WORKSHOP REPORT: SUMMARY ONLY

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Enhancing the Usefulness of

Science of Science and Innovation Policy (SciSIP) Research

An Agenda-Setting Workshop

Held at: George Mason University – Arlington, Virginia

On: December 7, 2015

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Executive Summary

Workshop Overview

On December 7, 2015, a group of practitioners of science and innovation policy drawn from the U.S. Federal government and select non-governmental organizations met for a workshop titled *Enhancing the Usefulness of Science of Science and Innovation Policy (SciSIP) Research: An Agenda-Setting Workshop.* The workshop was held at the George Mason University (GMU) campus in Arlington, Virginia, and organized jointly by the School of Policy, Government, and International Affairs at GMU and the Center for Science, Technology and Economic Development (CSTED) of SRI International. The workshop was sponsored by the SciSIP Program at the National Science Foundation.

This workshop was designed specifically to elicit input from practitioners in the field of science and innovation policy about important policy questions that they have faced in their careers that might be addressed by future SciSIP researchers. A second purpose was to learn more about how these professionals learned about the results of academic research relevant to their jobs, and ways by which the SciSIP program could facilitate knowledge transfer from the research community to the practitioner community. As a result, participants were drawn principally from the Federal government or from organizations involved in advising Federal and state governments on science and technology policy issues.

This report presents the results of the day-long set of interactive discussions and presentations with the hope that they provide helpful insights into the areas of research most likely to be read and used by practitioners in science and innovation policy. We also seek to strengthen the SciSIP community of practice, as envisioned by former Presidential Science Adviser Dr. John Marburger III, by presenting comments on potential mechanisms for improving the connection between researchers in this field and those who are charged with providing advice and recommendations to the policymakers formulating science and innovation policy. Although we summarize the inputs gathered from discussions among the participants, the workshop organizers are solely responsible for its content, and any statements contained herein should not be taken as representative of the views of the participants, their affiliated organizations, or the National Science Foundation.

Acknowledgements

The organizers would like to thank the current Program Director for SciSIP, Dr. Maryann Feldman, for formulating the call to organize this and similar workshops, and for her sponsorship and guidance of the workshop itself. We also thank the speakers who addressed the plenary sessions of the workshop: Dr. Faye Lomax Cook, Assistant Director for Social, Behavioral, and Economic Science at the National Science Foundation; Mr. Kei Koizumi, Assistant Director for Federal R&D at the Office of Science & Technology Policy in the Executive Office of the President; and Dr. Lisa Simpson, President and CEO of AcademyHealth.

Dr. Christina Freyman and Mr. Steven Deitz of SRI and Prof. Connie McNeely of GMU contributed substantially through their able facilitation of discussions during the workshop, and their views and inputs before and after the workshop itself. We owe special thanks to Mr. Alfred Sarkissian, a doctoral student at GMU, for his research contributing to the workshop framing paper and design. We also acknowledge the efforts of Mr. Sarkissian and his fellow graduate students in SPGIA—Lisardo Bolanos Fletes, Joel Hicks, Yong-Bee Lim, Lauren McCarthy, David Morar, and Camilo Pardo—who served as rapporteurs during the workshop and recorded comments and contributions from the participants. Thanks also go to the staff of the GMU Office of Events Management who helped with the logistics and preparations for the workshop.

Finally, we owe a tremendous debt of gratitude to more than 30 professionals and experts in Federal science and innovation policy who contributed a day of their time and their substantial expertise and thoughtful observations during the course of this workshop. We hope that this report reflects the quality and depth of their commitment to making more informed and scientific decisions on issues of science and innovation policy.

Key Findings

The workshop relied primarily on the World Café format to elicit the perspectives of the participants. This format centers on 30-minute, facilitated small group discussions. Each participant joined six of these discussions over the course of the day.

The morning sessions, which aimed at building a practitioner-driven agenda for NSF's SciSIP research, identified more than thirty specific questions, answers to which would help practitioners in a variety of settings. The organizers distilled these questions from notes taken during the discussions by the rapporteurs or the facilitators, or from written notes taken by the participants themselves. We grouped the thirty questions under ten broad themes that reflect the types of problems and challenges faced by practitioners.

1. *Making R&D Funding Decisions*

- How are R&D funding decisions actually made in practice?
- What heuristics do senior decision makers use when determining R&D funding levels and distributions? How frequently are formal models or evaluations used as inputs to funding decisions?
- What are the different types of decisions that policymakers in Congress, the White House and Federal agencies make and how can SciSIP research inform each of them?
- How well do different functional approaches (e.g., peer review, strong program manager, formula funding) to allocating and managing Federal R&D funding work under different conditions and circumstances? What are best practices?
- Can we build empirically-based, theoretically sound models of R&D priority setting and decision making that account for such realities as incremental budgeting; option preservation; international competition; and differing levels of uncertainty across R&D domains regarding technical success, subsequent commitments of complementary resources, and goal accomplishment?

2. *Managing Agency and Multi-Agency R&D Portfolios*

   - Can we develop better databases and better data management tools for managing R&D portfolios within and across agencies?
   - Are there effective ways to access and incorporate information about non-Federal R&D investments to aid decision makers in deciding whether and how to reinforce and/or take advantage of such investments?

3. *Evaluating Federal R&D Programs*

   - What is the return on Federal investments in R&D and how does it depend on the context and objectives of the investments?
   - How might ROI approaches be augmented to incorporate both non-economic returns and returns received outside of the U.S. (so-called "international spillovers")?
   - Have Federal R&D agency strategic plans, performance plans, and performance reports under GPRA led to measurable improvements in agency performance and R&D outcomes?
   - Can retrospective analysis of more than two decades of experience with GPRA reporting help improve their basic parameters, including assessment of R&D outputs and particularly R&D outcomes?

