Industry/University Cooperative Research Centers

Graduated IUCRCs: Case Studies

Lindsey McGowen & Denis Gray with Eric Sundstrom & Lou Tornatzky

IUCRC Evaluators Meeting

June 10, 2011

Outline

Industry/University Cooperative Research Centers

- Brief Review of the Graduated Centers Study
  - Quantitative analyses
- Qualitative Analyses
  - Why Centers unravel
    - Four cases
  - How do center's sustain themselves
    - Steel
    - Polymers
    - Communications
    - Welding
- Lessons Learned

Program Sustainability

Industry/University Cooperative Research Centers

- Definition (Shediac-Rizkallah & Bone, 1998):
  - Sustainability is continued program activities, continued benefits to stakeholders, & organizational capacity to continue to support the program once initial funding is exhausted
- Review of the literature indicates that sustainability can be measured in a variety of different ways and influenced by a variety of factors at multiple levels…. It's complicated.

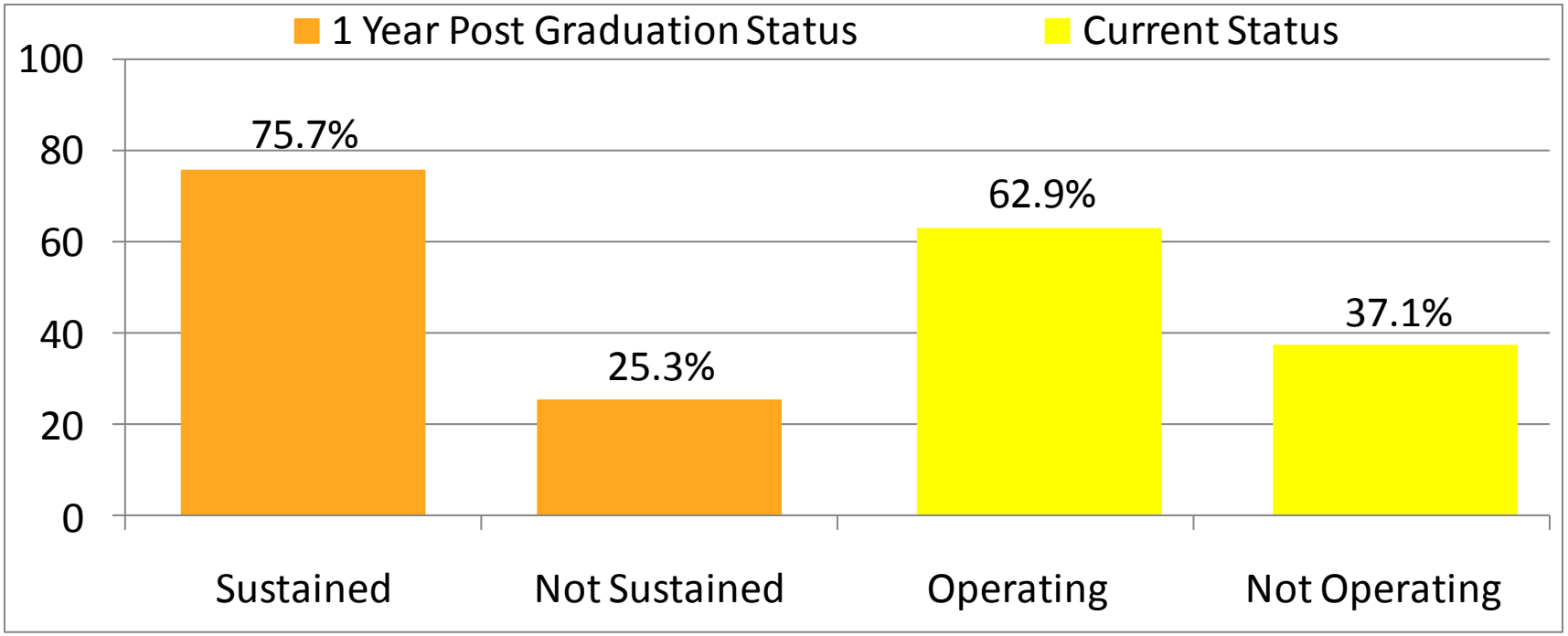
Graduated Centers: Quantitative Analysis

