

Assessing the SBIR Program

Findings, Impact & Future



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The National Academies

The National Academies



- National Academy of Sciences
 - Chartered by Congress in 1863
 - A self-perpetuating Honorary Society
- National Research Council (1916)
 - The Operating Arm of the National Academies
- National Academy of Engineering (1964)
- Institute of Medicine (1970)

Today's Presentation reflects my personal views

Small Companies Drive High-Technology Innovation

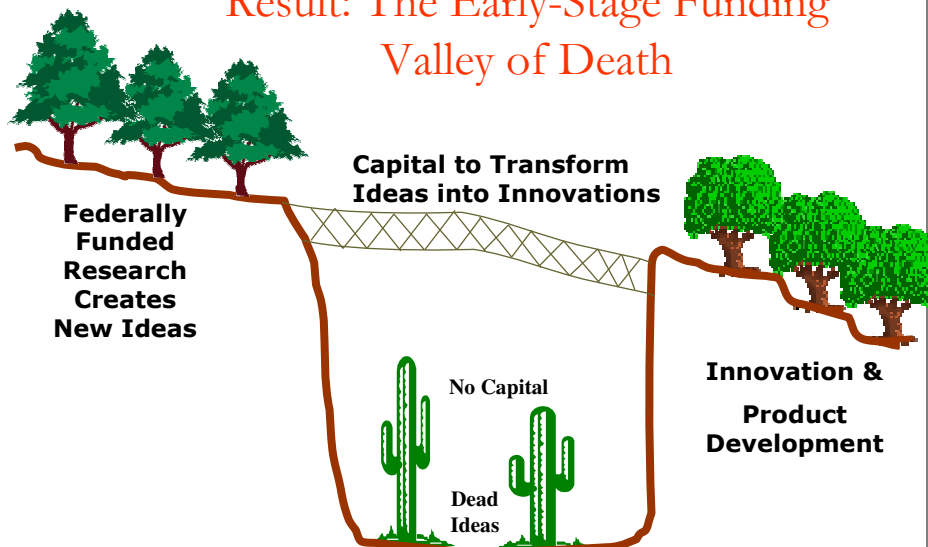
- Small Companies are Key Players in Bringing New Technologies to Market (Audretsch & Acs)
 - Large returns to national economic and strategic capabilities can result from relatively small national investments
 - Innovations—with the right policy support—can become products that support the agency missions and compete in global markets

But many innovative small
businesses face an
Early-Stage Funding
Valley of Death

The U.S. Myth of Perfect Markets

- Strong U.S. Myth: "If it is a good idea, the market will fund it."
- Reality:
 - Potential Investors have less than perfect knowledge, especially about innovative new ideas
 - "Asymmetric Information" leads to suboptimal investments
 - George Akerlof, Michael Spence and Joseph Stiglitz received the Nobel Prize in 2001, "for their analyses of markets with asymmetric information"

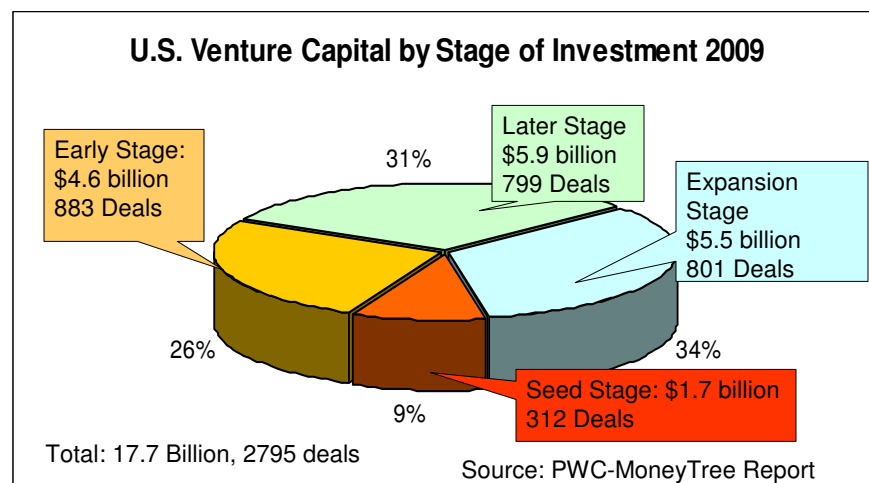
Result: The Early-Stage Funding Valley of Death



