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Technology Assessment in the USA: Distributed Institutional Governance

by Jathan Sadowski and David H. Guston, Arizona State University

In the US, there is a lack of a centralized technology assessment (TA) capacity, which effectively moves the US back in time, pre-Office of Technology Assessment, when TA functions existed but were so decentralized and varied that they were hardly recognized as such. There is no primary organization, public or private, to innovate new methods, establish best practices, or provide policy guidance. Instead, there are disparate organizations, the connections among which cannot even be called a network. This article will describe three discrete – but at times overlapping, interacting, and complementary – institutional settings where activities one could recognize as TA are occurring: government agencies, non-governmental organizations, and academic research centers. The paper will conclude with a brief discussion of the challenges and roadblocks to institutionalized TA in the US.

1 Introduction

When one thinks of institutionalized technology assessment (TA), whether in the context of the United States or elsewhere, one invariably calls to mind the Office of Technology Assessment (OTA). In service to the US Congress, OTA was the first and largest "parliamentary" TA office. Scholars, journalists, and participants have often written on its history and methods (see Bimber 1996; Guston 2003; Hill 1997; Keiper 2004; Kunkle 1995) – and for good reason, since it marks an important, and still unique, experiment in TA. OTA's origins reach back to the early 1960s[1] when tensions flared between the executive and the congressional branches of the federal government about access to technical and scientific advice (Bimber/Guston 1995). After much debate in Congress about what methods and styles of advice legislators needed at their disposal, the Technology Assessment Act, which would establish OTA, eventually passed and President

Richard Nixon signed it into law in 1972. After a largely productive – if sometimes controversial and tumultuous – lifespan, OTA eventually became the victim of widespread budget cuts. In 1995, the lights went out on OTA.

Socio-technically minded academics and policy-makers often speak with a fond nostalgia for OTA. There are periodically public calls to refund the organization. Representative Rush Holt, a Democratic member of Congress from New Jersey who also has a PhD in physics, argued in the popular technology magazine *Wired* for "reversing the congressional science lobotomy" – that is, the defunding of OTA – "by restoring a once robust science resource to its rightful place" (Holt 2009).[2]

At the time of this article's publication, however, OTA will have been defunct for nearly as long as it was operational. In these interim years, things have changed: For one, the political climate in the US is stormier than it was during OTA's existence. The aggressive partisan divide in the contemporary Congress means everything has become a battleground for ideological contention, and technoscientific issues have not escaped appropriation by some partisans to accentuate or even define that divide. OTA had frequently come under fire by some Republicans, who accused it of being a tool for the Democratic Party (Keiper 2004). Today, there are no prospects for such an institution to serve both houses and parties in Congress until there are significant shifts in the political dialogue.

The lack of a centralized TA capacity moves the US back in time, pre-OTA, when TA functions existed but were so decentralized and varied that they were hardly recognized as such. There is no primary organization, public or private, to innovate new methods, establish best practices, or provide policy guidance. Instead, there are disparate organizations, the connections among which cannot even be called a network. The remainder of this article will describe three discrete – but at times overlapping, interacting, and complementary – institutional settings where activities one could recognize as TA are occurring: government agencies, non-governmental organizations, and academic research centers. The paper will conclude with a brief discussion of the challenges and roadblocks to institutionalized TA in the US.

2 Government Agencies

Even without OTA, the US government gets TA through other means. We will largely focus on the ways TA emanates from the federal tier before pointing to TA at the state level.

After OTA shut down, Congress shifted responsibility for conducting officially sanctioned TA to the Government Accountability Office (GAO), at first as a pilot program and then, starting in 2008, as a permanent function. GAO was initially established in 1921 as the General Accounting Office until a 2004 legislative act changed its name. Observers often referred to GAO as the "congressional watchdog" for its audits and investigations of how the federal government spends public money. Part of GAO's mission, however, overlaps with that of parliamentary TA, to "provide Congress with timely information that is objective, fact-based, nonpartisan, nonideological, fair, and balanced".[3]

Similarly, the agency's own broad definition of TA matches the spirit of the overarching goals of other TA organizations: "the thorough and balanced analysis of significant primary, indirect, and delayed interactions of a technological innovation with society, the environment, and the economy and the present and foreseen consequences and impacts of those interactions".[4] While this aim is laudable, and individual TA reports issued by GAO have been well-received, the TA function there has not come close to being able to replace OTA's organizational capacity and leadership. GAO's TA function – which has produced only seven reports since 2002 – is somewhat lost within a larger, non-technical organization.

