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Good afternoon Chairman Rubio, Ranking Member Cardin, and members of the Committee; thank you for inviting me to share the views of the Information Technology and Innovation Foundation (ITIF) on the issue of reauthorization of the Small Business Administration's (SBA's) innovation programs, including the Small Business Innovation Research Program (SBIR) and Small Business Technology Transfer Research (STTR) programs.

The Information Technology and Innovation Foundation is a non-partisan think tank whose mission is to formulate and promote public policies to advance technological innovation and productivity internationally, in Washington, DC, and in the states. Recognizing the vital role of technology in ensuring prosperity, ITIF focuses on innovation, productivity, and digital economy issues.

THE SUCCESSFUL IMPACT OF THE SBIR/STTR PROGRAMS

The SBIR and STTR programs (enacted in 1982 and 1992, respectively) have grown to become the federal government's most impactful programs and largest sources of early-stage capital for technology commercialization, allowing U.S.-owned and operated small businesses to engage in research and development (R&D) activity that has a strong potential for commercialization. SBIR and STTR help promising new high-tech start-ups to grow and scale to become important economic and employment contributors to the U.S. economy.

SBIR is a set-aside program in which 11 federal agencies (all those with R&D budgets greater than $100 million annually) participate, designed for small businesses to engage in federal R&D with robust potential for commercialization. In 2017, 3.2 percent of these agencies' budgets were allocated to the SBIR program. In 2017, 0.45 percent of the research budgets of federal agencies with greater than $1 billion annually went to STTR, a sister set-aside program designed to facilitate cooperative R&D between small business concerns and U.S. research institutions with potential for commercialization.[1] In establishing the SBIR/STTR programs, Congress articulated several objectives, including: 1) to stimulate technological innovation; 2) to leverage small businesses to address federal R&D needs; and 3) to increase the extent of private-sector commercialization of innovations derived from federal R&D.[2]

SBIR and STTR provide over $2.5 billion annually to support small businesses engaging in R&D with commercialization potential. Since its inception, SBIR has granted over 160,000 awards, with total grants awarded to research-intensive small American businesses now exceeding $43 billion. On average, SBIR-supported companies receive 10 patents each day, testament to the innovative prowess of the more than 450,000 engineers and scientists working in companies that have been SBIR-supported.[3] Over the first 30 years of the program (according to data provided in 2013), SBIR grants engendered 70,000 issued patents and supported the launch of almost 700 public companies, with those companies attracting approximately $41 billion in subsequent venture capital investment.[4] Companies launched in part with SBIR support feature a "who's who" of some of America's most successful innovators, including 23andMe, Amgen, Apple, Biogen, Jarvik Heart, LIFT Labs, Millennium Pharma, Qualcomm, Symantec, iRobot, and countless others. The SBIR program has been so successful it's been copied by 17 countries. Moreover, a number of U.S. states have implemented state-level matching programs to empower their innovators to take advantage of, and extend, federal SBIR funding. For instance, Kentucky matches, on a competitive basis, Phase I and Phase II federal awards received by Kentucky high-tech small businesses, with the initiative attracting almost $50 million in federal grants and leveraging $1.84 in federal awards for every $1 awarded in state matching funds.[5] On May 13, 2019, Tennessee announced it would increase the size of its SBIR/STTR matching program to $3 million.

SBIR accounts for only about 3 percent of federal extramural research funding, yet numerous studies have documented the SBIR/STTR programs' tremendous contributions to the U.S. innovation economy. For instance, a 2008 ITIF study of the U.S. national innovation system from 1970 to 2006 found that SBIR-nurtured firms consistently accounted for about one-quarter of all U.S. R&D 100 Award winners, signaling that SBIR-supported firms were regularly contributing some of the most important, breakthrough innovations to the U.S. economy.[6] A 2016 ITIF report, "The Demographics of Innovation in the United States," surveyed 900 individuals who have made meaningful, marketable contributions to technology-intensive industries as award-winning innovators and international patent applicants. It found that among private firms with fewer than 25 employees which produced groundbreaking innovations, over half received assistance from public sources, including grants from the SBIR program.[7] Of private firms with between 25 and 100 employees in ITIF's study, 17.1 percent received SBIR grants, and 34.2 percent received some form of federal grant.[8] Similarly, a 2016 Bay Area Council Economic Institute study found that 1,267 companies were generated by the University of California from 1968 to 2015; and that of the 622 still active as of 2015, 189 of them, or 30 percent, received SBIR or STTR grants.[9]