The Myth of U.S. Venture Capital Markets

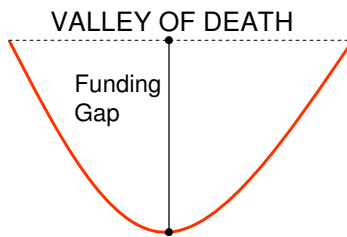
- Myth: "U.S. VC Markets are broad & deep, thus there is no role for government awards"
- Reality: Venture Capitalists have
 - Limited information on new firms
 - Prone to herding tendencies
 - Focus on later stages of technology development
 - Most VC investors seek early exit

U.S. Venture Investments Down 37% in 2009



The Early Stage “Valley of Death”

Pre-Seed	Seed/Start-Up	Early	Later
Founders, Friends, Family & Fools	Federal SBIR Grants/Angel Investors/Angel Groups		Venture Funds*
\$25,000	\$100,000	\$1 to 2 million	\$5 million



Adapted from: Richard Bendis and Ethan Blyer, "Creating a National Innovation Framework," *Science Progress*, 2009

* NB: Average Venture Investment is \$8.3 million

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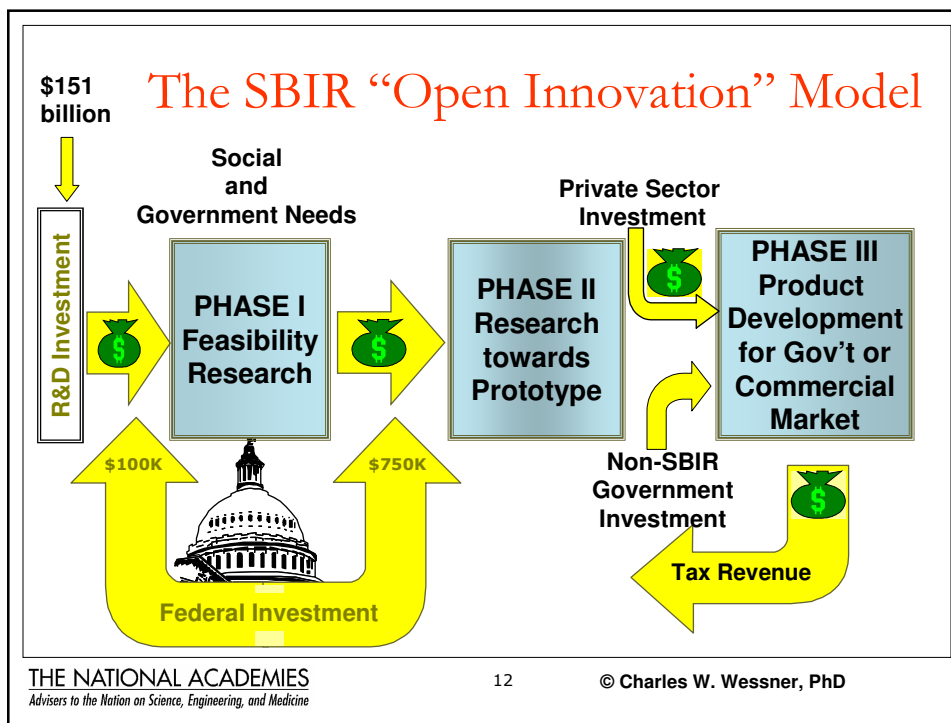
Crossing the Valley of Death is a Major Challenge

There are many paths:
The Small Business Innovation Research (SBIR) Program is a Proven Approach

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SBIR: Key Features

- **Large Scale:** Largest U.S. Innovation Partnership Program:
 - Currently a \$2.5 billion per year
- **Modest Award Amounts**
 - Small initial contract or grant
 - Larger Phase II award for successful companies
 - Follow-on acquisition in Phase III
 - Speculation permitted
- **Needs driven:** Participants vary
 - Government missions addressed by start-up firms, contract researchers, and high-growth gazelles



SBIR Concept Advantages

- The Government identifies Societal needs in health, security, environment, & energy
 - Needs can be simple or complex
- Industry initiates the proposals
- A 2-Phase Filter screens out weak ideas
 - Phase I: Proof of Concept
 - Phase II: Prototype
- Screening is based on Technological and Commercial Feasibility
 - 20 percent of applicants get a Phase I award
 - Of these 40 percent get a Phase II award
 - Companies can get several awards



After nearly 20 years of operation,
The Congress asked the Academies:

How well is SBIR Working Overall?

