



## Public procurement programmes for small firms – SBIR-type programmes

**This policy instrument aims at providing early-stage financial support to high-risk innovative technology-based small firms with commercial promise.**

### Target and purpose

Innovative small firms face difficulties in attracting investors to support their innovation projects – especially seed innovations – due to information asymmetries, moral hazard and the “herding” tendency of investors. Financing is more available for firms at a later stage of technology development and also for those which can provide substantial collateral.

In addition to financing constraints, the returns to investment in knowledge and innovation cannot be fully appropriated by innovating firms as knowledge is a public good that can “spill over” to others. Therefore, the level of private R&D investment of small innovative firms is likely to be below what would be socially optimal.

This has incited governments to play a role in funding the development of new technologies in companies through R&D contracts. The economic justification for these SBIR-type programmes is clear: government funding is meant to raise the level of private returns closer to the level of social returns.

From the governments’ perspective, SBIR-type programmes have a double aim: to stimulate technological innovation, ultimately boosting innovation and growth, while at the same time providing government agencies with new, cost-effective, technical and scientific solutions to meet their needs.

From the firm’s perspective, features that make SBIR contracts attractive (besides from the funding itself), include the fact that there is no dilution of ownership or repayment required. Award recipients retain rights to intellectual property developed using the SBIR award, with no royalties owed to the government. The government retains royalty-free use for a period, but this is very rarely exercised.

## Practice

The Small Business Innovation Research Program (SBIR) introduced in the United States in 1982 is the first large-scale public venture award programme. SBIR requires government agencies (mainly Department of Defense, National Institutes of Health, NASA, National Science Foundation, Department of Energy) with a certain level of external R&D budgets to set aside 2.5% of their funds for the programme, which offers competition-based awards to small innovative firms in three phases.

- Phase 1 (six months), USD 100 000 for a feasibility study allowing small firms to test the scientific and technical value of their R&D effort and its feasibility.
- Phase 2 (two years), USD 750 000 for a full R&D effort.
- Phase 3, the firm pursues – with non-SBIR funds – the commercialisation objectives resulting from Phases 1 and 2. Phase 3 follow-on projects can benefit from US government R&D funding; awards are then funded from mainstream budget lines.

The SBIR programme is worth over USD 2 billion annually and makes over 4000 awards each year. SBIR funds are designed as a first step on the procurement ladder. Awards are linked to public sector customer requirements and the details of the topic, awardee and awarded are published on the Internet. The majority of award-winners have less than 25 employees (CBR, 2006).

The success of the programme in the United States has inspired similar initiatives in other OECD countries, notably in:

- Japan since 1999. Various agencies or ministries are involved in implementing the programme which focuses on several areas: energy, environment, ICT, medical devices, agriculture and foods, bio and medical sciences. The SBIR programme is managed by the Small and Medium Enterprise Agency (METI), but each ministry operates its own procedures and cycles of operation.
- The United Kingdom since 2001. The SBIR earmarks a share of the government's procurement budget (about 11% of the budget in financial year 2007/2008) to be assigned to SMEs through competitive R&D contracts. The SBIR has been reformed several times to increase its performance, reach and impact. The last reform was launched in 2009; the new SBIR was piloted in the areas of defense, health and building. The Technology Strategy Board is the agency in charge of the programme.
- The Netherlands since 2004. The government launched a small scale SBIR – an initiative of the Ministry of Economic Affairs, in collaboration with other ministries – on several different themes: agriculture, energy, transport, water management and defense. SBIR projects are procured via tenders. An independent committee evaluates proposals and makes a ranking, the Minister uses the ranking in the choice of candidates.

## Appropriateness and feasibility

SBIR, as it has been designed in the United States, has several significant advantages:

- The programme is focused on helping small firms meet government and societal needs in domains as diverse as health, security, the environment, energy efficiency and alternative energy sources.
- The needs are articulated by government agencies, and the proposals are initiated by individual companies, often new to government R&D programmes.
- A two-phase filter is employed with fewer than 15% of applicants being accepted in the first phase and approximately half in the second phase.
- The programme has no budget line and thus requires no new funds; it is therefore politically viable and independent of the budget process.
- The programme is decentralized across the government. Programme ownership rests with many agencies quite different in size and with different missions. The programme is not the responsibility of a single “innovation agency” which reduces the risk of capture of civil servants.

## Success factors

The SBIR-programme has proven to be successful in the United States for enabling small business to develop technical innovation attracting third party interest (whether public or private). The main strengths of the programme are:

- Encourages novel research: it has a high-risk focus and projects involve novel research, rather than incremental change.
- Catalyst for employment and sales growth: the programme has had positive effects for award-winning firms in terms of employment and sales growth (Lerner, 1999).
- Certification: SBIR facilitates links with angel and venture capital investments – awards play an important role in certifying firm quality as they validate technology concept and commercialisation (Lerner, 1999).
- External links: SBIR provides a bridge between universities and the marketplace; an important percentage of SBIR awards involve university researchers.
- Size and breadth: the size and broad spectrum of the programme mean that support is distributed to a wide number of different firms, of which nearly a third are new to the programme each year.
- Flexibility: the programme allows to meet different mission needs of the government agencies.