More-recent studies of the impact of SBIR at specific federal agencies have found similarly powerful effects. A 2017 study of SBIR at the Navy and Air Force found that a total investment in SBIR/STTR of $6.25 billion generated $92.1 billion in total output, supported 30,000 jobs annually on average, and delivered a return on $1 of federal investment of $12 for the Air Force and $19.5 for the Navy.[10] A 2018 study of the National Cancer Institute's (NCI) SBIR/STTR program found that 690 awards issued as part of NCI SBIR/STTR Phase II grants from 1998 to 2010 supported companies that had generated $9.1 billion in total sales, delivered $26.1 billion in economic output, and supported almost 108,000 new jobs.[11] The study further found that 65 percent of the awards funded the development of a new treatment for patients who previously lacked a treatment option and that 89 percent of the grantees reported the NCI SBIR/STTR program provided funding at a pivotal moment for the business.[12] Of the 690 awards, the study found that 247 NIC SBIR-funded products were commercialized and that 110 were still under development. The NCI SBIR program has clearly had a powerful impact in promoting the development of technologies and products that have improved the lives of cancer patients worldwide.

Looking across all federal agencies, various National Academies studies have found that commercialization rates from SBIR/STTR Phase II awards range from 40 to 70 percent, varying by federal agency.[13] Those studies have also found that SBIR plays a major role in making projects that would not happen otherwise possible.[14] For instance, a study of NSF SBIR Phase II recipients found that 75 percent thought their project probably or definitely would not have proceeded absent program funding: 34 percent were definite and 41 percent thought it rather unlikely.[15] SBIR funding also leads to more impactful innovations. A 2018 study by Albert Link and John Scott, "Toward an Assessment of the U.S. Small Business Innovation Research Program at the National Institutes of Health," indicates that SBIR awards are not only largely successful in helping companies to convert promising innovations into new products or services, but that the program encourages companies to develop higher-risk technologies than would be developed without the award.[16] The authors found that projects that were expected to go forward without SBIR awards achieved sales about 23 percent more often than projects that did need the awards to advance (88 percent versus 71 percent); the authors attribute this slightly lower rate of commercialization as an indicator that many Phase II awardees are developing higher-risk technologies than would otherwise be advanced.

Finally, for many emerging start-ups, not only does SBIR funding assist their development of a process or technology up to the point of market commercialization, it also provides a "good housekeeping seal of approval" validation that is attractive to potential innovators, including venture capitalists, as a company seeks further financial resources to commercialize and grow their businesses.

FURTHER ENCHANCING THE IMPACT OF THE SBIR/STTR PROGRAMS

The SBIR/STTR programs have been tremendously successful, however there remains opportunity to further refine the structure and administration of the programs to further enhance their potential to facilitate the commercialization of technology and seed the development of innovative new businesses. Ideally, SBIR awards go to enterprises demonstrating the greatest potential for commercializing technologies and scaling into mature enterprises that contribute innovative products and services, support high-wage employment, and contribute to U.S. economic growth. According to SBIR data, 36 percent of SBIR-receiving firms have received from 1 to 10 SBIR grants (21,951 firms receiving 56,626 awards) and 30 percent of firms have received from 11 to 50 SBIR grants (2,295 firms receiving 47,343 grants).[17] However, 159 companies have gotten more than 100 awards, with these companies receiving a total of 36,533 awards (23 percent of all awards), while another 273 companies received from 51 to 100 awards (with these companies receiving 12 percent of total awards).[18]