Academies Study of SBIR

Unprecedented Large Scale Original Field Research

- **Surveys: Over 7000 Projects Surveyed**
 - Phase I Award Survey targeted 3000 firms
 - Survey on Phase II Awards (1992-2002) involved over 4000 firms
 - Program Manager Survey
 - Technical Manager Surveys (TPOCs and COTRs)
- **Case Studies**
 - Approximately 100 case studies conducted
 - Case Study selection reflects program diversity
- **Surveys & Case Studies Developed in Consultation with Agencies & SBIR users**



What did we find?

The SBIR program is “sound in concept and effective in practice”

Government, Firms, and Universities find SBIR to be an effective tool to advance their missions

SBIR Advantage for Government

SBIR helps Government Agencies
Solve Mission-related Challenges

SBIR's Advantages for Government

- **A low-cost technological probe**
 - Enables government to explore more cheaply ideas that may hold promise
 - Identifies dead-ends before substantial investments are made
- **Quick reaction capability**
 - Solicitation topics can respond rapidly to urgent national needs
 - Anthrax attacks led NIH to seek and get innovative bio-defense technologies
- **Diversifies the Government Supplier-base**
 - Brings in competition, low-cost solutions, new approaches to address government needs

SBIR helps Government Agencies solve mission-related problems

- **NIH:** Imaging Software, Audio-Visual Health Materials, Medical Devices, & Health Aids
- **DOD:** Low-cost, High-performance Drones; Sonar to avoid whales
- **NASA:** Instruments for Air Quality; Batteries for the Mars Rover

Why do Entrepreneurs like SBIR?

SBIR Provides an Incentive to Innovate

SBIR Jump Starts Entrepreneurs

- Provides 'first money'
 - Helps get new projects started
 - Academics can apply even without a company
- No dilution of ownership; owners retain control
- No repayment is required
 - Government recoupment is through the tax system
- SBIR recipients retain intellectual property developed using the SBIR award
 - No royalties owed to the government, though government retains royalty-free use for a limited period
- Certification effect draws in additional investment
 - Signal to private investors of technological validity and commercial promise of the innovation

Academies Research Reveals SBIR Impact on Firm Formation and Growth

- **Company Creation:** 20% of responding companies said they were founded as a result of a prospective SBIR award (25% at Defense)
- **Research Initiation:** SBIR awards played a key role in the decision to pursue a research project (70% claimed as cause)
- **Company Growth:** Significant part of firm growth resulted from award
- **Partnering:** SBIR funding is often used to bring in Academic Consultants & to partner with other firms

SBIR Helps Attract Additional funds from Angels, Venture Capitalists, and Industry

- **Angel Investors:** 37 percent of NRC survey respondents attracted additional investment from Angels and other sources
- **Venture Funding:** SBIR is a signal of research quality and commercial potential. Over \$1.5 billion in added VC investments between 1992 and 2005
- **Acquisition:** e.g., Philips acquisition of Optiva for \$1 billion

Why do Universities Like SBIR?