## Risk factors

Some risk factors are inherently linked to government funding small business research through awards:

- Risk of non-additionality: awards simply crowd out firm-financed R&D instead of increasing R&D activities or employment; they therefore only transfer costs of commercial R&D to the government (Wallsten, 2000).
- Lobbying: serial participation of unachieving firms whose probability of winning an award is strongly increased by relationships with federal officials (“SBIR mills”).
- Lack of motivation and evaluation: many government agencies can regard SBIR as a “tax” on their programmes and will not invest time in choosing the award-winners and follow-up on programme outcomes.
- Length of the application process: long cycle time between the application phase, and phase I and phase II awards, can be an issue for small firms with constrained monthly cash flow.

In addition, one of the main criticisms of the SBIR programme in the United States, has been that it tends to only develop a technology to a certain readiness level. Most major commercialisation successes (whether public or private) require substantial post-SBIR research and funding from a variety of sources. Survey results indicated that 56% of the surveyed projects managed to attract additional funding. However, many award-winning firms have stressed the difficulties in obtaining funding for the commercialisation phase (Phase III). Some federal agencies have been experimenting funding firms beyond phase II to help them develop their project at a sufficient level for interest by third parties (NRC, 2008).

## Evaluation

Econometric evaluation of the SBIR programme in the United States has raised some doubts about success of the programme, pointing to risk of non-additionality of SBIR funds (see section above on risk factors). Data showed that SBIR awards a) did not lead to an increase in employment in firms and b) appeared to crowd out private money that companies previously spent on R&D (Wallsten, 2000). Analysis also pointed to an inherent incoherence in the selection process of award-winners: SBIR managers aim at selecting firms on the likelihood of commercial success (“pick winners”) as they are looking for “success stories”. Research has shown that SBIR project performance is highest for those projects in industrial segments which themselves receive the highest level of venture financing (Gans and Stern, 2003). This means that if the programme administrators are given a strong incentive to identify projects with the highest performance, SBIR funding may precisely focus on those segments for which venture capital is already readily available. Instead, governments should fund proposals that are not likely to receive funds from private sources (Wallsten, 1998 and 2000), as these are likely to be those which yield great social returns, but negative profits for the firm.

However, commercial outcomes of the SBIR programme themselves are difficult to evaluate. In the United States, these were first only evaluated through a qualitative assessment based on “success stories”. This has then been complemented by more quantitative evaluations aiming to assess how much business-generated phase III dollars come from SBIR funds. This is not a simple task as a set of comparable firms must be chosen. The Department of Defense for instance is using the company commercialisation report (which requires firms that submit bids for phases I or II to report commercialisation for all previous awards). However, this dataset does not include further growth by award-winners that are ineligible for (or do not apply to) further awards. Measuring commercialisation with quantitative indicators therefore remains a challenge (NRC, 2007).

Several evaluations of the SBIR programme have nonetheless taken place and show that SBIR awards have caused the creation of new firms, with positive benefits in employment and growth for the local economy (NRC, 2000). Quantitative analysis has stressed that awardees grew significantly faster in terms of employment and growth (over a ten years period) and were more likely to attract venture financing than comparable firms (Lerner, 1999).

All the studies reviewed above argue for a continuous effort to carefully evaluate SBIR-type government programmes in order to assess their real economic impact, to improve programme performance and spread best practice. They point to the fact that the efficiency of the programme could be increased further through *a*) a regular internal/external assessment to inform agency management about programme outcomes (*e.g.* tangible results from firms’ previous R&D awards should be examined more closely) and *b*) through improved project management: government officials could for example be empowered to examine the track record of the firms receiving awards in order to help them better identify multiple unproductive award-winners (NRC, 2008).

Results from an evaluation in the Netherlands (2007) show that the first results of the SBIR pilot programme are positive. Data from 88 firms taking part in the pilot showed that: SBIR brought in new companies and new ideas; that companies receiving funds are small (less than 100 employees) and that they co-operate more with other companies and research institutes than companies that did not receive a contract.

The SBIR programme introduced in the United Kingdom has been evaluated by the DIUS as having less positive results than expected in terms of strengthening technical and scientific research. Problems encountered in the United Kingdom were linked to: a lack of participation from government departments, the low total value of the contracts to small firms and the fact that these were very rarely linked to technical development. Studies still point to insufficient participation across government; they also state that awards are highly skewed by a number of very small awards for phase I demonstration projects (CBR, 2010).

## Further resources

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- National Research Council (2009) , 21st Century Innovation Systems for Japan and the United States: Lessons from a Decade of Change: Report of a Symposium [www.nap.edu/openbook.php?record\\_id=12194&page=92](http://www.nap.edu/openbook.php?record_id=12194&page=92)
- SenterNovem (Netherlands) Website: <http://www.senternovem.nl/SBIR/SBIR>
- Technology Strategy Board (UK ) Website: [www.innovateuk.org/deliveringinnovation/smallbusinessresearchinitiative.ashx](http://www.innovateuk.org/deliveringinnovation/smallbusinessresearchinitiative.ashx)
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