A company receiving multiple SBIR grants is not necessarily a concern; indeed, in many cases, firms with multiple SBIR awards usefully meet the mission needs of an agency. Yet, ideally, recipients eventually largely graduate from SBIR and grow into high-tech enterprises that scale and create well-paying jobs in communities throughout the United States. This raises a concern because Link and Scott have found that companies repetitively seeking SBIR contracts are less likely to commercialize their projects.[19] Further, in a February 2019 study, "Analysis of the U.S. Department of Energy's Energy Efficiency & Renewable Energy and Fossil Energy SBIR Programs," Howell similarly finds evidence of decreasing returns from previous non-DOE SBIR awards. Specifically, Howell finds that among firms with no previous SBIR awards, an award increases a firm's probability of subsequent venture capital investment by 14.8 percentage points. For firms with at least one previous SBIR, the effect is halved to 7.5 percentage points.[20] Howell concludes that additional SBIR awards may produce valuable prototyping, but that a significant portion of firms with previous SBIRs are firms that may view SBIR awards as a core part of their buinses model, rather than a leg up to commercial success. Howell notes that her findings concord with Lerner's that "multiple awards are not associated with increased performance for SBIR awardees."[21] Accordingly, Congress should encourage federal agencies to implement a prioritization system in the award process that—presuming the technical aspects and commercialization potential of a given application are ceteris paribus—gives preference to applicants who have received fewer grants over time from the SBIR program.

As noted, an important Congressional objective of the SBIR/STTR program is to promote private-sector commercialization of innovations derived from federal R&D. However, as ITIF and Brookings wrote in their 2016 report, "Localizing the Economic Impact of Research and Development: Policy Proposals for the Trump Administration and Congress," SBIR's impact could be strengthened if some facets of the program were geared slightly more strongly toward commercialization.[22] Heeding that proposal, in 2018, Senators Chris Coons (D-DE) and Cory Gardner (R-CO) advanced the Startup Businesses Act, which proposed permitting SBIR and STTR grant awardees to allocate up to $50,000 of their awards for activities critical to building their businesses, including services such as market validation, intellectual property protection, market research, and business model development.[23] That

bill was incorporated into the John S. McCain National Defense Authorization Act for Fiscal Year 2019, which permits SBIR Phase II awardees to enter into agreements with one or more vendors to provide technical and business assistance (TABA).[24] TABA allows up to $6,500 for a Phase I award and up to $50,000 of a Phase II award to be directed toward activities focused on improving the commercialization success of SBIR awardees. The legislation marked a welcome step to allow a greater portion of SBIR R&D funds to go toward commercialization-oriented activities, in order to improve the commercialization success of small businesses. Specifically, TABA empowers federal agencies to enter into an agreement with one or more vendors to provide small business concerns engaged in SBIR or STTR projects with technical and business assistance services, such as access to a network of scientists and engineers engaged in a wide range of technologies, assistance with product sales, intellectual property protections, market research, market validation, and development of regulatory and manufacturing plans. All SBIR-active federal agencies should permit SBIR awardees to leverage up to $50,000 of their grant funding for technical and business assistance activities. However, one aspect of the TABA funds is that they must be contracted to a third-party service-provider, as TABA funds cannot be allocated to company staff. While small businesses will often find this a preferable option, tapping into the extensive expertise, experience, and knowledge base of external experts and specialists on commercialization-oriented activities, Congress should consider permitting SBIR recipients to use a share of TABA funds on internal personnel (e.g., a full-time internal asset focused on commercialization).

The National Science Foundation's I-Corps program has successfully helped scientists and researchers translate federally funded technologies into marketable products and services.[25] ITIF has called for increasing the scale of the I-Corps program across the federal government so that it can be made available to scientists and engineers at all federal agencies. In this regard, ITIF endorses the Innovators to Entrepreneurs Act of 2019, so-sponsored by Senators Chris Coons (D-DE) and Scott Todd Young (R-IN), which would expand application eligibility to anyone who receives a Small Business Innovation Research or a Small Business Technology Transfer award from any federal agency and allow them to use their grant funds to cover expenses of the I-Corps program.[26]

The amount provided to successful applicants in Phase I and Phase II of the SBIR program is appropriate, but one adjustment could be to index SBIR awards to inflation with an automatic adjustment made every five years, so that the relative value of awards keep pace with the rate of inflation growth over time.

