Outcomes related to combinatorial innovation in government programs: Feedback from cooperative research center directors

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Overview

• Research Question
• Sample & Methods
• Findings
  – Recruiting: success rate, channels, decisions, advice
  – Benefits to the Center
  – Costs to the Center
  – Do it again?
  – Suggestions for improving the supplement
Research Objective 2

- What has been the impact of the SBIR/STTR supplement for IUCRCs that had a member?
  - How successful are center directors in recruiting SBIR/STTR firms through the supplement?
  - Through what channels do center directors identify firms that are eligible for a supplement and convince them to join their center?
  - What do directors perceive to be the primary factors or motivations behind SBIR/STTR firms joining an I/UCRC under the supplement?
  - What do center directors perceive to be the benefits and costs, if any, of SBIR/STTR firms holding membership in their center under the supplement?
  - Based on their experiences, would center directors recruit SBIR/STTR firms again under the I/UCRC membership supplement?
  - What advice or recommendations do center directors have for the NSF to improve the operations or pay-offs related to the membership supplement?
Objective 2: Director’s Assessment of SBIR Memberships

- **Methodology**
  - **Data**
    - Web-based questionnaire completed by directors directly responsible for recruiting SBIR (forced choice; open-ended)
    - Dimensions: background, identification and recruiting strategies; benefits, costs, recommendations
  - **Sample**:
    - All centers with an SBIR → Director responsible for recruitment
    - Procedure: Letter from NSF/IUCRC; Letter from Project Team; Request for IAB information on SBIR; Confirmation of recruiting director; Email request to complete web survey
    - N = 34/48, Response rate = 70.8%
  - **Analysis**:
    - Descriptive statistics
    - Content analysis
    - Predictive based on center characteristics
### Involvement in Recruiting SBIR members

The bar chart illustrates the mean number of firms recruited and joined, as well as those recruited and not joined. The data shows a higher mean of firms recruited and joined (1.9) compared to those recruited but not joined (0.5).

**Mean N of Firms**

- Recruited & Joined: 1.9
- Recruited & Not Joined: 0.5
How did you identify potential SBIR members (Select all that apply)?

- Through the NSF: 35.3%
- Through an existing member of the center: 35.3%
- SBIR/STTR eligibility is discovered during recruiting: 17.6%
- Through someone in your own network outside the center: 32.4%
- The company contacted the center: 35.3%
- Other: 14.7%
## What convinced SBIR/STTRs to join?

<table>
<thead>
<tr>
<th>Reason</th>
<th>Frequency</th>
<th>Description</th>
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<tbody>
<tr>
<td>Subsidy</td>
<td>14</td>
<td>The firm joined due to the support provided by NSF; the membership fee subsidy</td>
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<td></td>
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<td>Ex: “The fact that the NSF pays most of their membership fee was the key.”</td>
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<tr>
<td>Align</td>
<td>14</td>
<td>There was common interests with Center; The fit with center research; The relevance of research to the firm; Membership would give the firm access to research/expertise in their area</td>
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<td>Ex: “The activities and projects in the center align very well with the activities of the SBIR/STTR company.”</td>
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<td>IAB</td>
<td>10</td>
<td>Membership would give the firm access to IAB/Center members for partnership, collaboration, etc.; Networking benefits</td>
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<td>Ex: “They are also interested to network with large companies with whom they may either collaborate or have other business relationships with later on.”</td>
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<tr>
<td>Resources</td>
<td>6</td>
<td>The firm would get access to technical or physical resources available at center; Use of center facilities; Support from faculty/students</td>
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<tr>
<td></td>
<td></td>
<td>Ex: “Using Center resources to evaluate their products.”</td>
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<tr>
<td>Prior</td>
<td>2</td>
<td>The firm joined due to previous experiences with center or faculty; Familiarity with the center</td>
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<td>Ex: “Positive experience working with faculty on prior occasions.”</td>
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<tr>
<td>IP</td>
<td>2</td>
<td>The firm joined for licensing or IP from center</td>
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<td>Ex: “Company would be better positioned to license technology (either from direct IAB funded projects or unfunded projects with key technologies).”</td>
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<tr>
<td>Other</td>
<td>7</td>
<td>Off topic comments; comments that do not quite fit into the above</td>
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<td></td>
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<td>Ex: “Actually, it’s hard to tell because only two of them responded to an initial overture, and both of them joined the center.”</td>
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Advice to directors in recruiting SBIR/STTRs?