The Federal Trade Commission (FTC) represents another increasingly TA-like function, this time from the executive branch of US government. While it does not have an official mandate for TA – its mission is to "protect consumers" and "promote competition" – FTC has, over the past fifteen years, been on the frontlines of analyzing and policing issues related to information privacy and the data economy. FTC holds workshops and writes in-depth reports on these

issues, which usually receive heavy attention and coverage from journalists, academics, and policy wonks.[5] Legal scholars Solove and Hartzog (2014, p. 583) find that, "in practice, FTC privacy jurisprudence has become the broadest and most influential regulating force on information privacy in the United States – more so than nearly any privacy statute or any common law tort".

In addition to the few federal agencies that conduct both *de jure* and *de facto* TA, presidential committees and commissions often provide advice to the executive branch through the conduct of TA-like activities. For example, in January 2014 the President's Council of Advisors for Science and Technology (PCAST) – a standing body advisory to the President and his Office of Science and Technology Policy – conducted a 90-day review of big data and privacy. PCAST released the resulting report "Big Data: Seizing Opportunities, Preserving Values" to the public, which became, according to the White House, "part of the foundation for future policies and actions that will help us stay at the forefront of this rapidly evolving sector".[6]

There are also presidential commissions that are more ad hoc than PCAST, but more stable than any one of its studies. Perhaps the most high-profile TA-like commission has been the Presidential Commission for the Study of Bioethical Issues.[7] This commission releases, on average, biannual reports that look at questions related to the ethical and social aspects of scientific research and technological development. Neither as technical nor as wonky as traditional TAs, the Bioethics Commission's reports are much more philosophical in their orientation: They sketch out ethical frameworks, principles, and approaches; they grapple with larger political questions related to justice, fairness, and democracy; and they consider individual rights, dignity, and autonomy.

Even in the absence of OTA, the most well-institutionalized governmental TA capacities exist at the federal level. "The technology assessment movement that contributed to the creation of OTA had only a modest impact in the states" (Guston et al. 1997, p. 235), however, and while there is some demand in the state legislatures for their own technical information and analysis, the supply is short. Part of the problem is that tight budgets and limited resources mean that state legislators often relegate TA-like functions to staffers – who are already stretched thin and likely not experts themselves. This situation leaves most states without their own dedicated organizations for TA, and state legislators must instead rely on whatever forms of distributed TA they have access to and trust to give reliable analysis – often including not only explicitly political organizations like executive agencies and lobbyists, but also ostensibly non-political, non-governmental organizations like state-level academies of science and state universities.

3 Non-governmental Organizations

In addition to official government agencies, there are many non-governmental organizations (NGOs) that undertake TA. We will describe and provide some examples of three major categories: think tanks and policy advocacy, quasi-governmental organizations, and media platforms.

There are many think tanks and policy advocacy organizations that conduct familiar TA activities, e.g., writing research reports, providing real-time analysis and commentary via articles, blog posts, and press releases, and generating policy recommendations directed at political decision makers. Unlike some government agencies like the former OTA or the current GAO that strive to be bipartisan and neutral, these organizations have explicit ideological positions with regards to what values, interests, and worldviews their work supports. Possessing such a worldview does not necessarily degrade their TA. One does, however, need to be conscious of the choices and framings that influence their analyses and conclusions. These NGOs are varied, and enumerating an in-depth, ideologically ordered, cross-section of them is beyond our current scope – especially since their TA functions are usually just one part of a larger organization. Some examples include the regulatory focus on "Internet and Technology" within the right-wing Heritage Foundation and the "Open Technology Institute" program within the centrist New America Foundation. Recently, the Brookings Institution, a left-center think tank, released a white paper that made an argument for creating what the author called a "Federal Robot-

ics Agency" (Calo 2014). This proposed agency – which would advise lawmakers, file court briefs, and fund new research – would serve as a source of in-depth knowledge about the social, legal, and policy aspects of the broad technical field of robotics. While motivations driving these legislative prescriptions are praiseworthy, white papers that take a strong stance on supporting efforts for (institutionalized) TA are still rare cases.

Curiously enough, though, a large number of NGOs with explicit focus on technology policy tend to argue for positions on the civil libertarian side of the political spectrum. Influential instances are the American Civil Liberties Union's project on "Speech, Privacy and Technology", the Electronic Frontier Foundation, the Center for Democracy and Technology, and Electronic Privacy Information Center. One could speculate about reasons for this ideological cluster: Perhaps new technologies, especially those related to digital information and communications, pose a greater – or at least more obvious – actual and potential threat to civil liberties than previous technologies did; or perhaps articulate, well-positioned, and wealthy people advocate for these libertarian policies that suit both their ideological disposition and their interests in these technologies.

While think tanks and policy advocacy organizations vie for attention in a decentralized TA environment, one large, centralized player does remain – the quasi-governmental National Academies complex, composed of the National Academy of Sciences, the National Academy of Engineering, the Institute of Medicine, and the National Research Council. The National Academies' TA capacity – the scope of topics, the process for conducting studies, the prolific output (two to three hundred reports annually), and the authoritative position – is, perhaps, the closest institutional proxy to OTA that exists in the US today – indeed, many high-ranking OTA personnel moved to the Academies. The National Academies' wide-ranging TA is unique when compared to other quasi-governmental organizations that only focus on specific technologies, e.g., the "Project on Emerging Nanotechnologies" partnership between the Woodrow Wilson International Center for Scholars and the Pew Charitable Trusts.