As recommended by NACIE, the National Advisory Council on Innovation and Entrepreneurship (an initiative of the U.S. Department of Commerce), another step that could be taken to promote SBIR's commercialization potential would be to modify the criteria and composition of SBIR review panels to make commercialization potential a more prominent factor in funding decisions. All participating SBIR agencies consider commercialization potential and plans in their grant funding decisions; however, agencies differ in the weight or emphasis they place on commercialization.[27] In particular, some agencies, such as NASA and the Department of Defense (DoD), more regularly intend to use the commercial products that flow from their R&D investments. In agencies where the intended customers are external, a greater portion of the merit review evaluation criteria and scoring should include commercialization factors, such as the company's understanding of market opportunity, product development timelines, and needed resources.[28] Further, to evaluate these important criteria, the composition of SBIR/STIR review panels at these agencies should include industry experts, investors with relevant industry or technology expertise, and/or representatives from commercialization intermediary organizations or venture development organizations.

Since 2010, SBIR/STTR has operated the Federal and State Technology (FAST) Partnership Program, which provides one-year funding to organizations to execute state/regional programs that increase the number of SBIR/STTR proposals (through outreach and financial support), to increase the number of SBIR/STTR awards (through technical assistance and mentoring), and to better prepare SBIR/STTR awardees for commercialization success (through technical assistance and mentoring).[29] FAST provides $3 million in total funding (up to $125,000 per applicant) for outreach, financial support, and technical assistance to next-generation, R&D- focused small businesses, with eligible applicants for FAST funding including state and local economic development agencies, Small Business Development Centers (SBDCs), accelerators, incubators, Women's Business Centers, Procurement Technical Assistance Centers (PTACs), colleges, universities, and other entities.[30] The FAST program fulfills an important function and it should be formally authorized by Congress and the Trump Administration.

As noted, the SBIR and STTR programs are effective, yet they do set a high bar for extremely early-stage enterprises. There is often insufficient funding available at universities (or from other sources) to push nascent technologies to the point where these companies are positioned to receive an SBIR or STTR grant. The problem is essentially that researchers and universities do not have the resources available to support the proof-of-concept work, market analysis, and mentoring needed to translate ideas and nascent technologies from the university laboratory into a commercial product. Furthermore, SBIR awardees tend to be more successful when commercialization potential is considered before the application process begins.

A national "Phase Zero" proof-of-concept program would not only help more projects cross the "valley of death," but would also help enhance the infrastructure (e.g., expertise, personnel, support, small business, and venture capital engagement) and facilitate the cultural change necessary for universities, federal laboratories, and other non-profit research organizations to better support commercialization activities.[31]

America's competitors have recognized the need for such an instrument. For instance, the European Research Council (ERC) has announced a new proof-of-concept funding initiative to help bridge the gap between ERC-funded research and the earliest stage of marketable innovations.[32] These awards can be as high as $215,000 for individual researchers, in total, equivalent to about 1 percent of ERC's budget.[33] Here in the United States, the Wallace H. Coulter Foundation has established Translational Research (for individual researchers) and Translational Partnership (for institutions) Awards for proof-of-concept research in biomedical engineering.[34] The Translational Research Awards are made in amounts of approximately $100,000 per year, while the university grants have a duration of five years at over $500,000 per year. The Coulter Translational Research Partnership Award in Biomedical Engineering award provides $1 million each year for a period of five years.[35]