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<tr>
<th>Advice</th>
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</table>
| Cultivate            | 7         | Develop a relationship with the company; Communicate with the company; Learn about the company and their needs; Stay in contact with company  
Ex: “Learn [about] their needs and missing capabilities. Offer them complementary capabilities and help to promote their technological and commercial goals. Also learn about people and champions in these companies that you can work closely.” |
| Project alignment    | 8         | Explain how particular projects can benefit their company; match center project with company needs; Target companies that could benefit from current projects and center capabilities  
Ex: “If possible start a new task or project that will directly benefit the SBIR/STTR member.”    |
| Proactive            | 6         | Be aware of market/industry needs; Keep looking for SBIR/STTR firms; Involve IAB in recruiting  
Ex: “Be pro-active and find companies in the areas of your interest which received the SBIR/STTR awards.”  |
| Benefits             | 6         | Explain financial benefits/leverage from center research; demonstrate how the company could benefit financially from center research  
Ex: “Center directors need to convince the company of the value associated with networking and access to technology.”  |
| Other                | 4         | Off topic comments; comments that do not quite fit into the above  
Ex: “There is an element of luck involved. It would be good if NSF can help connect directors better with companies.”  |
Benefits of having an SBIR member

- None: 2.9%
- Too Early to Tell: 2.9%
- Other: 11.8%
- Helped Recruit new members: 14.7%
- Hired Student: 14.7%
- Contributed Equipment/Resources: 20.6%
- Commercialization: 32.4%
- Relationships with other members: 35.3%
- New proposals: 41.2%
- Continued partnerships: 47.1%
- Image/PR: 50.0%
- Improved research agenda: 61.8%
- Firm actively engaged in research program: 64.7%
- Mentored student: 67.6%
- Extra funds: 91.2%
Comments on Benefits

• A recent SBIR member has a female founder/CEO. We would like to have her involved in mentoring female STEM undergrads and get them involved in I/UCRC projects.

• Group dynamics....a small company who takes the time to get and stay engaged adds to the culture of innovation that rubs off on our graduate students.

• The SRIR/STTR firms bring in "commercialization" aspect of the research to us. Especially, it is very beneficial for our students to interact with these members to learn things from different aspects.

• ...creates investment/collaboration opportunities for these larger members.

• SBIR companies bring dynamic relations and motivation to the center because they have very specific and urgent needs. They contribute by facilitating and speeding the processes.

• Provided role models to our students interested in tech entrepreneurship.
Costs of having and SBIR member

- None 35.3%
- Too much pressure for commercialization 17.6%
- Other 14.7%
- Too Early to tell 8.8%
- High maintenance members 8.8%
- Poor research alignment 5.9%
- High effort to recruit 5.9%
- Too narrow projects 2.9%
- Low firm involvement 0.0%
- Turnover 0.0%
Comments on Negatives

• ...the major issue that must be confronted is the likelihood that a small company could reasonably jump from a $5,000 annual membership fee to one at $50,000 (current Center annual membership fee). I believe that this gap limits the term of SBIR membership to two years (the duration of NSF subsidy).

• ... they tend to terminate their membership once their SBIR award expired. However, we have been trying to team up with some of them for new collaboration and new proposal submissions.

• Even with a positive experience, these companies can not afford the annual membership fee on their own. It also greatly increases the Center Director workload by needing constantly to focus on recruiting.

• Two members have been widely disparate in their responses, with one being mostly in the "benefits" category and another begin more in the "negative" aspects category. So we've experienced both ends of the spectrum.
Likely to recruit SBIR/STTR again?

- Very Unlikely: 57.6%
- Undecided: 15.2%
- Somewhat Likely: 9.1%
- Likely: 12.1%
- Very Likely: 6.1%
### Suggestions for improving the supplement?

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<tr>
<th>Advice</th>
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<tr>
<td><strong>Length</strong></td>
<td>4</td>
<td>Extend length of membership; Firms need more time to realize benefits</td>
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<td>Ex: “Make it possible for the SBIR/STTR member to apply for an additional year or two at an associate level to maintain the connection and potentially transition them from fully subsidized to a fully paying member.”</td>
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<tr>
<td><strong>NSF support</strong></td>
<td>6</td>
<td>NSF could help centers in recruiting (e.g., provide contact information at the firm); NSF could do more to encourage firms to collaborate with centers; Expand the number of partnerships</td>
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<td>Ex: “Make it easier to read about and identify these companies. Provide funds to invite companies to center activities for recruitment purposes.”</td>
</tr>
<tr>
<td><strong>Fine</strong></td>
<td>5</td>
<td>Program/supplement is OK, good as it is</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ex: “NSF is doing a good job. This is a good program.”</td>
</tr>
<tr>
<td><strong>Poor</strong></td>
<td>2</td>
<td>Program is not helpful for students; Disagreement with program design</td>
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<td>Ex: “If NSF is interested in entrepreneurial experiences for students, this is not the way to go about it in my view.”</td>
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<tr>
<td><strong>Other</strong></td>
<td>1</td>
<td>Off topic comments; comments that do not quite fit into the above</td>
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<td>Ex: “NSF supplement funds should be given directly over to the center and not to the SBIR/STTR company so that the center can manage its financial affairs more easily.”</td>
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Objective 2: Director’s Assessment of SBIR Memberships

• Major Findings
  – For those who found members, recruiting success rate was very high: 86% success vs. 30% success with ‘typical’ members
    • But we didn’t survey centers with no supplements so …
  – Members found via multiple channels: NSF (SBIR list); company contact; network
  – Memberships have multiple benefits for Centers
    • Majority listed funding support, student mentoring, engaged partner, improved research, and center image
  – Memberships have some costs for Centers
    • 1/3 reported no costs
    • Primary cost was structural: turnover