Industry/University Cooperative Research Centers

- Goals:
  - Descriptive
    - To determine the status of I/UCRCs post-funding
    - To determine how much fidelity to the I/UCRC model sustained centers exhibit
    - To determine the level of sustainability centers have achieved in terms of continued program activities, structures, and outcomes
  - Predictive
    - To determine what factors predict center status
    - To determine what factors predict fidelity to the IUCRC model
    - To determine what factors predict the level of sustainability centers have achieved in terms of continued program activities, structures, and outcomes

Graduated Centers: Post-funding Status

Industry/University Cooperative Research Centers



- 1 Year Post Graduation Status
  - 53 sustained
  - 17 not sustained
- Current status
  - 44 operating
  - 26 not operating

Graduated Centers: Fidelity

Industry/University Cooperative Research Centers

	%
industrial support	96.2
university based	94.3
Tech Transfer	94.3
Structural Fidelity Mean: 0.75	
stakeholder meetings	69.8
membership fees	67.9
IAB	67.9
consortial results dissemination	64.2
consortial project selection	50.9
Assessment Fidelity Mean: 0.21	
Evaluator	17.0
LIFE	17.0

- Industry support, university based, and tech transfer are almost universal across sustained centers
- EFA yielded a 2 factor solution, but…
- **These measures of fidelity may not fully capture the various organizational forms and identities of formerly funded I/UCRCs….**

Graduated Centers: Predictive Findings

Industry/University Cooperative Research Centers

	Grad status	Grad budget	Grad members	Grad students	Grad Univ. expenditures on R&D	Grad in-kind	Grad Industry support for outside research
Post-grad status		+					
Current status	+	+					+
Assessment fidelity		+					
Structural fidelity	+	+				-	
Current members			+				
Current budget			+				
Current IP					-		
Current grad students graduating				+			

- Predictive results are somewhat underwhelming…
- Based on quantitative analyses, we learned a lot about the rate of sustainability but just a little about why/how of success/failure

Qualitative Case Studies

Graduated Centers: Qualitative Analyses

Industry/University Cooperative Research Centers

- Goals and Objectives:
  - To try to get a better understanding why some centers sustain
  - To try to get a better understanding how centers sustain
- Methodology
  - Opportunistic analysis of archival data for 4 cases
    - When Triple Helix Unravels: Learning from failure in case studies of industry-university cooperative research centers (Gray, Sundstrom, & McGowen, in press; *Industry and Higher Education*)
  - Structured interviews with four strategically selected success cases

Triple Helix Unravels

- 4 failure cases + 1 sustained from interviews
- Cases:
  - Two failed within 1-4 years
  - Two failed within 5+ years
- Conclusions: Multiple Flaws
  - Structural weaknesses: no doctoral programs
  - External factors: industry with exclusive IP interests; lack of absorptive capacity in firms
  - Lack of institutional support especially during transitions
  - **Lack of leadership/ Botched succession planning**
- IUCRCs fail for a number of different reasons, and they succeed for a number of different reasons in a variety of forms
- The following cases illustrate the diverse paths to program sustainability for IUCRCs

Case 1:
Advanced Steel Processing & Products Research Center

ASPPRC: Sustained with Fidelity

Industry/University Cooperative Research Centers

- IUCRC Founded: 1984
- Host Univ.: CO School of Mines
- Members: 7
- Center continues to operate using the IUCRC model
- Supported solely by industry and Univ. – no gov't support
- Successfully adapted to globalization and consolidation in industry

