Predictors of Cooperative Research Centers Post-Graduation Success

by

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Outline

• Background & Purpose
• Literature
• Program
• Methodology
• Preliminary Findings
Background

- Federally supported research centers are typically funded for a time-limited period ~ 10 years
  - Concerns about entitlement
- An explicit goal of some programs, cooperative research centers (CRCs), is to create “self-sustaining” centers
- How effective are CRCs in achieving this goal?
Purpose of Research

- To assess the extent to which graduated Centers become self-sustaining
- To determine what factors predict Center sustainability post graduation from NSF support
- To assess the extent to which graduated Centers maintain fidelity to their program model
What do we know about sustainability?

- Very little
  - General literature
    - Modest literature on program sustainability primarily from public health literature
    - Meta analysis (Scherier, 2005)
    - 19 studies; 2 multivariate
  - Centers
    - Tiny, inconclusive literature based on ERCs
    - Ailes, Roessner, & Coward (2000): data collected at graduation
    - Mudjamar (2005): ~ informal survey with 50% response rate
General Model of Sustainability

• Definition (Shediac-Rizkallah & Bone, 1998):
  – Sustainability is understood as continued program *activities*, continued *benefits* to stakeholders, & organizational *capacity* to continue to support the program once initial federal support is exhausted

• Sustainability vs. Institutionalization
General Model of Sustainability

Four categories of factors that influence sustainability. Emphasis on alignment across categories.

- **Environmental Factors**
  - **Stakeholder involvement** - IAB, Faculty, University Admin. (Tornatzky & Fleisher, 1990)
    - Buy-in, network of support, tailoring
  - Alignment
    - Values, needs, resources, structure, process
  - Branding/Prestige

- **Organizational Factors**
  - Fit with organization
  - Formal structures
  - Resources ($, in-kind, facilities)
  - Administrative policies and procedures
  - Technical expertise

- **Program Factors**
  - Implementation quality
  - Durability to adaptations
  - Proven Effectiveness
  - Benefits to clients
  - Ownership among staff
  - Funding
  - Research area

- **Individual Factors**
  - Champion roles
  - Leadership actions
    - Entrepreneurial orientation
    - Relationship management
Research Questions

• What is the status of graduated Industry-University Cooperative Research Centers (I/UCRCs)?
  – Preliminary Results

• What factors (environmental, program, organizational, individual) predict post-graduation sustainability?
  – Preliminary Results

• How much fidelity to the I/UCRC model do graduated Centers maintain?
  – Data to be collected
Why NSF’s I/UCRC Program?

- **GOAL**
  - "NSF intends to seed partnered approaches to ... research, not to sustain the Centers indefinitely. The Foundation intends for Centers gradually to become fully supported by university, industry, state, and/or other non-NSF sponsors. “ (NSF I/UCRC website)

- **NSF-SPONSORED**
  - Modest $ Support ($130K/YR/CENTER; $7 MILLION)
  - Receives 90% support from industry, state, other federal

- **MODEL**
  - University-based (faculty & students) research center
  - Industrial consortium (membership: $30-50K/YR)
  - Involves multiple sites: 50+; 600+ firms
  - **Ongoing evaluation**
## Question by Source by Variable Table

<table>
<thead>
<tr>
<th>Research ?s</th>
<th>DV</th>
<th>IV</th>
<th>Data Source</th>
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<tbody>
<tr>
<td><strong>Status?</strong></td>
<td>Dropout – alive</td>
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<td>Archival Data: CD Reports</td>
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<td>Graduated – alive</td>
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<td>Graduated - merged</td>
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<tr>
<td><strong>Predictors?</strong></td>
<td>Sustainability: program adaptability, program champion, fit, benefits to staff/clients, stakeholder support, funding</td>
<td>Archival Data: CD Reports PO Reports</td>
<td>Interviews: Center Director and/or Evaluator</td>
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<td>Sustainability:</td>
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<td>Capacity</td>
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<td><strong>Fidelity?</strong></td>
<td>Continued Core Components (hi/med/lo): Industry support Consortia format Shared research &amp; IP Strong industrial influence</td>
<td>Interviews: Center Director and/or Evaluator</td>
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What do these centers look like?

**Status:**

- **Drop out – alive**
  - Hydrogen Center: dropped out of IUCRC after 7 years because firms did not like consortia approach; continued for many years as a contract research organization with ~$2M/year budget (low fidelity)

- **Drop out – dead**
  - Bio Pharma Center: dropped out IUCRC after 4 years due to lack of industry support and terminated operations; sharing IP was a major obstacle

- **Graduated – alive**
  - Communications Center: recently celebrated its 25th anniversary, has 8 companies, ~$1M/year; continues to be a catalyst for research and education.
  - AgroChem Center: recently passed 17th anniversary; performs research and provides services for federal agencies; ~$2M/year (low fidelity)

- **Graduated – dead**
  - Robotics Center: graduated from IUCRC but terminated operations 1 year later; director left and industry went in a different direction

- **Graduated – merged/ absorbed**
  - Ceramics Center: graduated from IUCRC and then merged with another center and successfully competed for a new IUCRC award; foci of combined centers was sufficiently different to justify a new award; $4.6M in FY2006.
The current I/UCRC Population and Participants

- Participants:
  - Any NSF I/UCRC that is beyond the 10th year of funding and...
    - graduated (completed funding cycle)
    - did not graduate but is no longer in the program
    - graduated and was absorbed by another Center
    - N = 69

- "Over 80% of the Centers established continue on as successful centers without NSF funding" (NSF I/UCRC website).
Post-Graduation Status: Preliminary Results

- There are 69 Centers that were started and are no longer funded by the I/UCRC Program
  - 41% did not reach 10 year graduation
    - 29% did not reach 5 year renewal
    - 12% reached the 5 year renewal, but not 10 yr graduation
  - The status of the remaining 59% that did reach 10 year graduation will be determined based on future data collection
Preliminary Results: Cohort Effects

Early Adopters may be more likely to sustain the program post graduation. But why?
Predictors of graduation status: Preliminary Results

• **DV:**
  - NSF Funding Status
    » Funded < 5 years
    » Funded 6-9 years
    » Funded > 10 years

• **IVs:**
  - Average annual NSF $
  - Industry membership $ in final year
  - Number of funding source types in final year
  - Number of Industry members in final year

• **Results of Multinomial Logistic Regression**
  - # Industry Members: Significantly predicts graduation status ($p < .001$)
Summary & Conclusions

• Achieving self-sustainability is an important and explicit I/UCRC goal
  – Facilitates long-term outcomes/benefits

• Level of sustainability is unclear, but…
  – Fewer Centers than expected graduate

• Inside the Black Box
  – Evidence of a cohort effect
  – Stakeholder investment out weighs the importance of funding in determining sustainability
  – Complete picture at next year’s AEA…
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