Risky Business

Why the Government Needs to Take Cues from the Private Sector to Better Compete for Critical Technology

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Recent U.S. support and preparation for wars across Europe, the Middle East, and Asia have demonstrated the importance of catalyzing current and future critical technology startups so that America can maintain its security and economic competitive advantage. Public[1] and private sector[2] entities are doing their part by either requesting funding authorizations from Congress or raising large funds specifically dedicated to such investments. The Central Intelligence Agency's In-Q-Tel, DoD's Office of Strategic Capital, and a number of private sector venture capital firms with funds focused on national security challenges are key representative examples of these efforts.

Despite funds and expressed support from public and private sectors for the critical technology startup ecosystem, leaders in government, private investment, and startups have expressed concern that development of critical technologies should be happening faster and more efficiently.[3] Even with a significant focus on communication, progress has been impeded by cultural differences, especially around risk tolerance. Governmental agencies need to learn from the private sector's risk-tolerant culture for private-public partnerships on critical technologies to be successful.

During the July 2024 Aspen Security Forum, Defense Innovation Unit (DIU) chief Doug Beck said, "The villain, if there is one, is sometimes policy, but much more frequently, it's culture. . . . The way you change it is with success. So we're working really hard right now at DIU and across the department at putting points on the board."[4]

To accelerate this process, defense leaders in the Pentagon should look to other agency programs that successfully implemented venture capital mindsets as a guide. As illustrated below, when the government's risks produce successes, they are a testament to a culture that understands the need to place many bets, with the few successes far outweighing the many failures. Losses should be viewed as a necessary part of technological discovery that ultimately leads to impactful public benefits.

Background

Research and development of new technologies is extremely uncertain because there is no definitive way to predict when discovery and innovation will happen. When a discovery does happen, it leads to significant financial and strategic advantages for those that own that advancement. Venture capital (VC) investors have learned to build portfolios around those long-term, highly lucrative "tails" of the distribution curve. VCs know that most of their high-risk investments will never pay off, but the small portion that do succeed will make money at a level that more than covers the other failed investments. This shifts investment toward high-risk, high-upside startups that are not afraid to pursue disruptive technologies.

Government culture is far more risk-averse due to the incentives of government employees. Defense Department program managers, for example, see incentives trickle down from their ultimate funding authority, Congress. Congressional leaders decide funding priorities, timelines, amounts, and measures of success. Members of Congress face significant pressure to get results they can take back to their constituents while also showing they

are being good stewards of taxpayer dollars. This favors funding projects with short payback periods and high probabilities of success, and those guidelines are not conducive to critical technology investment.

Learning from Current Government Programs that Incentivize Risk-Taking

The U.S. government needs to make successful critical technology investments, but the political realities of election cycles mean that leadership is unlikely to come from elected officials unless there is a direct threat to the United States. For example, Russia's development of Sputnik helped drive significant investment for an American moon landing; the COVID-19 pandemic sparked Operation Warp Speed, which accelerated support for critical vaccine development; and the chips shortage caused by far-flung global supply chains catalyzed the passage of the CHIPS and Science Act.

The rare exceptions are usually led by the agencies themselves rather than Congress, such as NASA's Starliner program—a collaboration with industry designed to develop a spacecraft that transports astronauts and cargo to and from the International Space Station and other low-Earth-orbit destinations—and the Energy Department's loan program. Both successfully send strong signals risk tolerance and bridge the culture gap between high-risk technology development and risk-averse government bureaucracies.

National security agencies across government have instilled different cultures of risk-taking to meet their respective missions. For instance, some agencies are focused on exploration, pushing the bounds of science, and others are focused on maintaining status quos and systems that limit risks and safeguard security in the short-to-medium term. For these reasons, not all agencies may be able to exactly duplicate the aforementioned DOE and NASA programs, but the programs still serve as conceptual blueprints in designing new programs aimed at better integrating risk calculations and delivering more competitive technologies as the U.S. seeks to survive and thrive in an ever-changing competitive international environment. In addition to the Defense Advanced Research Projects Agency (DARPA) and existing labs, the Defense Department has recently instituted the DIU and the Office of Strategic Capital, but incorporating the following recommendations will help keep critical technology projects from getting bogged down by Pentagon bureaucracy and a risk-averse culture.

