Industry-University Research Collaborations
Best Practices

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Presented at Technology Management Policy Graduate Consortium – Cambridge, UK

June, 2010

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Motivation

**T** Project funded by the Cambridge Massachusetts Institute (CMI)

**M** “The biggest challenge does not lie in the supply of ideas from universities, but the ability of industry to take advantage from university research”

– Lambert Report on Business-University Collaboration

**P** “Building collaborative relationships with universities...is by far the best way to ensure they are responding to industry needs”

– Lord Mandelson
Drivers for Industry-University Collaborations

**T** Increasing difficulty for companies to do “all” necessary research

- Industrial R&D budgets remaining constant, but shifting to development (Office of Science and Technology Policy, 2008)

**M** Move towards *open innovation* paradigm (Chesbrough, 2003)

- Global view of R&D
- Ideas sought from outside the company
- “Reapplied with pride” just as important as “invented here”*

**P** More than 8 pieces of legislation in the U.S. (Bozeman, 2000)

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* **FORTUNE**: Interview with CEOs Immelt and Lafley, 11/06
The Problem

- Industry often dissatisfied with its ability to extract value from university collaboration

  **Yield Rate:** “I would say realistically it’s about 10-20%. We’d like it to be higher. There have been... [projects] where you’d think... *it would’ve gone somewhere but it didn’t for whatever reason.*”
  
  — *Project Manager*

- “The problem is on the demand side”
  

- Literature provides little on *actionable practices*
  
  - Abundant information on the benefits, but not *on how to do it* (Perkman & Walsh, 2007)
  
  - Lack of systematic information on project selection criteria, management processes to achieve positive impact for company
Research Objectives

- Identify, in a manner that can be acted upon, the best practices for industry-university collaborations
  - Project selection criteria
  - Collaboration management
  - Uptake of research results

- Expected research results
  - Better understanding of the collaboration dynamics
  - Go beyond the recognition of problem: provide actionable solutions
Methodology

- Case Study research with multiple embedded levels of analysis (Yin, 2009)
  - Why are companies dissatisfied?
  - How can we increase the impact of university research?

- On-site interviews in 25 companies with experience in collaborations

![Pie chart showing distribution of industries: Aerospace 22%, Software and IT 5%, Pharma 19%, Materials 10%, Consumer Electronics 4%, Automotive 3%, Biomed 7%, Mining 5%, Paper 6%, Petro-Chemical 2%]
Previous research is focused on collaboration outcomes

- E.g. Patents, Publications, Licenses, Hires, etc. (Cohen et al., 2002)

However, the success of a collaboration should be judged based on impacts on company competitiveness

- E.g. Tangible difference in products, processes, services, strategy
Collaboration Success Metrics

- Interviews with over 100 project managers, asked to evaluate:
  
  **1. Outcomes**
  
  • New Ideas/methods?
  • Solutions to problems?
  • IP (Inc. Software)?

  **2. Impacts**
  
  • Knowledge influence strategy?
  • Applied tech. into products?
  • Steps taken to protect IP?

- Interviews with senior technology personnel who coordinate university research activities
  
  - Independently judge the project manager’s assessment
The Outcome-Impact Gap

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Major Outcome
- Clear and significant potential benefit to the company
- Includes negative but useful results

Major Impact
- Observable and generally agreed upon positive impact on company’s competitiveness or productivity.

Leading Research Question:
Why don't some research collaborations with interesting outcomes produce an impact on the company’s productivity or competitiveness?
Defining Information for Closing the Gap

- Survey instrument composed of **closed** and **open-ended** questions
- Closed questions enabled **quantitative** analysis of practices
  - Activities/practices determined through interviews with managers of industry-university collaboration and literature
  - Practices organized into scales that capture collaboration attributes
  - Scales assessed statistically
- Open-ended questions to elaborate Case studies
Example: Boundary Spanning Activity

- Boundary Spanning Activity (Allen, 1977)
  - Primary process through which knowledge is transferred across organizations
  - It is performed by key individuals ("boundary agents") who identify and communicate new information and ideas.

- Our hypothesis
  - The boundary spanning activity of the project manager will have a positive effect on the collaboration’s outcomes and impact
Measurement of Boundary Spanning Activity

- Created a scale by asking project managers the frequency at which:
  - Brought the project up in conversation with other individuals involved in R&D
  - Solicited suggestions from technical professionals about how the project could better fit their needs.
  - Telephoned university researchers for unscheduled discussions.
  - Used project ideas or results in discussions about future company technologies

- In total, 7 activities that define a single practice
  - Cronbach’s alpha = .831 -> scale is reliable

- Scale positively correlated with
  - Outcomes (r=.267, p<.05)
  - Impacts (r=.300, p<.001)
Other Practices (Attributes) Analyzed...

- Quality of Relationships
  - Trust, previous relationships, informal contacts
- Professional Networks
  - Communities of practice
- Communications
  - Frequency, type (email, face-to-face, etc), vocabulary
- Geography (proximity)
- Project Characteristics
  - Duration, Budget, founding sources
  - Number of people involved in project
  - Strategic alignment
- Company Policies
  - Champions, PM support, resources
- Approximately 100 questions related to practices
Data Analysis Results

- Analysis of data led to *seven best practices* for university-industry collaboration project managers.

- Data show *these specific practices* contribute to closing the outcome-impact gap.

- Taken together the practices provide a *suite of actionable items to enhance project impact*. 

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Seven Best Practices

1. Define the project’s strategic context as part of the selection process
2. Select *boundary spanning* project managers
3. Share, with the university team, the vision for how the collaboration can help the company
4. Invest in long-term relationships
5. Establish a strong communication linkage with the university team
6. Build broad awareness of project within the company
7. Support the work internally both *during* the actual contract and *afterwards*, until the research can be exploited
Summary of contributions

- The **outcome** of industry-university research collaboration does not always lead to an **impact** for the company.

- We described research to determine project management behaviors linked to the **gap between outcome and impact**.

- We presented **seven data driven best practices** to close this gap.

- More information and case studies:

Questions?

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