An emerging trend of media platforms has begun to serve TA-oriented functions. These platforms strive to present analyses, arguments, and recommendations in a way that a non-specialized audience can understand and incorporate into their lives. Such platforms are still scarce, but there are notable vanguards including the "Future Tense" program – a partnership between the New America Foundation, *Slate* magazine, and Arizona State University – which aims to "explore emerging technologies and their transformative effects on society and public policy."[8] Through a fellowship program, a regular series of public events, and a dedicated channel on *Slate.com*, Future Tense presents a multi-scalar way of spreading its impact. Another example is *The New Atlantis: A Journal of Technology and Society*, an outlet that describes itself as "an effort to clarify the nation's moral and political understanding of all areas of technology."[9] Specifically targeted at policy-makers and scientists, as well as an interested public, *The New Atlantis* is one of a few hybrid outlets that tow the line between professional journal and popular magazine. It does so by combining elements of academic rigor and socio-technical topics with the argumentative style and lucidity of a political commentary magazine. The hope is that such a synthesis hits the right balance where technological topics can be assessed in a way that has broader political and socio-cultural impacts. Platforms like Future Tense and *The New Atlantis* are relatively new, so it remains to be seen how effective they actually turn out to be at providing fresh approaches to both the practice and dissemination of TA.

As media platforms, Future Tense and *The New Atlantis* also represent the work of think tanks and policy advocacy groups expanding their vision and audience beyond traditional, narrowly cast decision makers and toward the educated public. A group called Expert and Citizen Assessment of Science and Technology (ECAST) pursues a similar effort, but oriented toward the creation of participatory TA (pTA). Rather than advocate for a recreated OTA, a group representing academic research (Arizona State University), science museums (Museum of Science, Boston), quasi-governmental organizations (the Woodrow Wilson International Center for Schol-

ars), non-governmental organizations (the Loka Institute), and citizen science (Science Cheerleader and SciStarter) came together in 2010 to create ECAST. While marginally institutionalized, ECAST has nevertheless spearheaded US involvement in the participatory project "World Wide Views on Biodiversity", organized by the Danish Board of Technology, and has received a cooperative agreement from the US National Aeronautics and Space Administration to conduct a pTA of NASA's planned Asteroid Initiative.

4 Academic Research Units

For readers of this journal, perhaps the most familiar modes of TA – and the ones they are likely most directly contributing to – are those stemming from academic research units. These university-based organizations grew up around the TA-like funding schemes from public and private sponsors, which provide the resources needed to coordinate and direct research outcomes. They all operate differently, based, in part, on the parameters, goals, and conditions inherent to external funding sources. But there is a more general family resemblance among these organizations that reflects the culture of their academic context. Unlike the other institutional categories we describe, TA originating from academic research is most heavily geared towards epistemic contributions, dialogue, and critique, with an emphasis on academic publishing, and with some organizations undertaking pTAs and/or writing white papers for industry and policy-makers. While academic research centers are often funded by government agencies (e.g., the U.S. National Science Foundation [NSF] or U.S. Department of Energy), their forms of TA tend to be somewhat more removed from policy-makers than think tanks and quasi-governmental agencies. Many such activities have been spawned by connecting societal research to new or emerging science and technology research, e.g., the Ethical, Legal and Social Implications (ELSI) Research Program attached to the Human Genome Initiative and the social and ethical implications (SEI) research attached to the National Nanotechnology Initiative.

Examples of the latter are the two Centers for Nanotechnology in Society, one at Arizona State University (CNS-ASU) and the other at University of California, Santa Barbara (CNS-UCSB). NSF funds these centers to conduct a variety of academic research, public engagement projects, and informal science education initiatives (such as working with science museums) – many of which revolve around questions of governance. Another example is the Belfer Center for Science and International Affairs (BCSIA) at Harvard University, which focuses on the intersections among science, technology, environment, and security. BCSIA advances scholarly knowledge and takes an active role in providing policy advice to lawmakers, diplomats, and military leaders. A third is the Center for Internet and Society at Stanford University, which researches information and communication technology and law, focusing on regulation and legal protection for civil liberties, privacy, data protection, and network neutrality. While lodged in universities, these centers and their numerous cognates are not very different from their counterpart "think tanks" in NGOs.

