century of operation, the OTA ensured that Congressional debate was well-informed by science and technology expertise. Since its shuttering in 1995, however, no replacement has been created to fill the void, efforts to delegate certain aspects of the OTA's remit to other offices within Congress have been limited, and reliance on outside advice means Congress has only received patchwork advice for decades. If Congress is serious about addressing science and technology issues and preserving America's global scientific edge, then it should revive the OTA and bring America's science and technology experts formally back into Congress.

I. Introduction

i. the looming crisis

According to the U.S. government, science and technology are "cornerstones of the American economy," (U.S. Department of State 2017). It's estimated that half of all GDP growth from 1946 to 2007 was due to science and technology innovation (Tassey 1999). However, almost a decade ago, the National Academies (2010) warned that a major storm was brewing in its report "*Rising Above the Gathering Storm, Revisited: Rapidly Approaching Category 5*"; while science and engineering advancements could drive future economic growth, other countries were rapidly increasing their investment in education, innovation, and research and development. The United States was falling behind, and its failure to keep pace created a looming economic crisis (National Academy of Sciences, National Academy of Engineering, and Institute of Medicine 2010).

In March 2019, Dr. Marcia McNutt, President of the National Academy of Sciences, warned Congress that the storm had not abated—American leadership in science is still under threat (Maintaining U.S. Leadership 2019). Beginning in 2014, the portion of total scientific publications from researchers in the U.S. began to decline, and in 2016, the number of publications from researchers in China surpassed those from the U.S. (National Science Board 2018). Recent polling from Research!America found that only 38% of Americans think the U.S. position as the world's preeminent country for scientific research and innovation will strengthen by 2050, while 28% believe it will weaken, and another 22% are unsure whether America will retain its leadership in science and innovation (Research!America 2018, 2019). If America hopes to maintain its global economic and scientific edge, then it needs sound, expertly guided, federal science and technology policies.

ii. Congress Desperately Needs Science and Technology Advice

Unfortunately, Congress is currently ill-equipped to produce such policies. Only 14 members of Congress have any background in science or engineering (Manning 2019). Their lack of formal training means legislators must rely on staff for scientific guidance (Graves and Kosar 2018). While no legislator has the expertise needed to cover the spectrum of policy issues they must legislate on and reliance on staff expertise is not inherently an issue, the staff levels in Congress are drastically lower than they were decades ago. Over the past 25 years, committee staff levels in the House and Senate have declined by 50% and 20% respectively (Goldschmidt 2017, 17).

This decrease is mostly the result of rule changes made under Republican control of the House in 1995 that eliminated pooled funding for staff and consolidated staff positions (Kelly 2012). Efforts by Republicans to cut the Congressional budget have also led to a stagnation in staff wages, which adjusted for inflation, did not increase from 1990 to 2010 (Schuman 2010), and decreased from 2009 to 2013 (Drutman 2015b).

This decline means Congress must seek external science and technology advice, but they also lack access to this guidance. When asked, only 24% of surveyed Congressional staff said they were satisfied with Congressional access to “high-quality, nonpartisan, policy expertise within the legislative branch” (Goldschmidt 2017, 9). The advice staffers do have access to is often from lobbyists. More money is now spent lobbying Congress than Congress spends funding itself (Drutman 2015a). The lack of access to scientific expertise both within and outside of Congress impedes its ability to regulate and oversee efforts to tackle pressing issues that threaten national security, economic, and public health interests, including climate change, cybersecurity, antibiotic-resistant superbugs, genome-editing tools like CRISPR, and our nation’s uncertain energy future.

iii. Increasing science expertise is a priority for congress

Luckily, Congress recognizes that it lacks the science and technology expertise it needs to address the growing number of challenges facing the country that have complex technical dimensions. After receiving numerous requests for Congress to reexamine its

access to science and technology advice, the conference committee on appropriations, in its report for Fiscal Year 2019, directed the Congressional Research Service (CRS) to investigate the resources available to Congresses within the legislative branch relating to science and technology policies (U.S. Congress 2018). The conference committee also directed the Government Accountability Office (GAO) to reorganize and expand its technology assessment functions for a narrow range of technology policy issues (U.S. Congress 2018).