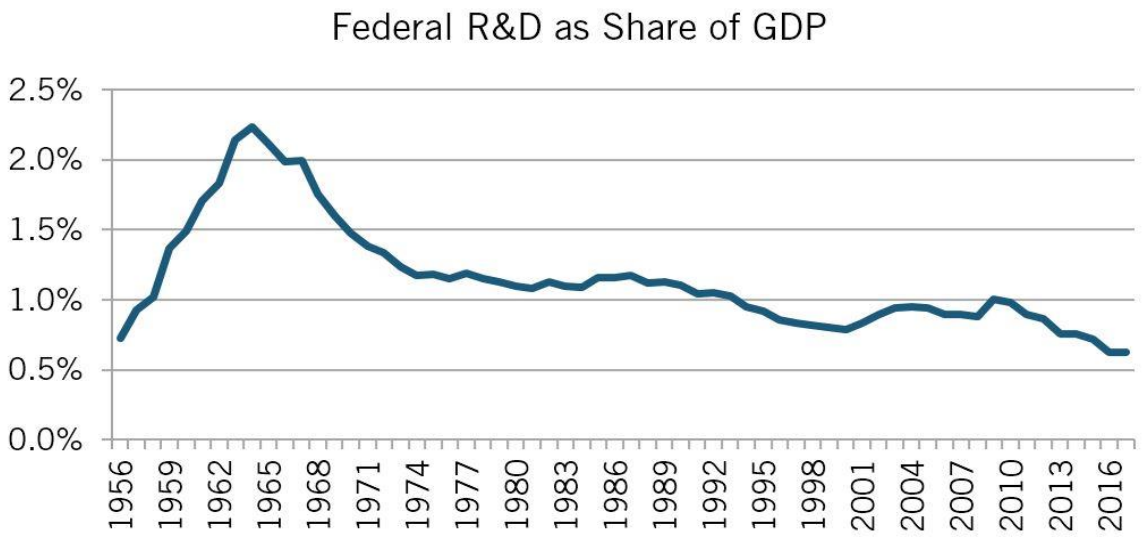
Similarly, NIH's Research Evaluation and Commercialization Hub (REACH) program fosters the development of therapeutics, preventatives, diagnostics, devices, and tools that address diseases within NIH's mission in a manner consistent with business case development. The work supported by the REACH program may include technical validation, market research, clarification of intellectual property position and strategy, and investigation of commercial or business opportunities.[36] Finally, a number of states, such as Colorado, Louisiana, and Tennessee, have

developed Phase Zero grants to help firms apply for SBIR grants and support early proof-of-concept research. For instance, Colorado's Bioscience Discovery Evaluation Grant program provided 163 proof-of-concept grants from 2007 to 2013 with $10 million, launching 38 companies. However, while a step forward, collectively these foundation and government programs are still modest in size. As such, Congress should implement a proof-of-concept-program, perhaps through a grant program for states that agree to match the funds on a dollar-for-dollar basis. (Such an initiative could be rolled into the SCNR program recommended subsequently).

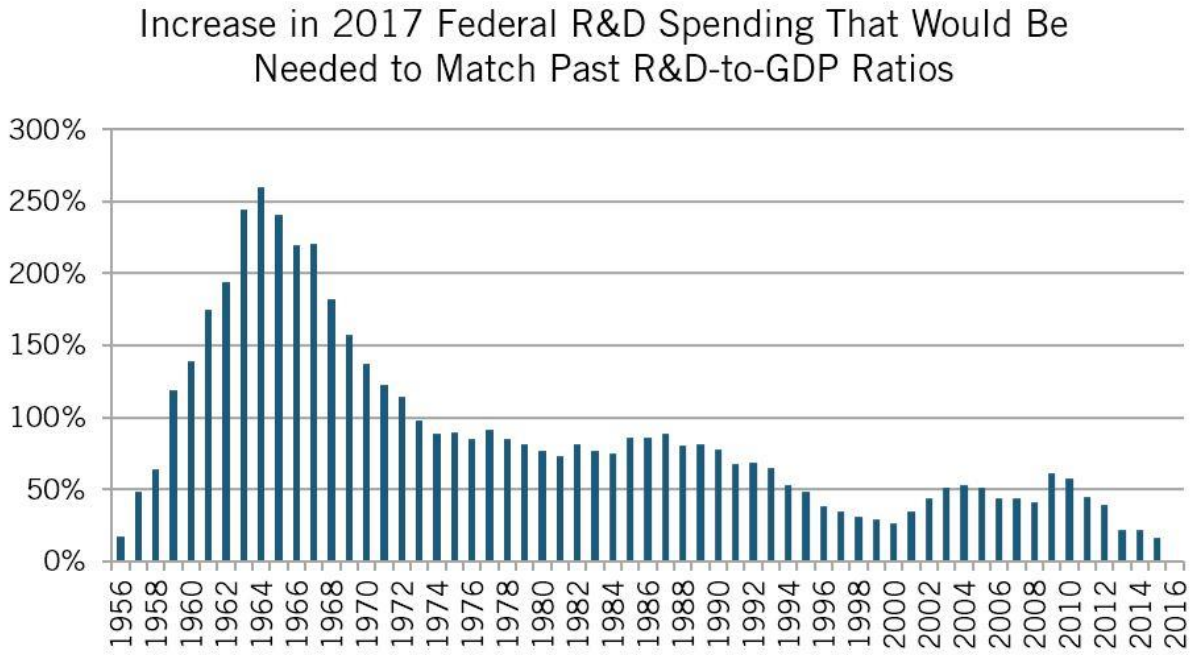
In addition, federal agencies with SBIR/STTR programs should standardize their commercialization data-collection practices. The data are now collected individually by each agency in their own form and with different requirements, which both makes it more difficult for small businesses to comply or for useful insights to be gleaned from the data.