5 Conclusion

In the US context, TA comprises a highly distributed set of organizations, which are at best loosely networked together by a broadly shared and overarching function, but distinguished by varying capacities, methods, values, intentions, and goals. On one hand, distributed TA allows for an agile, bottom-up style where not one particular type of TA necessarily becomes dominant and shuts out other alternatives. On the other hand, the basic challenge with distributed TA is that there is little or no coordination of what subjects are studied, how they are analyzed, and how to ensure assessments have impact. There are gaps and clusters in the distributed TA network. That is, we see partial coverage of scholarly issues – with clusters around, for example, civil liberties like privacy and free speech or bioethical concerns related to research conduct and individual harms – and of existing or emerging technologies – with clusters around, for example, nanotech-

nology, information and communication technologies, and environmental topics.

The purpose of this paper is to give an overview of the institutional landscape. Therefore, we are reticent to go further than that descriptive goal by providing our own blueprints or predictions about what the future holds for TA in the US. As we see it, right now the National Academies complex represents the most holistic, diversified organization, but it is still independent and discrete, just a larger node in the network. There is not a single institution that acts like a leader, whether through coordinating dispersed efforts, serving as a clearing house for best practices, or ensuring influence and impacts. Much more planning, communication, and resources are needed before such an institution, or small group of institutions, could be created to oversee, manage, and tighten the network of distributed TA.

It is also possible that things will remain stable, and widespread debates continue to be the norm. Worse, the capacity for TA could degrade further, until it is nothing more than *ad hoc* advocacy and speculation. But one thing is certain: The nature of the present distributed model is rife with too much uncertainty to be sure of what will emerge.

Moreover, it is difficult to point to one primary cause for this form of distributed governance. The reasons likely comprise a diverse set of factors. Anything beyond (educated) speculation, however, would require a study that exceeds the boundaries of this paper. As explained in the introduction, fierce partisanship in the US impedes legislative endeavors such as creating new agencies or granting robust capacities to existing ones. Additionally, "technology" and "innovation" hold positive, even revered, positions within the dominant worldview in the US. That is, for many, innovation is an end in itself – rather than a way to make progress toward improved public health, sustainable energy production, etc. –, so any self-conscious attempt at governing the development or implementation of a technology is seen as unnecessary, or even backward. When combined with the iron grip of the invisible hand of capitalism, the technological optimism of American culture can put quite a stranglehold on (institutionalized) TA in the US.

Disclosure Statement

Jathan Sadowski previously worked for the "Future Tense" partnership between the New America Foundation, *Slate* magazine, and Arizona State University, and he is a graduate student in CNS-ASU. Dave Guston is a principal in ECAST, and the director of CNS-ASU.

Notes

1) Inouye and Süsskind (1977) argue that OTA's lineage reaches back, indirectly, to a 1937 government report, Technological Trends and National Policy.
2) In-depth assessment of the many lessons to be learned from the OTA experience can be found in other volumes (e.g., Morgan/Peha 2003).
3) http://www.gao.gov/about/index.html (download 6.8.14).
4) http://www.gao.gov/technology_assessment/key_reports (download 6.8.14).
5) FTC's most recent report was released in May 2014: "Data Brokers: A Call for Transparency and Accountability"; http://www.ftc.gov/news-events/press-releases/2014/05/ftc-recommends-congress-require-data-broker-industry-be-more (download 13.11.14).
6) http://www.whitehouse.gov/issues/technology/big-data-review (download 7.8.14).
7) http://bioethics.gov/about (download 7.8.14).
8) http://futuretense.newamerica.net/ (download 7.8.14).
9) http://www.thenewatlantis.com/about/ (download 7.8.14).

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Experiments in Technology Assessment for International Development: What Are the Lessons for Institutionalisation?

by Adrian Ely, University of Sussex, Patrick van Zwanenberg, CENIT, and Andrew Stirling, University of Sussex

Several countries across the OECD have a relatively strong history of using technology assessment (TA) to inform science, technology and innovation (STI) policies. But many lower income, developing countries lack the capabilities and institutions for doing so. Despite its more general potential role in this area, TA has been used relatively little (in or outside the OECD) to inform and challenge investments and policies that address international development objectives. This paper discusses two case studies in which non-governmental TA exercises have focussed on international development objectives in and across lower income countries. Both have made particular efforts to include broader perspectives in the TA process. The paper asks what we can learn from these networked "experiments" and explores possibilities for further institutionalisation of TA for international development.

1 Introduction

International organisations (see e.g. UN System Task Team 2012) often point to key roles for science, technology and innovation (STI) in helping to foster sustainable and inclusive development. This includes moves towards a "green economy in the context of poverty alleviation and sustainable development" discussed at the 2012 Rio+20 conference (UNEP 2011) and to other international development objectives such as the effective implementation of the UN Framework Convention on Climate Change (UNFCCC), maintaining progress towards millennium development goals (UNDP 2011) and the formulation and realisation of sustainable development goals (OWG-SDGs 2014).

Annual global expenditure on research and development continues to grow beyond one tril-