While these are positive steps towards ensuring Congress has access to quality science and technology advice, an even more effective solution exists, and it is one that Congress created more than forty years ago: The Office of Technology Assessment. Requests to revive the OTA were partially what spurred the conference committee to direct the CRS to investigate the availability of science and technology expertise in Congress (U.S. Congress 2018). Time and resources need not be wasted on reinventing the science and technology assessment wheel.

Recent efforts to revive the OTA have provided evidence that this is also viable politically. In 2018, a vote to fund the OTA garnered more bipartisan support than previous attempts (Fluitt and Givens 2018) and only fell short of passage by just 22 votes (Boyd 2018). According to the Washington Post Editorial Board (2018), the OTA could provide unmatched benefits for Congress. With Democratic control of the House, reviving the OTA now has the votes to easily pass through one chamber of Congress with bipartisan support. Congress can seize the opportunity to reestablish the OTA as the source of expert science and technology advice and give itself the resources needed to address pressing policy issues facing the country.

II. The old Office of Technology Assessment

In 1972, the OTA was established by Congress under the Technology Assessment Act of 1972 and codified under 2 U.S.C. §471-481 (Blair 2014). Congress designed the OTA to be its in-house science and technology experts. Its mission was to ensure that Congress understood, anticipated, and incorporated science and technology into policy making (Technology Assessment Act of 1972). In 1995, Congress zeroed out funding for the OTA to honor

campaign promises to slash government spending, effectively eliminating it (Bimber 1996). However, the legislation authorizing the OTA was not repealed in 1991; therefore, reviving the OTA would simply require re-appropriating funding for the office.

i. Structure

Congress designed the OTA specifically to ensure its assessments avoided accusations of partisanship or bias. The Technology Assessment Board (TAB), which included six Senators and six Representatives split evenly between parties, governed the office (2 U.S.C. §473). This structure gave the OTA credibility, insulated it against allegations of bias, and ensured that it incorporated a broad range of interests when conducting studies (Hill 1996). The TAB approved assessments, distributed resources, and authorized the release of final reports to Congress and the public (Blair 2014). The TAB appointed the director of the OTA as well as the Technology Assessment Advisory Council (TAAC) (Blair 2014). The TAAC was comprised of ten science and technology experts from academia, industry, and private institutions selected to serve 4-year terms on the council to review and evaluate the activities and assessments of the OTA (2 U.S.C. §476). The OTA had an annual budget of just over \$20 million, which supported around 200 full-time staff and research contractors (Bimber 1996; Kenezo 2005). One-third of its staff worked on a rotational basis and came from academia, industry, and other government offices (Fluitt and Givens 2018). The composition of its staff kept the OTA's expertise relevant to current studies.

In its 23 years of operation, the OTA issued over 700 reports for Congress (Whiteman 1985). Assessments conducted by the OTA could be requested by the chairperson, ranking member, or simple majority of any standing, special, select, or joint committee of the House and Senate (2 U.S.C. §472). OTA reports provided a menu of policy options for lawmakers to consider and debate (Graves 2018b). The position of the OTA within Congress enabled an iterative dialogue between requesting Members of Congress and their staff and OTA researchers which helped ensure OTA reports remained relevant and useful to committees (Fluitt and Givens 2018).

ii. Success of the OTA

OTA assessments protected Congress against what may have been costly misappropriations and

provided momentum for legislation that potentially improved the health of many Americans. A 1994 report by the OTA helped the Social Security Administration avoid a \$368 million investment in an outdated computer program (Hess 2016). The OTA also saved Medicare \$5 billion in costs related to unnecessary cholesterol screenings in 1989 (Susman 1996). OTA research from 1987 and 1990 even convinced Congress to extend Medicare reimbursements for mammograms and pap smears for older women (Wexler 2015). OTA reports also shaped debates on major legislation, including the Superfund Act, 1980 Energy Security Act, and Clean Air Act (Houghton 1995). The OTA ensured Congressional debates on laws, policies, and regulations were well-informed by science and technology expertise.