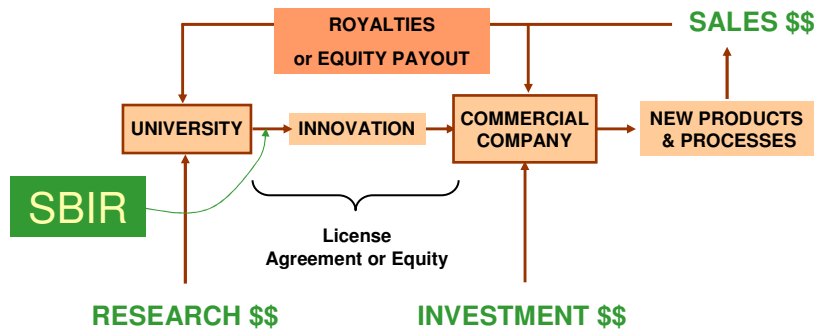
They increasingly find it a useful tool to move Ideas from the Laboratory to the Market

SBIR links the University with Industry and helps create new Spin-outs

- SBIR Innovation Awards Directly Cause Researchers to create New Firms
 - **Lowers Risk:** Faculty do not have to give up University post
 - **Lowers Overhead:** Don't need to have a company to apply
 - Reasonable Chance: 15 to 20% success rates—comparable to other grants
- New firms help grow the region and provide returns on R&D investments

How Ideas are Commercialized

Transferring University Technology to Firms



- Licensing to existing companies – brings royalty \$
- New company formation – brings royalties and/or equity
- Other, less direct, contributions to regional economic activity

Drawn from C. Gabriel, Carnegie Mellon University

Major Finding: SBIR Awardees Come From & Work Closely with Universities

- Over a third of the respondents in the NRC survey Phase II Survey of 4000 firms reported university involvement in their SBIR project. Of these:
 - More than 80% of NIH respondent companies had at least one founder from academia
 - About 1/3rd of founders were most recently employed as academics before founding the company
 - About 1/3rd of projects had university faculty as contractors on the project and 1/4th used universities themselves as subcontractors
 - 15% of SBIR awards involved graduate students.

SBIR Advantage to States

SBIR can draw in Federal Funds to help
Small Businesses in Washington State
Cross the Valley of Death and Create
New Jobs and Growth

But you have to apply to win

- **Key Factor: States with more applicants get more SBIR awards**
- **Number of applicants is related to:**
 - Number of high-tech companies
 - Number of Science and Engineers in the State
 - State expenditures on R&D
 - Private R&D expenditures in the state
 - Number of research universities
- **SBIR is merit-based**
 - If you have a quality proposal—you can win
 - If you are rejected, you can try again!

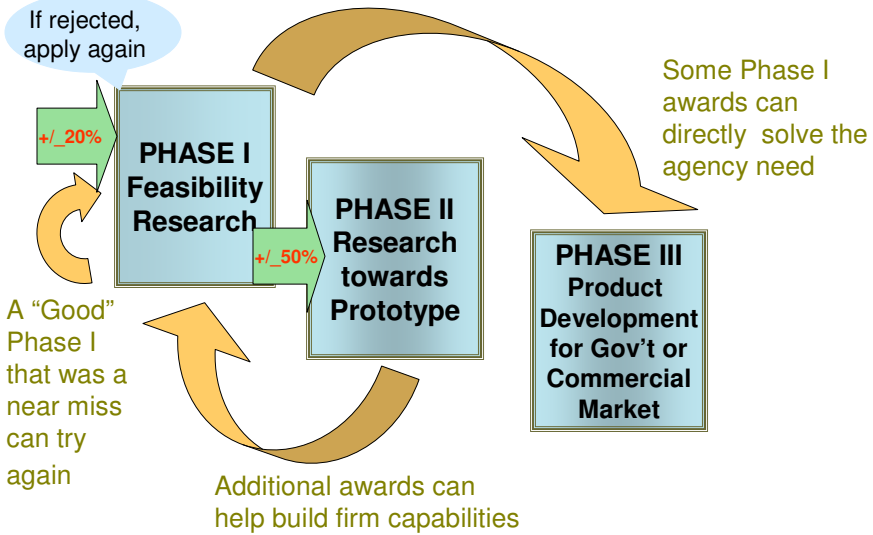
Source: NRC, An Assessment of the SBIR Program, 2008, page 99

Boosting SBIR Participation:

Leveraging SBIR to Boost State Growth

- Advertising the program helps!
- Incentives for Applicants may help generate applicants
- Follow on funding for winners helps sustain growth
 - North Carolina awards up to \$100,000 in matching funds to each company that wins a SBIR grant from the federal government.
 - This approach reinforces support for high-potential small firms
 - Source: Robert McMahan, North Carolina Board of Science and Technology

SBIR is a Flexible, 2nd Chance Program



What is the Overall Impact of SBIR?

