Evaluating the Indirect Effects of Self-Sustaining Cooperative Research Centers

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Outline

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General Context

- Many federal and state programs are launched as “demonstration” projects and/or are provided time-limited funding
- Explicit or implicit goal of these efforts is for programs to sustain themselves post-government funding
  - Similar approach is taken for S&T initiatives
- Very little research on these indirect outcomes and impacts
What are Indirect Outcomes & Impacts?

- Grant Funding Period
- Post Grant Sustainability
- Post Grant Transformed

**Indirect Outcomes:**
- Funding Leveraging
- Industrial Partnering
- Student Education
- Research/Innovation

**Indirect Impacts:**
- Economic Development
- Organizational Impacts
- Commercialization
Purpose of Research

• To assess the status of Centers after their grant ends
• To assess the extent to which Centers maintain fidelity to the I/UCRC model post-funding
• To determine the level of sustainability achieved by graduated I/UCRCs – how successful are they
• To determine what factors predict Center program sustainability post-funding
• To determine the indirect impact of the I/UCRC program as achieved by graduated centers
• What do we know about Center sustainability?
  
  – 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
    » IUCRC: no systematic information about graduated centers
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.

• **Measure**
  
  – Program activities
  
  – Benefits to key stakeholders
  
  – Infrastructure
Background:
I/UCRC Program

• Oldest CRC program, started 1980
• Time limited funding
• Explicit goal of creating self sustaining Centers
  – “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. [Centers are expected to] develop a plan to work toward self-sufficiency from NSF” (NSF I/UCRC website, 2006).

• Ongoing evaluation throughout the 10 year grant
  – Data archived back to 1986

• Assumption of success
  – “Over 80% of the centers established under the I/UCRC program continue on as successful centers without NSF funding” (NSF I/UCRC website, 2006)
Method

- **Design**
  - Semi-structured interview protocol

- **Measures**
  - Funding, partners, structure, fidelity, students, research...

- **Participants**
  - **Sampling Criteria**
    - Center received an NSF I/UCRC operating grant
    - Center no longer funded by an NSF I/UCRC operating grant
    - Center graduated and merged with a newer Center
    - Center has not received NSF I/UCRC money for at least 1 year
      - Population N = 73
  - **Respondents**
    - Key Informant hierarchy
      - 1) current director; 2) recent director; 3) director at the time of transition, 4) site director, 5) University official, and/or 6) involved faculty/staff
Center Status
Graduation Status

- There are 73 Centers that were started and are no longer funded by the I/UCRC Program
  - 37% Do Not Graduate
    - did not receive the full 10 yrs of NSF I/UCRC grant
  - 63% Graduate
    - Received 10+ years of NSF I/UCRC grant support
Center Status

1yr Post Funding Status

Current Status

Grad: 85% Operating, 15% Closed
Not Grad: 63% Operating, 37% Closed
Grad: 80% Operating, 20% Closed
Not Grad: 64% Operating, 33% Closed

Closed
Operating
Outcome Categories

• Closed: Did not continue to operate (as a center)
• Merged: Joined another existing/graduated I/UCRC
• Sustained: Continues to operate as a research entity, while maintaining at least 2 of the 3 core features of an I/UCRC
  – University based, Industry funded, shared research
• Transformed: Continues to operate, but:
  – Funded under another program, i.e. branded as a new center
  – Absorbed and/or integrated into another pre-existing entity
  – Discontinuous change in research focus
  – Has not maintained at least 2 of the 3 core I/UCRC features
Center Status

- 77% continued to operate in some form beyond the end of their grant
- 66% currently operating in some form

1yr Post Funding Status

- Closed: 23%
- Sustained: 49%
- Transformed: 18%
- Merged: 10%

Center Current Status

- Closed: 6%
- Sustained: 44%
- Transformed: 16%
- Merged: 6%
Indirect Outcomes
CENTER LIFE CYCLE

Active Centers
(Current Year)

Closed Centers
(Cumulative Record)

* Study sample does not include centers graduated in the last 2 years, information about their current status is not reflected.
Investment Leveraging

Direct Leveraging = 1:8
Indirect Leveraging = 1:15

Millions

- Indirect Leveraging
- Direct Leveraging
- NSF
INDUSTRIAL PARTNERING By YEAR: Plus Currently Operating* Graduated I/UCRCs (N = 35)

TOTAL NUMBER OF MEMBERS

AVERAGE NUMBER OF MEMBERS PER CENTER

*Does not include merged centers or those for which current member data is missing
Educational & Research Outcomes

• Students:
  – Over 1200 currently supported
  – Nearly 400 graduate in last year

• Research:
  – Over 600 ongoing projects
  – Over 1000 pubs in the last year
Indirect Impacts
CAPPS/YamCo: Economic Development Impact

- Center Developed new food processing technology
  - Increased quality & safety of food
- Worked with NC Dept of Agriculture to ID tech transfer potential
- Established $6Mil processing plant
- Creates Jobs
- Increases producer profit
  - Reduced processing cost
  - Higher crop yield
WRC/Edison Welding Institute: Organizational Impacts

- Independently operating for over 20 yrs
- Transformed from Research Center to a Non-Profit High-Tech Consulting & Research Org
- Partners with 2500+ Industrial firms & Government Agencies
- Budget: $25Mil
CAPCE/Owens Corning Commercialization Impacts

- Development of a higher quality, safer, more environmentally friendly plastic foam product
- Application for building, transportation, and health care industry
- Testing with Owens Corning demonstrates cost effective feasibility of mass commercialization
- Potential to increase demand for and US share in $2Bil global industry

Scott, C.S. (2009) *Compendium of Technology Breakthroughs of NSF I/UCRCs*
Lessons Learned & Next Steps

• Lessons Learned:
  – I/UCRCs have a strong history of producing self-sustaining centers
    » 80% of centers that complete their grants are currently still operating
  – NSF’s current I/UCRC Evaluation Project does not capture indirect outcomes & impacts
    » Centers not routinely evaluate post-funding
  – Post-funding evaluation yields rich evidence of program effectiveness

• Next Steps:
  – Multivariate predictive analysis
  – Case Studies
  – Stakeholder ID Impacts
Acknowledgements:
This project is supported by a grant from the National Science Foundation

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