The OTA also inspired other countries, including Austria, Denmark, France, Great Britain, and the Netherlands, to adopt similar science and technology assessment structures within their legislative processes (Houghton 1995). Representatives from nearly one-third of the world's countries visited the OTA over the course of its lifetime to understand how it operated (Houghton 1995). The world initially looked to the U.S. for leadership and innovation in incorporating science and technology expertise into policymaking before its abdication in 1995.

iii. Criticisms of the OTA and elimination

The OTA was successful in elevating the quality of science and technology policy debates in Congress, but it was not without its faults. The main criticism of the OTA was that its reports were not timely and rarely kept pace with the Congressional schedule (Hill 1996). Because only committee chairs and ranking members could request assessments, members of Congress without powerful positions, especially junior members, found little utility in the OTA (Hill 1996). Together, these faults gave the OTA a relatively low profile in Congress outside the committees for whom it regularly conducted reports.

The OTA worked to avoid association with either party, but it began to face partisan criticism from Republicans after it published a report in 1984 highly critical of president Regan's Strategic Defense initiative (Sadowski 2012). The OTA then actively worked to maintain a low profile within Congress to avoid becoming the target of partisan attacks

(Bimber 1996). While this insulated the OTA for many years against accusations of partisan bias, the OTA's low profile gave it few prominent allies and made it an easy target for renewed Republican attacks on science policy advice and budget reductions under the new Republican majority's "Contract with America" in the 104th Congress (Bimber 1996; Sadowski 2012).

III. Technology assessment post-OTA

Science and technology assessment following the shuttering of the OTA has become diffuse and inefficient because no organization is positioned to replicate the OTA's guidance. The decentralization of science policy analysis has led to duplicated, underfunded, irregular, and shallow technology assessment efforts (Hill 1996; Wexler 2015). This has undermined Congress' ability to set science and technology policy agendas and made it reliant on the White House Office of Science and Technology Policy (OSTP) within the Executive Branch—an office that can have extremely variable staff levels depending upon the value science has within an administration.

i. Congressional Research Service

One office that could be tasked with technology assessment is the Congressional Research Service. While fulfilling the consulting dimension of the OTA's work would dovetail with the CRS current work, unlike the OTA, the CRS would struggle to replicate the OTA's analysis because it lacks the in-house experts that the OTA staffed (Fluitt and Givens 2018). The CRS, without major restructuring, would only be able to produce research summaries and memos by collecting and synthesizing research conducted by outside experts (Graves 2018a). Because the CRS has 22% fewer staff than it did in the 1970s, the staff members that remain are often stretched too thin to complete in-depth reports (Graves and Kosar 2018). A radical change in the structure and remit of the CRS would be necessary for it to provide the same quality of in-depth analysis the OTA was able to produce. The loss of services the CRS currently provides Congress would only compound the difficulty of moving science and technology assessment within the CRS.

ii. Government Accountability Office

The Government Accountability Office has also attempted to provide assessment services previously conducted by the OTA. Starting in 2001, the GAO began conducting a limited number of technology

assessments (Blair 2014). This past February, the GAO expressed interest in expanding its Science, Technology, Assessment, and Analytics (STAA) team (Heckman 2019). Some have argued STAA should be given a chance to fill the void left by the OTA (Kaplan 2019). Structural and cultural limitations, however, prevent the GAO from filling the OTA's role. Its mandate is to investigate how the government spends public funds (31 U.S.C. §712 (1)) and evaluate government programs (31 U.S.C. §717 (b)). The GAO's focus is government oversight—not policy assessment. While the GAO conducts some policy analysis, it lacks a culture of policy consultation and has little experience advising Congress on science and technology governance (Fluitt and Givens 2018). GAO reports also lack the menu of policy options that were provided by OTA reports (Fluitt and Givens 2018).