SBIR is an Important Force for
Innovation in the United States

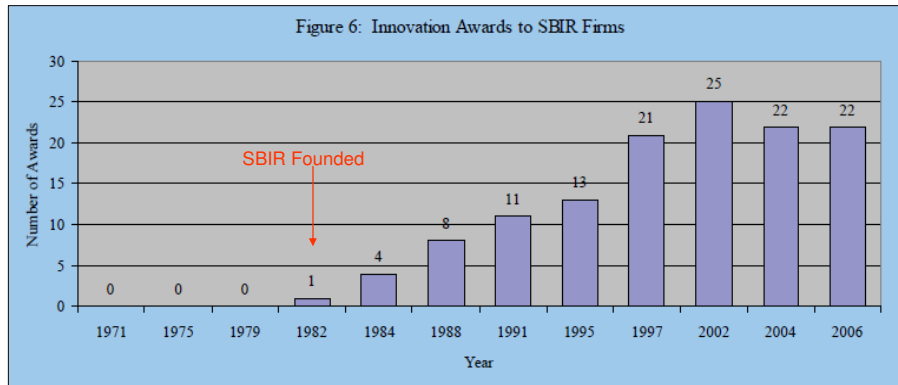
SBIR Improves Markets

- **Creates new Information:**
 - SBIR award selection mechanism creates new knowledge about the technological potential and commercial prospects of new ideas
 - Draws on local expertise, new ways of thinking
- **Provides more Market Choice:**
 - Creates alternatives to oligopolistic government suppliers
 - Provides new options and competition for NASA procurement and can lower costs
 - Introduces new products and services for government and consumers

SBIR Fosters Collaboration

- The trend in innovation in the U.S. is towards greater multi-disciplinary and collaborative R&D
 - More cooperation between Federal Labs and the Private Sector
 - More cooperation between Universities and the Private Sector
- Small Businesses, aided by SBIR awards, are a significant and increasingly important contributors to U.S. innovation

“The SBIR program has become a key force in the innovation economy of the United States”



- SBIR now accounts for nearly a quarter of all ‘U.S. R&D 100’ winners, an annual list of top 100 innovations
 - Source: Block and Keller, “Where do innovations come from?” ITIF, July, 2008

Impact of the Academies Assessment

Mainstreaming the Program
Shaping SBIR Reauthorization

The Academies Review has “Mainstreamed” the SBIR Program

- Fundamental impact of the Academies study has been to “Mainstream the Program” in the policy dialogue
 - SBIR seen less as a “Set-Aside” or “Tax” and more as an Enabler of Innovation
- Much greater focus and understanding of the challenges of Early Stage Finance and the need for appropriate policy support
- The Academies review has substantially improved policymakers understanding of the Valley of Death in the innovation system and the role of SBIR in that system

University Perceptions have Shifted

- “Indeed, SBIR and STTR programs are now widely viewed by many faculty and research administrators as **an important tool** that can help them transform the research generated in our university laboratories into new industrial products, good, and services.”
- “As a result, more and more of our faculty are directly engaged in research funded through these two programs.”
 - Robert M. Berdahl, President of the Association of American Universities
 - Testimony to be presented before the House Science and Technology Committee on April 23, 2009

The Impact on Program Management

- Program Manager testimony tracks closely with Academies recommendations
- Contributed to a Culture of Evaluation created in key agencies
- Recommendations already adopted by agencies where possible

Phase 2 of our Assessment of SBIR is Underway

It will provide a
valuable second
snapshot of data



The Technology Innovation Program is a Complement to SBIR

A Source of Support for
Innovative Firms at Phase III

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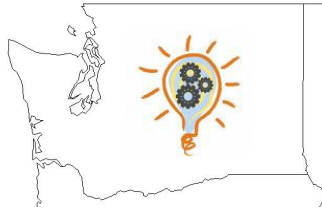
The Technology Innovation Program (TIP)

- TIP accelerates innovation through high-risk, high-reward research in areas of “critical national need”
 - Aim is to speed the development of high-risk, transformative research
 - Targeted to address key societal challenges
- TIP provides funding to universities, small and medium-sized businesses, and consortia for research on promising technologies
 - Awards are Merit Based
 - Funding provided through cost-shared research grants, cooperative agreements, or contracts
- Sufficient Funds not Available

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To Conclude...