4. *Designing and Implementing Public-Private Partnerships (PPP) for R&D*

   - How well do various models of public-private partnerships for science, technology, and innovation work?
   - Are different models better in difference circumstances?
   - How might their structure and operations be improved?

5. *Optimizing the Performance of the Federal Laboratories*

   - What is the nature and structure of the Federal government science and engineering enterprise?
   - What approaches would improve valuation and management of R&D activities conducted by government laboratories?
   - In what ways should Federally-employed and Federally-contracted scientists and engineers be managed and rewarded differently from those in academia and industry?

6. *Enhancing Regional Contributions of Federal R&D Investments*

   - What contributions do Federal laboratories make to regional innovation systems and to regional economic development in general?
   - How important is active participation in open innovation to the performance of the laboratories in achieving their missions?
   - For laboratories with primary missions other than economic development, to what extent can regional and national economic development be achieved as a side effect or co-benefit of achieving their primary mission?

7. *Tailoring Industrial Innovation Policy to Sectoral Variation in Innovation Processes*

    - How do industries, including service industries, vary with regard to innovation and commercialization processes?
    - How do appropriability mechanisms, such as patenting, trade secrecy, and use of complementary assets, differ by sector and over time?
    - How can Federal technology transfer policy as embedded in the Bayh-Dole Act be made more flexible and be adapted to industry-specific requirements?
    - How should policies aimed at accelerating industrial innovation be tailored to achieve better results across Federal missions, such as energy, transportation, and environmental protection, that impact "legacy" sectors?

8. *Lessening the Burden of Regulation on Academic R&D Performers*

    - How have regulations on the conduct of research affected R&D performers and outputs?
    - Would it be possible and useful to conduct regulatory impact analyses before issuing such regulations?

9. *Enhancing the Contributions of Scientific and Technical Understanding to Regulatory Policy Making and Implementation*

    - What is the relationship between information offered by the public and by scientific advisors and regulatory outcomes?
    - Do the institutional mechanisms through which such advice is offered make a difference?

10. *Helping Education and Training Institutions Respond More Effectively to Changing STEM Labor Market Needs*

    - Through what channels, how effectively, and how quickly does labor market demand for STEM skills get translated into education and training programs?
    - How can Federal research and education programs be better designed to facilitate adjustment by education providers to changing labor demand, where appropriate?

The afternoon sessions, which sought to identify mechanisms that would strengthen the contributions of SciSIP research to practice, led to the following strategies for SciSIP research activities (items 1-5) and for SciSIP program management (items 6-10) to consider:

1. *Commission meta-analyses or research syntheses on topics known to be of interest to practitioners and on which a well-established literature exists:* Syntheses of specific literatures targeted to particular groups within the community of practice would likely provide a high return on a modest investment.
2. *Solicit proposals and cluster awards around specific practitioner-identified themes:* The workshop participants expressed a firm consensus that the community of practice is likely to be better served if researchers and practitioners together define some topics of shared interest, balancing those defined solely by principal investigators.
3. *Support research in order to identify research themes of interest to practitioners:* The SciSIP community of practice is not well-defined, and it is likely that many of its 'members'

are unaware that they belong to it. Themes identified through relatively unstructured approaches that draw on self-identified members of the community may not represent fully the potential demand for SciSIP research.

4. *Create a "SciSIP Fellows" program in which researchers would serve temporarily in Federal agencies:* Active researchers may have knowledge that would be useful to Federal agencies. Experience in the Federal government would provide valuable input into the definition of research problems when the Fellows return to academia.
5. *Establish a pilot version of I-Corps for SciSIP:* I-Corps was devised to encourage NSF's natural science and engineering grantees to translate their findings into commercial use. The I-Corps template might be modified to reflect the differences between outreach to businesses by scientists and engineers and outreach to policy-makers by social scientists.
6. *Articulate more specifically to proposers that the program will interpret NSF's "broader impacts" criterion to include the anticipated value of the research results to the community of practice*: Clearer guidance as to the meaning of this criterion could encourage proposers to invest energy in engaging with the community of practice during proposal preparation and in communicating research results.
7. *Create a program advisory board that includes both practitioners and researchers:* This approach may provide a mechanism for identifying themes of mutual interest to both practitioners and researchers and for building awareness and trust that supplements a rechartered and reactivated Interagency Working Group.
8. *Develop stronger relationships with communication intermediaries:* Workshop participants generally agreed that the SciSIP research community should seek to leverage existing platforms that already reach the community of practice, such as think tanks and media organizations as well as government-wide websites like data.gov and research.gov. Projects carried out by such intermediaries or in partnership with SciSIP researchers are more likely to reach practitioners than efforts to build new platforms, such as the SciSIP website.
9. *Encourage SciSIP staff to intermediate actively between researchers and potential users of their research in the community of practice:* A targeted approach in which SciSIP staff members broker connections might be effective in reaching potential users and gaining their trust. However, this "trusted broker" responsibility could put a strain on the program staff and should be designed and implemented carefully in order to avoid the perception of favoritism and bias.
10. *Expand the use of practitioners as proposal reviewers:* This action would provide another mechanism to align SciSIP research projects more closely with practitioner demand, but would have to be handled judiciously, because there will be aspects of proposals that such reviewers may not be well-qualified to assess.