While the GAO is attempting to build the capacity needed to provide Congress technology assessment advice, that is no guarantee for success. The institutional culture within the GAO will necessarily have to shift, and major efforts would be required to change perceptions within Congress about the role of the GAO. The limited scope of the GAO's technology assessment efforts also means it still could not fully replace the services of the OTA. Additionally, involvement by the GAO in more policy discussions and debates may open it up to partisan criticisms, undermining its ability to continue providing government auditing and oversight services.

iii. National Academies

The National Academies and the National Research Council also conduct some technology assessment, but its mission and function make its assessments unable to fill the role OTA reports played in the policy process. First, National Academies reports take much longer to produce—the contract negotiation period alone can take up to 18 months (Fluitt and Givens 2018). While the OTA was criticized for the timeliness of its reports, National Academies reports take even longer. The National Academies also seek to reach consensus views on assessment recommendations before releasing reports (Blair 2014). This practice narrows the range of insights produced and limits their utility in policy debates. Most importantly, the National Academies pride themselves on their insulation from politics (Graves and Kosar 2018), but this makes them less responsive to Congressional

needs. Their location outside Congress, even longer report times, and intentional insulation from the political process mean they are in a particularly poor position to advise Congress regularly on science and technology policy.

iv. Reliance on the Executive Branch

Because Congress lacks an adequate source of science policy expertise, it now relies on the Executive Branch to set the science and technology policy agenda. This is done mainly through the White House Office of Science and Technology Policy (Bimber 1996)—an office without a director for the first year-and-a-half of the Trump administration (Yong 2019) and with one-fourth the staff it had under the Obama administration (Katz 2017). Congress's deference to the OSTP undermines its independence and ties the quality of expert advice to whether the President values science and technology expertise. In 2018, The OSTP only had 50 staff members working on federal science and technology policy (E&E News 2018), and the position of Chief Technology Officer went unfilled for two years of the Trump presidency (Chafkin 2019). Even if science and technology policy were prioritized by an administration, assessments from the OSTP could easily contain political bias. Furthermore, advice can change with the shifting priorities of an administration or during a change in administrations. The Executive Branch cannot provide the in-depth, unbiased assessments that Congress needs to make well-informed policy.

Outside of the OSTP, Congressional staffers are also reliant on federal agencies for science policy guidance (Fluitt and Givens 2018). While further removed from the politics of the White House, federal agencies are nevertheless susceptible to the political whims of an administration. Experts in federal agencies have had their work suppressed, edited, and censored by politically appointed (Maron 2017; Scoville 2019) and federal agency researchers have begun to self-censor out of concern for political retribution (Carter 2019). Expert scientists are being kept off advisory panels, reducing access to expert scientists in academia (Rodrigo 2019). The agencies themselves are also losing experts for legislators and their staff to consult. In the first year of the Trump administration, over 200 scientists left the EPA alone (Friedman, Affo, and Kravitz 2017). 80% of scientists in the Department of Agriculture's Economic Research Service are projected to leave when it relocates to

Kansas City at the end of 2019 (Baskin 2019). Across the Executive Branch, as of June 2018, only 25 of 83 "scientist appointees" had been filled (Center for Science and Democracy 2018).

v. Reliance on outside expertise

Legislators and their staff may also seek out and receive science and technology policy advice from individual researchers in academia and industry. This *ad hoc* approach, while useful for Members of Congress or staff to receive advice on a specific issue of interest, is not optimized to provide Congress, as an institution, in-depth and sustained science and technology assessments. This informal network of connections is highly dependent on whom the legislator or their staff know in academia and industry. Even if a legislator has scientists on their staff, their professional connections within science cannot possibly cover the breadth of policy issues the legislator might have to consider. Additionally, connections between outside experts and Congress that can facilitate the incorporation of scientific advice take time and constant contact to develop (Akerlof 2018). While a legislator or their staff might succeed in building these relationships, they can quickly be lost with staff turnover, Congressional retirement, or election loss. The lack of any formalized advising relationship between outside experts and Congress constrains their utility in providing science and technology policy assessments.

IV. Reestablishing the OTA

Only re-establishing the OTA can solve the pressing expertise crisis in Congress. Its structure and mandate ensured it could provide non-partisan expert opinion on the science and technological questions faced by society. Even with an expanding technology assessment office in the GAO, there would be very little overlap according to its directors (Corrigan 2019). Re-establishing the OTA would also restore some power and independence to the legislative branch (Fluitt and Givens 2018). Just as the Congressional Budget Office acts as a check to the White House Office of Management and Budget, the OTA would serve to check the OSTP (Heckman 2019). This would ensure Congress can execute its Constitutional oversight role and operate with sound legislative advice.