ASPPRC: Sustained with Fidelity

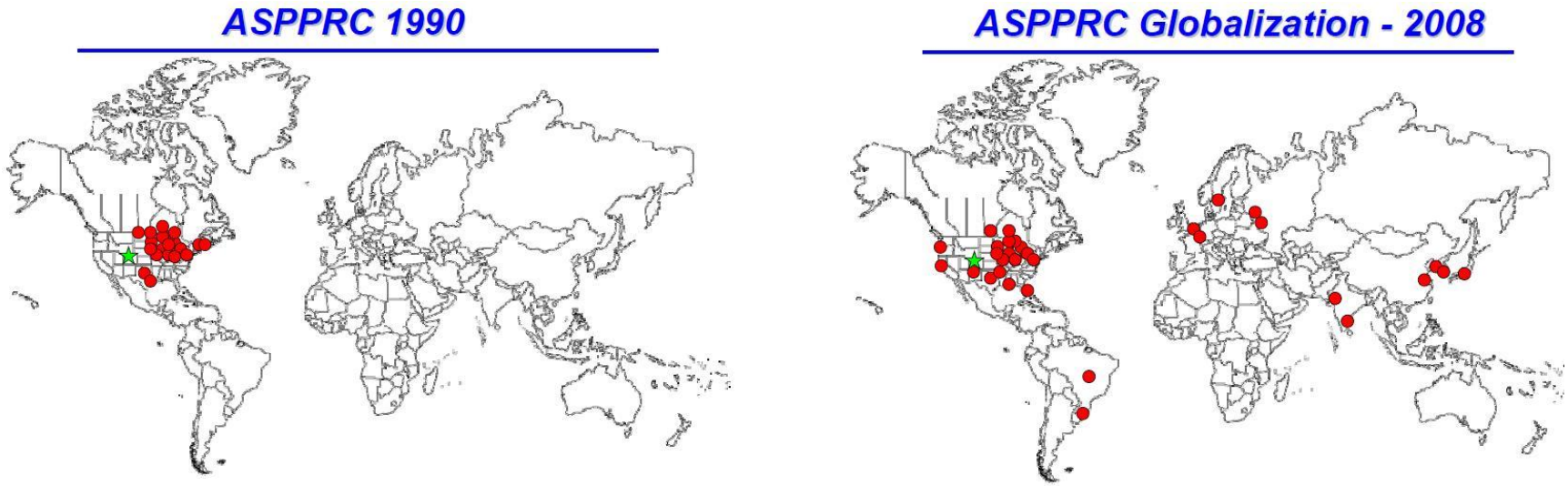
Industry/University Cooperative Research Centers

- Center has maintained fidelity to the IUCRC model while adding some minor organizational innovations
  - IAB not only selects research projects, but also approves center operations, staffing, and budget
  - 3 research thrust areas
    - New projects in each area are identified at the request of the steering committee for that area
  - Automatic membership fee increase every 2 yrs
  - Extra Designated Research Projects
    - Funded by individual members, Only 7% of total Center budget ~ $1.6M
  - Very “In the Field” orientation

ASPPRC: Globalization & Consolidation

Industry/University Cooperative Research Centers

- Currently has 20+ members around the world...



- This transition has required managing different cultural expectations about I-U collaboration and emphasizing communication
- Corporate reshuffling has also required ASPPRC to maintain close connections to their champions w/in organizations

ASPPRC: Sustainability Factors

Industry/University Cooperative Research Centers

- Center very well aligned with Univ. mission and research funding model
  - Univ. also highly supportive in terms of indirect, recruitment of internationally renowned researchers, administrative support, and state of the art facilities
- Balancing Adaptability with Fidelity
  - ASPPRC has maintained core features of the IUCRC model while adapting to changes in the industry they serve
- Center's leadership transitions well managed: founding CD worked closely with and groomed current CD
  - Preserved organizational processes and structures in the face of industrial turmoil
  - Univ. has already hired current CDs future replacement

Case 2:
UMass/Industry Research on Polymers

CUMIRP: Fidelity Plus

Industry/University Cooperative Research Centers

- IUCRC Founded: 1980
- Host Univ.: UMass
- Members: 13
- Center housed in one of the top Universities in its field
- Center continues to operate using the IUCRC model, but has added several organizational innovations to meet the needs of member companies
- Center has contributed significantly to the TT policy of the univ. and operates its own TT office
  - Also played significant role in formation of IUCRC policy on TT
- CDs have always had close connection and involvement with industry

CUMIRP: Adaptation & Fidelity

- Changes in industrial business model and declining membership required CUMIRP to expand and reinvent
  - CD position became full-time
  - Mini-consortia (i.e. clusters) focused around research areas; vary over time based on industrial interest
    - Clusters directed by steering committees
    - The IAB now acts in an advisory/advocacy function; by invitation only
  - New fee structure depending on # of clusters participated in and company size
  - Added a 1) contract research component, 2) unrestricted grant component, and 3) a short term scoping project component
    - Competing successfully for PFI
  - Center facilitates sponsored research and grants
  - Univ. agreed to a costs structure to provide for self-funding of the Center