Finally, the United States would benefit from increasing SBIR funding. For instance, the FY 2016 National Defense Authorization Act commissioned the "Section 809 Panel," a small advisory group tasked with identifying and recommending ways to streamline and improve the federal defense acquisition process. The panel's final report found that SBIR had "effectively leveraged small businesses to further DoD's mission-related capabilities" and called for increasing the Department of Defense's percentage allocation of extramural R&D funds allocated to SBIR from 3.2 to 7 percent, phased in over a five-year period.[37]

However (leaving the SBIR percentage set-aside level issue aside), the most important way for the federal government to increase its levels of SBIR funding would be to increase its investment in R&D, which is woefully lagging compared to historical norms (and relative levels invested by peer nations). For instance, in 2017, federal R&D investment as a share of GDP fell to 0.62 percent, the lowest level since 1995, as the chart below shows.[38]



To understand just how far off the historical pace federal funding for research has fallen, the graph below shows how much 2017 R&D funding levels would need to increase in order to match past R&D-to-GDP ratios. For example, to match levels from the 1980s, federal R&D funding levels in 2017 would have needed to be about 80 percent higher than they were.



Public R&D is crucial for the United States' position in the global economy because many of the benefits of innovation are concentrated domestically. Thanks in part to programs like SBIR and STTR, federal R&D funding makes it more likely that U.S. firms are the first to leverage new discoveries, giving them advantages over international competitors. Thus, anemic government R&D spending is particularly concerning in the light of increases by other nations around the world, especially adversaries.[39]

FURTHER STIMULATING U.S. TECHNOLOGY TRANSFER AND COMMERCIALIZATION ACTIVITY

While SBIR and STTR represent effective programs for tapping into the potential of small businesses to meet federal agencies' R&D needs and to promote the commercialization of technologies stemming from federal R&D activity, America's current system for funding research still pays too little attention to the commercialization of technology, and is still based on the linear model of research that assumes that basic research gets easily translated into commercial activity.[40] The innovation process remains choked with a variety of barriers, including institutional inertia, coordination and communication challenges, and lack of funding for proof of concept research and other "valley of death" activities. Accordingly, it's time for federal policy to explicitly address this challenge and to allocate more resources to commercialization activities. ITIF proposes that Congress allocate a modest share of 0.15 percent of agency research budgets (about $125 million per year) to create a Spurring Commercialization of our Nation's Research (SCNR) program that would fund university, federal laboratory, and state government technology commercialization and innovation efforts.[41] Ideally, the SCNR funding would be added to the current SBIR percentage allocation.

Half of the SCNR funds would go to universities and federal laboratories, which could use the funds to create a variety of different initiatives, including mentoring programs for researcher entrepreneurs, student entrepreneurship clubs and entrepreneurship curriculum, industry outreach programs, seed grants for researchers to develop commercialization plans, etc. For instance, the funds could be applied to "commercialization capacity building grants" to institutes of higher education pursuing specific innovative initiatives to improve an institution's capacity to commercialize faculty research or to "commercialization accelerator grants" to support institutions of higher education pursuing initiatives that allow faculty to directly commercialize research in an effort to accelerate research breakthroughs. The intent would be to use the funds to continue to turn America's federal laboratories and universities into engines of innovation, broadening the capacity of both students and faculty in the latter to successfully innovate. This matters because universities play an increasingly important role in the U.S. innovation system. For instance, from 1996 to 2015, academic technology transfer contributed to 380,000 invention disclosures, 80,000 U.S. patents issued, and 11,000 start-up companies formed.[42] And according to a report prepared for AUTM and the Biotechnology Industry Organization (BIO), from 1996 to 2015, academic patents and their subsequent licensing to industry—substantially stimulated by the Bayh-Dole Act—bolstered U.S. GDP by up to $591 billion, contributed to $1.3 trillion in gross U.S. industrial output, and supported 4,272,000 person years of employment.[43] SCNR would be a mechanism enabling the federal government to bolster the innovation capacity of U.S. universities which are contributing tremendously to the U.S. economy.