Strong Leadership from Governmental Agencies

While funding for national security stakeholders across the interagency may fluctuate and Congress's repeated failures to pass on-time budgets create constant uncertainty, agency leaders must provide clear guidance on critical technology requirements and funding available to overcome these hurdles. Chairman of Joint Chiefs of Staff General CQ Brown, Jr., provides a strong example of how to do so in a recent post urging the military to take a portfolio approach to diversify the sources of its efforts to reduce vulnerabilities while ensuring continuity, and focusing on outcomes instead of rigid requirements.[5] Moreover, agency leaders can filter their approaches by using Chris Brose's "moneyball military" theory as a guiding principle where the systems they create are flexible, entrepreneurial, meritocratic, and properly disruptive.[6] Leaders must strive to be nonpartisan when describing new projects and try to avoid letting any party or individual claim credit for the initiative.

When NASA's space shuttle program was ending in the late 2000s, NASA shifted to a model in which it acts as a customer to private corporations providing space flights. It was critical that NASA maintain its ability to transport humans safely to the International Space Station and other future outposts, so NASA decided to support the long-term, high-risk research and development that was necessary to make commercial space flights possible. NASA laid out clear goals and requirements for its Starliner program and provided clear signals that it would prioritize the program in its budget through fixed-cost funding.

Fund Multiple Projects for the Same Critical Technologies

Investing in high-risk technologies is about placing bets to find the tails of the distribution curve. Like VCs, investing in multiple companies in the same space increases the odds of being on the side of a groundbreaking discovery.

In 2010, Commercial Crew Development phase one funded five companies for a total of $50 million, and in 2011, Commercial Crew Development phase two awarded just under $270 million to four companies. Further funding rounds culminated in 2014 when NASA announced Boeing and SpaceX had received contracts to provide crewed launch services to the International Space Station for $4.2 billion and $2.6 billion, respectively.[7] Funding was spread across multiple companies before settling on the winners.

Part of the contract required subcontracting to small businesses, and many innovative technology startups have been supported through this program. The Starliner program has taken longer than anticipated and has encountered highly publicized setbacks, but this only reinforces the need to place multiple bets on different companies like venture capitalists do. The Starliner program demonstrates how the U.S. government can provide long-term support for private companies in critical technologies.

Celebrate the Wins and Build on Failures

The Department of Energy's (DOE) efforts to innovate have not been perfect and show that government agencies should speak publicly about successes and failures to bring about a needed shift in risk culture. The VC investment model produces a lot of failed investments, which can be a public relations nightmare for a government agency. Wins should be highly publicized, while failures should be framed as feedback mechanisms that will improve future processes to enable more wins for the public going forward.

An example of a government initiative that has created successful incentives is DOE's Loan Program Office (LPO), which distributes money to energy-related projects in areas such as solar, wind, and next-generation vehicles. According to DOE, the LPO provides "debt financing for large-scale, innovative energy infrastructure and advanced automotive manufacturing projects in the United States."[8]

Created in 2005, the LPO has disbursed more than $33 billion through FY23. The LPO specifically discusses its "risk management culture" in its FY23 report, saying, "LPO measures its performance not by whether all loans outperform expectations or whether some underperform, but rather whether LPO sees losses in the portfolio at or under reasonable budgeted estimates for the risk we are taking to advance innovative or high-impact technologies and supply chain projects in the United States."[9] That VC-like mentality sends clear signals that the department is interested in high-impact projects and is willing to accept the associated risk. Successful investments are highlighted and DOE's strong support for the program has helped it remain through multiple political cycles.

Despite this program's success, it was famously used as an example of government waste when Solyndra collapsed in 2011 and defaulted on its $528 million dollar loan. However, by 2014, the Department of Energy was already reporting that the program's interest payments of $810 million had exceeded losses of $780 million. With strong departmental leadership and successes such as Tesla and 1366 Technologies, the loan program was able to continue even with the headline-grabbing losses from Fisker Automotive, Abound Solar, and Solyndra.

Agencies should distinguish between strategic risk and waste in their communications and judiciously and expeditiously root out any fraud or waste through well-funded inspectors general.

Conclusion

With the U.S. government identifying China as its top pacing challenge, government agencies must act expediently to bring more risk into their efforts to develop critical technologies and preserve America's competitive advantage. Two existing U.S. programs—NASA's Starliner initiative and DOE's Loan Program Office—are successful examples of how large federal bureaucracies can leverage venture capital mindsets to bet on innovative technologies and create incentive structures that will allow more disruption. Even in an increasingly polarized political climate, both parties agree on the need to maintain America's competitive advantage in the face of a rising China and other geopolitical threats, so federal agencies should feel empowered to take risks on critical technologies.

The views expressed are those of the authors and do not reflect the official guidance or position of the United States government, Department of Commerce, National Institute of Standards and Technology, or the CHIPS National Semiconductor Technology Center Program.

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