Challenge and Opportunity

# Leveraging and Shaping Private Sector Innovation

The federal science and technology (S&T) budget is sizeable, but the majority of the national investment is by the private sector. This is both a challenge and an opportunity for the incoming Trump administration: How can the federal government gently influence the direction of private investments to support national needs? How can federal agencies better leverage private-sector innovations to meet current and future goals?

## Current Investment Picture

Throughout its history, the United States has relied on innovation to solve its toughest problems and set up future successes. While most innovation occurs in the private sector, government plays a significant role in fostering innovation as an acquirer, user, and regulator of new technology. The next presidential administration will need a broad understanding of the innovation ecosystem outside of government and the support of the new federal agency leadership to enact plans that enable our nation to both cultivate and tap into private-sector innovation, so that we continue to enjoy our predominant economic and strategic position on the competitive world stage.

*R&D Magazine* forecasts that U.S. innovation investment will reach $514 billion in 2016. Industry remains the leading investor (66 percent) and performer (72 percent) of overall U.S. R&D, with the federal government a distant second at 25 percent and 13 percent respectively (when including federally funded research and development centers).

Internationally, the United States is the top country in R&D spending, representing 26.4 percent of the global investment. However, China plans to increase its R&D investment and could replace the United States as the top R&D spender and world innovator by 2022. Other major nations, such as Japan, Germany, the U.K., and Russia, are also ramping up their innovation investment.

> **"From the advances that put a computer on every desk to the discoveries that led to lifesaving vaccines, major innovations are the result of both government investments in basic research and the private-sector creativity and investments that turn them into transformative products... The public sector's investments unlock the private sector's ingenuity."**
>
> –BILL GATES, "ACCELERATING INNOVATION WITH LEADERSHIP," OCTOBER 2016

## Understanding the Problem

Federal R&D investments are an increasingly critical component in seeding and growing the nation's innovation ecosystem. That's because the private sector is focusing its R&D spending on later stage development and return on investment, while significantly decreasing its investments in early-stage applied research. According to the Information Technology & Innovation Foundation, private-sector firms "don't fund basic research because it is high risk—it doesn't readily translate into products in the short term. Firms are simply financially unable to

*The MITRE Corporation is a not-for-profit organization chartered to work in the public interest. We apply our skills in systems engineering, research and development, and information technology to help the government address issues of critical national importance.*

address foundational research problems; research addressing basic and broad research questions lies outside the scope of most private investment."

Without federal investment in these critical research categories, the pipeline of new discoveries that enable later stage development would dry up, and American innovation would suffer. Fifty-six percent of our early-stage research takes place at America's research universities—and the majority of that is federally funded. Universities perform another important role in the national innovation ecosystem by training the nation's future innovators.

The federal government has traditionally influenced external innovation through its acquisitions and by highlighting for industry its continuing needs. However, these are slow-moving activities, with benefits realized months or even years after initial actions. Accordingly, federal agencies are taking new initiatives to quicken the pace of innovation adoption. For example, some agencies are sponsoring challenges and prize competitions. In another example, DoD and DHS have established offices in Silicon Valley to develop deep public-private partnerships, particularly in the field of cybersecurity.

## Areas of Opportunity for the New Administration and Agency Leaders

To increase engagement of federal agencies with private-sector innovators and to influence innovation coming out of that sector, the incoming administration could consider the following ideas as priorities for action within the first year:

- Direct the National Science Foundation to lead an effort by government, industry, and academia to measure the effectiveness of early-stage research strategies. This is an inherently difficult task, as basic, early-stage research doesn't often lead to measurable impacts, and sometimes research "failures" can result in important discoveries. Nonetheless, a better understanding of the impacts of the nation's research strategies and investments will lead to better strategies in the future.
- The Office of Science and Technology Policy could lead a public-private effort to fully understand the national innovation landscapes for our most strategically important activities and publish this information so that the affected communities can benefit from it.
- Implement stable and effective policies, practices, and funding in support of basic research performed by universities and of graduate education, as recommended by the National Academies of Science.
- Work with OMB not only to roll back limitations on federal employee participation in conferences, but also to encourage employees to participate in conferences that increase their awareness and understanding of external innovation activities. OMB Memorandum M-12-12 has reduced federal knowledge of external activities and limited opportunities for private-public partnerships that could have resulted in new capabilities and cost savings.
- Encourage agencies and their staffs to implement a culture change that moves them away from focusing almost entirely on managing in-house innovation activities in isolation. Agencies instead should devote more effort to understanding and leveraging external innovations so that they can focus their own R&D efforts on closing remaining gaps.

*For further ideas about applying the guidance in this paper to your agency's particular needs, contact federaltransition@mitre.org.*