The other half of SCNR funds would go to match state technology-based economic development (TBED) programs. State TBED programs spur the development of cutting-edge, science-based industries by boosting research funding. For example, Oregon's Nanoscience and Microtechnologies Institute serves as a forum for R&D synergy among Oregon's three public research universities, the Pacific Northwest National Laboratory, the state, and the "Silicon Forest" high technology industry cluster. States also try to ensure that research is commercialized and good jobs are created in both cutting-edge, science-based industries and industries engaging in related diversification. For example, the Georgia Advanced Technology Development Center at Georgia Tech is a technology incubator that offers services including consulting, connections to university researchers, and networking with other entrepreneurs and service providers. States have also established programs to help small and mid-sized firms support collaborative research at universities. For example, Maryland's Industrial Partnerships program provides funding, matched by participating companies, for university-based research projects that help companies develop new products or solve technical challenges.[44] Finally, states have established initiatives to help firms commercialize research into new business opportunities. For example, Oklahoma's nonprofit i2E organization helps Oklahoma companies with strategic planning assistance, networking opportunities, and access to capital. i2E's Oklahoma Technology Commercialization Center assists researchers, inventors, entrepreneurs, and companies in turning advanced technologies and high-tech startup companies into growing companies.[45] But without assistance from the federal government, states will invest less in TBED activities than is in the national interest. A performance-based allocation to help fund state TBED efforts would help correct this limitation.

The portion of SCNR funds supporting state TBED activities could also be structured in a way to match states' investments in their technology commercialization programs. Matching federal funds would be available concomitant with a state's level of investment (prorated against state population with a maximum cap) in its technology commercialization programs. States would use the money for direct, merit-based project grants to existing SMEs or to startup companies looking to commercialize new products or technologies.

One issue an SCNR program could help address is Congressional concern regarding a lack of regional balance in allocation of federal technology transfer and commercialization support funding. SCNR could help a more-diverse set of universities and research institutions bolster their innovation capacity, thus bringing more opportunity to more regions of the country, not just predominantly leading high-tech hubs. Another challenge is increasing the amount of SBIR/STTR applications coming from minority- and female-led applicant teams; such individuals tend to experience similar SBIR application success rates, but there tend to be far-fewer applicants, so there overall numbers are lesser.

The U.S. Small Business Administration's Office of Investment and Innovation (OII) operates the Growth Accelerator Fund Competition (GAFC) program, which the SBA instituted to "support the development of accelerators and their support of startups in parts of the country where there are fewer conventional sources of access to capital."[46] The program seeks to stimulate economic development and innovation via the award of several nominal ($50,000), flexible, non-repayable prizes that support organizations such as accelerators, incubators, maker spaces, and various hybrid forms of them. It awarded 223 awards to 187 distinct organizations from 2014 through 2016 (with funding levels of $2.5 million in 2014 and 2015 and $3.4 million in 2016, though just $1 million in 2017). In 2018, the Library of Congress evaluated the first years of the program (2014 to 2016).[47] The Library of Congress's analysis included a variety of interviews and surveys, but concluded by noting that the preponderance of respondents found the program to be "a relatively low-cost, small, impactful government program, unique in structure and target, which supports the infrastructure needed to successfully launch startups" and which "should continue to be funded" although ideally with a higher prize level (up to $100,000) and a larger staff to handle program management and metrics development.[48] The GAFC uniquely provides seed resources to a broad range of accelerator models and programs across a diverse footprint of geographies and sectors across the United States. The Growth Accelerator Fund fulfills an important function, and Congress and the administration should continue to authorize it, and support it with an annual program budget of at least $10 to $20 million. The Growth Accelerator Fund Competition could fit within an umbrella of programs under a SCNR if Congress were to introduce such an instrument.

