Predictors of Graduated I/UCRC Success

Thesis Proposal Research

by

Lindsey McGowen

North Carolina State University
Purpose of Research

- To assess the extent to which the Centers become “successful” after graduation
- To assess the extent to which graduated Centers maintain fidelity to the I/UCRC model
- To determine what factors predict Center “success” post graduation from NSF support
What is known about NSF’s track record of producing sustainable Centers?

- Lots of archival data while supported by NSF
  - Total budget, by source
  - Industry membership descriptors
  - Faculty and student stats
  - Center Director info
  - Degrees, hires, publications
- No info post-graduation
- Estimated 80% graduation success rate
- What does “success” mean?
Old Lit: Empirical Reports

Ailes, Roessner, & Coward (2000)

- **Goals:** To explore issues of self-sustainability, funding, cultural change for graduated ERCs
- **Methodology**
  - Interviews with Center leadership
  - N = 16, response rate = 100%, Centers from 5 cohorts, 1985-1990. Data collected year before graduation and year of graduation (11th year)
- **Results**
  - **Outcomes:**
    - All centers survived as research entities to some extent
    - Fidelity to ERC model varied
    - Changes in research focus
    - Negative effects
  - **Hypothesized Predictors:**
    - Infrastructure
    - Transition planning
    - Center management
    - Faculty involvement
    - Institutional factors
    - Research area
    - Industrial participation
    - Educational programs

Mujumdar (2005)

- **Goals:** Investigated what happened to ERCs after graduation, how Center's changed, and the consequences of graduating form NSF support.
- **Methodology**
  - 22 item survey completed by Center leadership
  - N = 10, response rate = 62.5%, follow-up to Ailes et al. (2000) study
- **Results**
  - **Outcomes:**
    - Sources of Funding
      - University (75%)
      - Industry (100%)
      - Government (63%)
      - Other (89%)
    - Funding Range $500K - $27M
  - **Predictor Factors Identified**
    - Mission/Vision
    - Tech Transfer
    - Research
    - Education/Outreach
NSF I/UCRCs bridge the gap between industrial and academic sectors, by (Dees, 2001):

- Adopting a mission to create and sustain industrial collaboration,
- recognizing and pursuing opportunities,
- engaging in a process of continuous innovation, adaptation, and learning,
- acting boldly without being limited by resources currently in hand
- and exhibiting heightened accountability to the industry, faculty, and university served and for technology transfers.

Sector
- Private
- Non-profit
- Public
- Academic

A typology of the construct (Peredo & McLean, 2006):

- Integrated social entrepreneurship
  – Double bottom-line: social & financial
  – Earned income activities themselves create social value
  – Hybrid organizational structure
- Partnered social entrepreneurship
  – Partnerships with for-profit entities make social value creation possible
  – Licensing, contracting, job creation
- Market-based social entrepreneurship
  – Social goals guided by market demands
  – Business orientation toward social value
• **Search terms:** confirmation, continuation, durability, incorporation, institutionalization, level of use, maintenance, routinization, stabilization, sustainability, and sustained use (Johnson et al., 2004)

• **Sustainability** develops out of the program lifecycle in which program design, development, and implementation inform long-term success (Kline & Rosenberg, 1986; Tornatzky & Fleisher, 1990’ Yin 1979).

• **Four main components:** continued outcomes and benefits, continued program activities, capacity for continuation, continued mission/vision/values (Shediac-Rizkallah & Bone, 1998; Weiss, Coffman, & Bohan-Baker, 2002)
New Lit: Sustainability  
(Factors Identified)

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

- **Program Factors**
  - Alignment
  - Stakeholder positive relationships
  - Implementation quality
  - Durability to adaptations
  - Effectiveness
  - Ownership among stakeholders
  - Funding

- **Organizational Factors**
  - Formal structures
  - Champion roles and leadership actions
  - Resources
  - Administrative policies and procedures
  - Technical expertise

- **Environmental Factors**
  - Stakeholder involvement - IAB, Faculty, University Admin. (Tornatzky & Fleisher, 1990)
    - Buy-in, network of support, tailoring
  - Alignment b/t the program, the host organization, and the stakeholders served
    - Values, needs, resources, structure, process
New Lit: Sustainability
(A planning model)

- Plan early – develop capacity
- Involve multiple stakeholders
- Secure/pursue necessary resources – financial, political, human
- Formalize key relationships, procedures, and structures
- Adapt to changes in the organization, stakeholders, and research area
- Evaluation/feedback
Research Questions

• What is the status of graduated Centers?
• How much fidelity to the IUCRC model do graduated Centers maintain?
• How “successful” are graduated Centers? How is success measured?
• To what extent do pre-graduation archival data predict success?
• What transition strategies do Centers use to manage graduation? To what extent does transition strategy predict success?
Participants

• Any NSF I/UCRC that is beyond the 10\textsuperscript{th} year of funding \textbf{and} \ldots
  
  -- graduated (completed funding cycle)
  
  -- did not graduate but is no longer in the program
  
  -- graduated and was absorbed by another Center
  
  -- \( N = 69 \)
What is the Status of Graduated Centers?