CUMIRP: Sustainability Factors

Industry/University Cooperative Research Centers

- Adapted model to meet industry needs
- University support in terms of operational flexibility and support of CD
- Long-term CD allows for continuity in the face of changes in univ. admin.
- CD also maintains relationships with multiple contacts and various levels w/in member firms
- Integrated partnerships with other research units/centers/institutes on campus
- State of the art facilities
- Recognition of the impact the center has on the univ., faculty and students

Case 3:
Center for Advanced Communications

CAC: Transformed

Industry/University Cooperative Research Centers

- IUCRC Founded: 1990
- Host Univ.: Villanova Univ.
- Members: 6
- Center housed in a small private univ. with minimal focus on research; No PhD Programs
- Center associated with a state tech. focused economic development program: Ben Franklin Technology Partners
- When NSF funding ended and founding director died, the center had lost almost all members and funding
- Center now operates as a contract research org. conducting research in 4 thrust areas
- Center instrumental in the development of a PhD program in EE

CAC: Sustainability Factors

Industry/University Cooperative Research Centers

- Now operates with a $2.5M budget based on industrial contracts and gov't grants
- Success was achieved by:
  - Establishing 4 state of the art multi-million $ research labs
  - 3 new research faulty positions
  - University allowed CAC to keep ½ of all indirect
  - Research area is one of the fastest growing and most influential of the 21st Cent.
  - NSF PFIs established CAC as an important partner with several federal labs, academic institutions, and firms
- Realized it could not survive as consortial center but could prosper as a contract research organization closely aligned with state/local economic development goals

Case 4:
Center for Welding Research

Center for Welding Research: Transformed

Industry/University Cooperative Research Centers

- IUCRC Founded: 1980
- Host Univ.: Ohio State
- Members: 9
- Center transformed from and IUCRC into EWI
- Organizational Context:
  - Well aligned with OSU strengths & regional industry, and economic development plans
  - Welding Department strategic planning focused around developing an industrially relevant welding center
  - CD worked as a champion for the center's inception

From CWR to EWI

- Thomas Edison Technology Centers program launched in 1983
  - CRW Director was involved in a proposal to fund EWI and helped to foster the transition from CWR to EWI
- Transition to EWI was important because there was a need in the region and in industry for more applied research than is dictated by the IUCRC model
  - CWR was an academic partner with EWI intended to be the successor org.
  - EWI founded 1984

EWI

- Independent 501(c)3
- Focus on Service:
  - Contract research, consulting, technical assistance, technical library, member-only website, newsletter, and discounted courses/seminars
  - larger scale industry base, variable membership fees
  - **ALSO included longer-term cooperative research and an IAB**

- By 1987 Dr. Graff was CEO of EWI; CWR completely absorbed
- Multi-million $ facilities expanded
  - Funded through multiple state, federal, and university sources

- Current Members: ~250
- Current Budget: ~ $25M

EWI: Sustainability Factors

- Continuity in Executive Leadership
  - CD involved in inception of CWR and EWI as well as the transition and post transition periods
- State Technology Based Economic Development
  - OSU and the Edison Program are unique in terms of their endurance over time
- OSU Support
  - Centers well aligned with univ. mission
  - Univ. strategically positioned itself to be a catalyst for regional economic development through funding and partnership with key players
- NSF Staff Support
  - NSF saw the bigger picture of fostering technological growth and helped support the transition from IUCRC to Institute

- **Intriguing Development**
  - **EWI is in the process of becoming a member of the new joining centers at OSU; feel need to support training of new generation of grad students**

Lessons Learned

- IUCRC model contributes to long-term sustainability
  - 62% after 20+ years is high rate
- Centers sustain for a number of reasons:
  - Quantitative: Structural issues, money, and members
  - Qualitative: Adaptability, environmental/institutional fit, stakeholder support, facilities, **leadership, leadership, leadership**
- Sustained centers via multiple paths
  - Most are high fidelity IUCRCs
  - Transformation
    - Minor tweaks →Major reinvention
    - State economic centers of excellence; contract research organizations

Questions?

Research supported by supplement to grant #535449