Access to risk capital is not evenly distributed throughout the United States. In 1995, Silicon Valley accounted for 22.6 percent of U.S. venture capital, Los Angeles/Orange County 12.5 percent, Boston 9.9 percent, New York 6.4 percent, and all other areas of the United States 48.6 percent. Twenty years later, in 2015, Silicon Valley had more than doubled its share, to 46.4 percent, New York's share rose to 12.4 percent, Boston moved to 10.2 percent, and Los Angeles to 8.7 percent, while the share for the rest of the United States fell to 22.2 percent.[49] In other words, today just four regions of the United States account for 78 percent of all U.S. venture capital investment, while the remainder of the country contests for the remaining one-fifth. Accordingly, a substantial number of promising young businesses scattered throughout all regions of the United States likely have difficulty securing capital.

The Small Business Jobs Act of 2010 helped to address this problem by creating the State Small Business Credit Initiative (SSBCI), a $1.5 billion fund, administered by the U.S. Department of the Treasury, designed to strengthen state programs that support lending to small businesses and small manufacturers.[50] The SSBCI gave states significant flexibility to design programs to meet local market conditions, with SSBCI supporting 152 small business programs from 2011 to 2015. Approximately 69 percent of the funding supported lending or credit support programs and 31 percent supported venture capital programs. From 2011 to 2015, SSBCI programs supported nearly $8.4 billion in new capital in small business loans and investments.[51] In effect, SSBCI provides an opportunity for states to

supplement existing venture capital programs, revitalize programs lacking sufficient state support, and create new programs where state managers perceive unmet needs in evolving entrepreneurial ecosystems. The SSBCI has made a positive impact in expanding high-potential businesses' access to credit, and therefore Congress should reauthorize it and double its funding, although Congress should indicate that its preference would be for SSBCI funds to go primarily to traded-sector enterprises (i.e., those competing in international markets).

Congress could take further steps to help new and small business, particularly in globally traded sectors. One step would to be encourage the Small Business Administration to focus more resources on firms in traded sectors, like agriculture, manufacturing, and software, content and internet services.[52] Currently the SBA treats all industries alike in its funding priorities, but industries serving local markets (e.g., liquor stores) play little role in supporting local or national economic competitiveness, and by and large providing funding to them simply shifts activity from one firm to another. Neither of these things is true for firms in industries that are globally traded, yet only 7.5 percent of loans under the SBA's primary program for assisting small businesses (7A loan program) go to manufacturers. Congress should require the SBA to develop a plan to significantly increase the share of support going to traded-sector firms.[53]

CONCLUSION

The success of the SBIR and STTR programs show that effective public-private partnerships can play an important role in stimulating America's innovation economy. In general, the SBIR and STTR programs have been highly successful and deserve Congress's continued and enthusiastic support. In fact, cutting back SBIR/STTR funding, or eliminating entire SBIR programs, such as at the Department of Energy, as the Heritage Foundation proposed in its *Blueprint for Balance*, would weaken the United States' capacity for private-sector innovation.[54]

Yet despite the success of the SBIR/STTR programs, innovation never ceases, nor does global competition for innovation advantage, and efforts to continue to enhance the programs' potential to contribute to greater levels of technology transfer and commercialization are warranted, with a good example of "institutional innovation" in the programs being Congress's recent authorization that a modest share (up to 5 percent) of SBIR Phase II funds could be applied to commercialization-oriented activities. Expanding resources available for "Phase Zero" or related proof of concept activities could also help enhance the impact of SBIR applications.

While eleven federal agencies participate in SBIR—and, as this testimony has contended, generally effectively so—federal policy can and should still do much more to promote technology transfer and commercialization from U.S. universities, federal laboratories, and other research institutions. A broader initiative is needed. Accordingly, a Spurring Commercialization of our Nation's Research program would build institutional capacity for innovation at U.S. universities and federal laboratories and provide additional resources to help U.S. states stimulate technology transfer and commercialization activity, such as by supporting state TBED programs or by providing a pool of funds that could be used to provide matching funds for initiatives such as states' Phase Zero proof of concept programs. In conclusion, the SBIR/STTR programs are some of the most effective in America's arsenal of programs to stimulate innovation, though efforts toward continued refinement and improvement are warranted.

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