Even though the OTA fell victim to criticism and eventual budget elimination from Congressional

Republicans, its reestablishment would enjoy broad, bipartisan support among the American public. 67% of Americans agreed in 2018 that public policy in the U.S. should be “based upon the best available science,” including 77% of Democrats and 70% of Republicans (Research America 2018). Reestablishing the OTA also has some support among current Congressional Republicans who have an interest in strengthening the independence of the Legislative Branch (Graves 2018a). Republicans also joined Democrats in a 2015 letter to then-Speaker Paul Ryan encouraging him to reestablish the OTA (Graves and Kosar 2018).

i. Reestablishing the foundations of the OTA

Reestablishing the OTA would not be procedurally difficult. The Technology Assessment Act of 1972 has never been repealed, so re-establishing the OTA can be executed through the appropriations process alone (Hill 1996). Robert Cook-Deegan, a former staffer in the OTA, has proposed that the OTA could be successfully reestablished with \$5 million in preliminary funding (Kaplan 2019). In April 2019, the House Appropriations Committee included \$6 million in its \$3.943 billion budget for the Legislative Branch to restart the OTA (House Committee on Appropriations 2019). Adjusting for inflation, restoring the OTA’s budget to pre-closure levels would cost \$34 million (U.S. Department of Labor 2019). While more than Cook-Deegan’s proposed \$5 million or the \$6 million appropriated by the House, this would still be less than 1% of the total legislative branch budget, which is currently \$4.836 billion (Brudnick and Eckman 2018) and only 0.00083% of the \$4.1 trillion federal budget (Angres and Salazar 2019). In contrast, the GAO has requested a \$58 million *increase* in its budget for FY2020 (Heckman 2019). As the OTA is refunded over time, work could be contracted out, as it was when the OTA was initially established (Majumder 2019).

ii. Improving the OTA’s structure

Congress can also take a few actions to further strengthen the office and address some of the criticisms of the old office. Individual members of Congress should be authorized to request assistance in drafting legislation as well as full assessments. This would not overburden the OTA because the TAB would still approve assessment requests, but it would make the OTA a useful resource for every member of Congress. The OTA should also be given the ability to

commission its own studies to assist committees—such as Intelligence or Judiciary—that may not have direct oversight of science and technology policy but still handle legislation with a scientific or technical dimension. This would more prominently and permanently incorporate the OTA into the legislative process and ensure Congress is equipped to have well-informed policy debates on the issues facing the country.

The new OTA could also improve its assessment process to be timelier, better distribute its findings, and connect with the public. It could be timelier by producing a wider array of assessments, memos, briefs, and forecasts, and it can better distribute its work through multiple media forms (e.g. videos, podcasts, open-source databases) in addition to reports (Fluitt and Givens 2018). The CRS has successfully adopted a number of these reform strategies and could provide a framework for incorporating them into a revitalized OTA. The OTA could increase its connections with the public by incorporating participatory governance mechanisms into its assessments. The OTA was originally authorized to seek a broad spectrum of voices in its assessments, including those of citizens (Hill 1996), and the new OTA would simply need to expand those efforts. This would help strengthen democratic norms (Rayner 2003) and improve the legislative credibility of Congress (Sclove 2010).

V. Conclusions

Congress faces a myriad of science and technology policy challenges yet lacks the institutional knowledge and resources to address them. While Congress recognizes the need for access to science and technology expertise, it risks perpetuating inefficient solutions rooted in the devolved environment of technology assessment that emerged after the OTA closed. Fortunately, a better solution exists. The OTA could be restarted with an initially modest amount of funding, and even a fully refunded OTA would require a budget that is a tiny fraction of Congress’s total expenditures. The OTA has a historical track record of producing in-depth and consequential science and technology assessments, and it can be restarted procedurally with relative ease.

The new OTA would reestablish legislative independence and act as a boundary institution

between science and politics that improves the integration of American scientific expertise in policymaking. Sound science and technology policy built upon expert advice would benefit Congress, American society, and the world. U.S. scientific and economic leadership are being challenged on multiple fronts. The reestablishment of the OTA

would send a clear message domestically and abroad: America is not only still the preeminent destination for research and discovery, but it is also committed to leveraging its pool of knowledge to better the lives of every citizen.

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