SBIR is a tool to Improve
Washington State's Innovation
Performance

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What Washington State Can Do

- Increase funding for STEM education
- Remove constitutional barriers to public-private collaboration in the research and commercialization of new technologies
- Build university expertise: Draw-in star faculty
- Invest strategically to attract federal research funding
- Focus on technologies of the future such as clean energy research, and the workforce to build them
- **Focus on federal innovation programs, and help ensure funding levels that can make a difference**

Source: Technology Alliance—2009 Innovation Policy Toolkit

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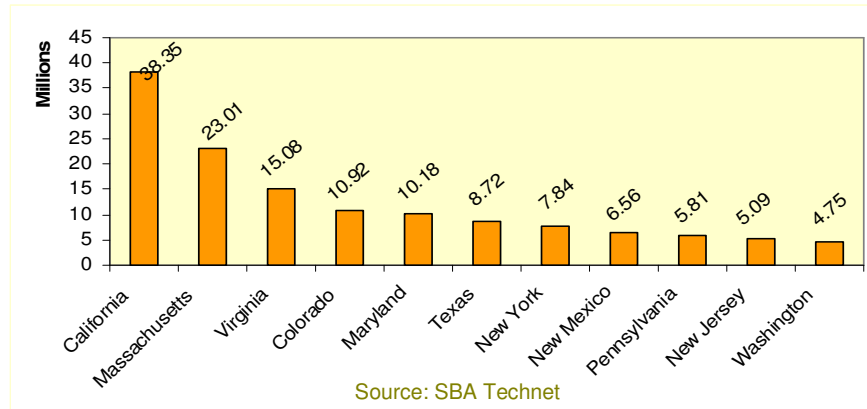
Top 15 SBIR states in 2008, by total \$ awards

#	State Code	State Name	Phase 1 Awards	Phase 1 Dollars	Phase 2 Awards	Phase 2 Dollars	Total Awards	Total Dollars
1	CA	California	697	\$82,515,946	356	\$278,582,404	1,047	\$361,098,350
2	MA	Massachusetts	489	\$61,165,308	226	\$171,850,806	710	\$233,016,114
3	VA	Virginia	224	\$21,037,229	138	\$99,849,029	360	\$120,886,258
4	NY	New York	199	\$23,986,199	79	\$63,696,987	275	\$87,683,186
5	MD	Maryland	160	\$24,262,450	80	\$62,495,818	240	\$86,758,268
6	CO	Colorado	182	\$19,024,192	82	\$64,199,849	263	\$83,224,041
7	PA	Pennsylvania	131	\$17,709,962	79	\$56,139,072	209	\$73,849,034
8	TX	Texas	142	\$16,523,542	63	\$50,923,096	204	\$67,446,638
9	OH	Ohio	126	\$14,200,043	68	\$52,175,467	193	\$66,375,511
10	NC	North Carolina	67	\$13,238,896	35	\$34,458,587	102	\$47,697,483
11	FL	Florida	104	\$10,190,356	53	\$36,706,407	155	\$46,896,763
12	NJ	New Jersey	92	\$10,438,810	48	\$34,365,438	140	\$44,804,248
Totals:			3626	\$438,192,880	1809	\$1,379,428,249	5407	\$1,817,621,130

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Is Washington State taking full advantage of SBIR?

Washington was 11th among States in Total SBIR Dollars Awarded in 2009



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What Washington State can do

- Match SBIR with state programs:
 - Support “Phase 0” applications
 - Provide Phase I to Phase II bridge funding
 - Provide follow-on funds and networking opportunities for SBIR companies
 - Use State and Local Procurement

What does the Federal Government need to do?

- Reauthorize SBIR without structural change
- Fund the Technology Innovation Program
- Develop new Programs

Thank You



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