**DVs**

- **Status:**
  - Drop out – alive
  - Drop out – dead
  - Graduated – alive
  - Graduated – dead
  - Graduated – merged/absorbed

**Method/Source**

- **Archival Data**
  - Director Structural Report

- **Interview/Survey**
  - Current Director
  - Previous Director
  - Evaluator
  - Dean

**Analysis**

- **Descriptives**
- **Results**
  - Means by category
  - ...

Slide 11
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

![Pie chart showing the distribution of post-graduation status: 59% dropout, 29% 5-9 years, 12% 10+ years.](image-url)
Preliminary Results: Cohort Effects

Number of Centers Leaving the Program

Year Center was Started

79-91
N = 44

92-06
N = 25

10+ yrs
Dropout, 5-9 yrs
Dropout, < 5 yrs

71%
20%
40%
44%
9%
16%
How much fidelity to the IUCRC model do graduated Centers maintain?

**DVs**
- Fidelity/Core Components: (high, medium, low)
  - Industry support
  - Consortial/ membership format
    » Shared research & IP
  - Biannual meetings
  - Strong industrial influence
    » LIFE forms

**Method/Source**
- Interview/Survey

**Analysis**
- Regression
- Descriptives

**Results**
- Scores by cohort/ category
How successful are graduated Centers?

**DV*s**
- Success:
  - Funding changes – overall, by source
    » NSF criteria
  - Size – Faculty, Students, IAB, Projects
  - Research – survival, focus, scope
  - Tech transfer???
  - Publications, patents

**Method/Source**
- Archival Data (pre-grad)
  - PO Data
    » Research, tech transfer
  - CD Report
    » Funding, size, tech transfer
- Interview/Survey (post-grad)

**Analysis**
- T-test/Chi Square
  - Change over time – pre-grad, 3yrs post, 6+yrs, post
- Descriptives

**Results**
- Changes in Center success over time
- Means by category
To what extent do pre-graduation archival data predict success?

**DV**s
- Status
- Success

**IV**s
- Director Structural Report
  - Funding at year 10
  - N of members
  - Change in members
- Process Outcome
  - Industry
    » Satisfaction
    » Research relevance
    » Etc
  - Faculty
    » Satisfaction
    » Commitment
- Social Ent./Champion
  - Satisfaction w/ admin.
  - Leadership

**Method**
- Archival data
- Director Structural Report
- Industry Process Outcome
- Faculty Process Outcome

**Analyses**
- Predictive OLS Regression
- Logistic Regression
- Event history

**Results**
- Correlations among variables
- % of variance in DVs accounted for by IVs (R^2)
What transition strategies do Centers use? Do they predict success?

**DVs**
- Status, Success

**IVs**
- Plan exists
  - Components
    » Research
    » Member recruitment
    » Faculty recruitment
    » Other funding sources
    » IP & Tech. transfer
    » Other
  - Stakeholders involved
    » Center Administration
    » Faculty
    » Industry
    » University
- Plan does not exist

**Method**
- Interviews/Surveys

**Analyses**
- Qualitative analyses of interviews
  - What contributed to success?
- Descriptive
- Regression

**Results**
- Strategic Planning
  - % using various tactics identified
  - % plan exists
  - % no plan
  - Correlation b/t planning IVs and DVs
## Timeline

<table>
<thead>
<tr>
<th>Task</th>
<th>6/06</th>
<th>7/06</th>
<th>8/06</th>
<th>9/06</th>
<th>10/06</th>
<th>11/06</th>
<th>12/06</th>
<th>1/07</th>
<th>2/07</th>
<th>3/07</th>
<th>4/07</th>
<th>5/07</th>
<th>6/07</th>
<th>7/07</th>
<th>8/07</th>
<th>9/07</th>
<th>10/07</th>
<th>11/07</th>
<th>12/07</th>
</tr>
</thead>
<tbody>
<tr>
<td>Approved - COMPLETE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Extended Lit Review - COMPLETE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Archival Data Cleaning – In Progress</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sample Identification - COMPLETE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Proposal Prep. – In Progress</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interview/Survey Design</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Proposal Defense</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Data Collection</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Analysis</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Defend</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>