

Capitalizing on Science, Technology, & Innovation

The NRC Assessment of the SBIR Program Findings & Recommendations



NCET2 Web-Conference Series
Creating & Funding University Startups
January 30, 2008

Sujai J. Shivakumar, Ph.D.
National Research Council

The National Academies



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

The U.S. Small Business Innovation Research (SBIR) Program

The Main Source of Federal
Funding for Early-Stage
Technology Development

The SBIR Program

- Created by the Small Business Innovation Act of 1982 & renewed in 1992 & 2001
- Participation by all federal agencies with \$100 million R&D budget
 - Agencies must allocate 2.5% of their R&D budgets for small business awards
- Currently a \$2.2 billion per year program
 - Largest U.S. Partnership Program
 - Focus on New Firms & New Ideas in Existing Firms

SBIR Concept Advantages

- Program is Focused on Government and Societal needs in health, security, environment, & energy
- Proposals are Industry-Initiated
- 2-Phase Filter
- No new money, hence politically viable
- Program ownership rests with many agencies, not a single “tech agency”
- Changes incentives within Organizations for those who wish to change
 - University Professors can apply their knowledge

SBIR's Win-Win-Win Proposition

- Why do Entrepreneurs like SBIR?
 - Grants mean no dilution of ownership
 - Awards are a signal of quality to private capital market
- Why do Governments like SBIR?
 - SBIR helps Government Agencies Solve their Problems
 - Private Sector Ingenuity helps address Public needs
- Why do Universities Increasingly Like SBIR?
 - Helps Universities to diversify & grow the regional job base
 - Cooperation validates Research Funding

The NRC Study of SBIR

A Study of Unprecedented Scale
and Scope

The National Academies' Assessment of SBIR

- A \$5 million, Large Scale Study with 20 researchers
 - Study covers 96% of the program
 - 5 agencies, each with unique missions
 - Administered separately by multiple institutes, centers, laboratories, and agencies.
 - NIH alone has 23 separate institutes & centers using SBIR
- Required original green field research
 - Limited Previous Academic & Government Analysis
- The Study Goals are to Assess SBIR's Contributions & Improve its Operations

Academies' Study of SBIR involved 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

Some Insights from the Academies' Study

SBIR's Contribution to Entrepreneurship

SBIR Enables Entrepreneurial Firms

- NRC Phase II Survey and Case Studies show that awardees believe that SBIR has helped them:
 - Start a company
 - Build capacity
 - Develop and refine new technologies
 - Grow intellectual property
 - Retain control of intellectual property
 - Pursue multiple paths to commercialization
 - Signal quality of research/technology to capital markets

Academies' Research Reveals SBIR Impact on Firm Formation and Growth

- SBIR Awards Have a Substantial Impact on Participating Companies.
 - **Company Creation:** 25% of responding companies said they were founded as a result of a prospective SBIR award
 - **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 Stimulates Scientific and Technological Knowledge

- SBIR Pushes the Scientific Frontier
 - Awards select for High Risk, Novel Research
 - Project failures are associated with technically challenging projects and not a sign of program failure
- Multiple Knowledge Outputs
 - SBIR projects yield new scientific & engineering data
 - Results visible in numerous publications, patents and licenses, research equipment
- Enhances Human Capital
 - Opportunities for research and training for junior research staff
 - Knowledge gained often applied to other research projects

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 and the University:

A Mechanism to Transfer Knowledge

- SBIR Innovation Awards Directly Cause Researchers to create New Firms
 - Faculty do not have to give up University post
 - Cooperation creates High-Tech Jobs
- Universities can diversify & grow the job base
 - Increasingly universities are the largest regional employer for all types of employment
- Cooperation validates Research Funding
 - Returns to Society in Health, Wealth, & Taxes
 - SBIR is a proven mechanism in an uncertain game

Conclusions

SBIR Contributes to the Development of Scientific & Technological Knowledge

- SBIR Generates Knowledge
 - As embodied in data, publications, patents, licenses, models, algorithms, equipment, new firms, etc.
- SBIR Broadens Scope & Speed of Research
 - Helps firms initiate new high-risk research
 - Helps broaden the scope of existing research
- SBIR Disseminates Intellectual Capital
 - Suggested by presence of extensive Licensing agreements by SBIR awardees
- SBIR Builds Networks between Universities &Firms
 - Faculty and students draw on SBIR to establish businesses, start projects, drive towards commercialization

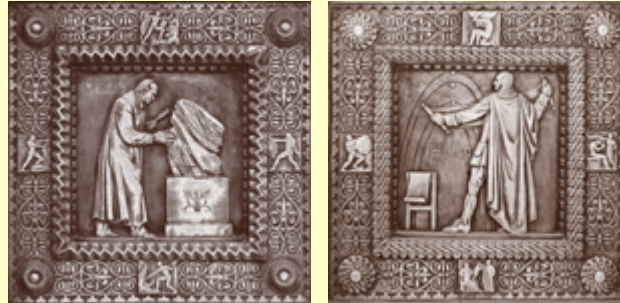
SBIR Brings New Ideas to the Market

- Small firms use SBIR to:
 - Advance Projects
 - Develop specific capabilities
 - Attract additional funding
 - Create and Market new Products & Services
- Significant Commercialization
 - About half the projects reach the marketplace in some form (NRC Phase II Recipient Survey)
 - Results are highly skewed—Small number of big-pay-off awards
- Commercializing Academic Research
 - Academics encouraged to found new firms that can commercialize their results

Capitalizing on SBIR

- The United States needs to Capitalize on Investments in R&D through SBIR
- SBIR Preserves Market Orientation
 - Addresses National Needs
 - Draws on Small Business Imagination
 - Improves Operation of Markets
 - More Information & More Firms
 - More Firms Create More Competition
 - Helps Create New Firms (and Jobs)
- A Goal of the NRC Assessment is to Improve the Effectiveness of SBIR through Operational Improvements to Enhance National Competitiveness and Security

Thank You



Sujai Shivakumar, Ph.D.
The National Academies
500 Fifth Street, NW
Washington, D.C. 20001
sshivaku@nas.edu
Tel: 202 334 1337

<http://www.nationalacademies.org>