Individual and Sub-organizational Factors Affecting Industry Membership in University-based Cooperative Research Centers

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Study Phases

- Literature review : unanswered questions
- Center Director Survey : Recruiting practices
- Organization Interviews : Decision making processes
- Organization Survey : Cross-sectional, predictive

Literature Review: What do we know?

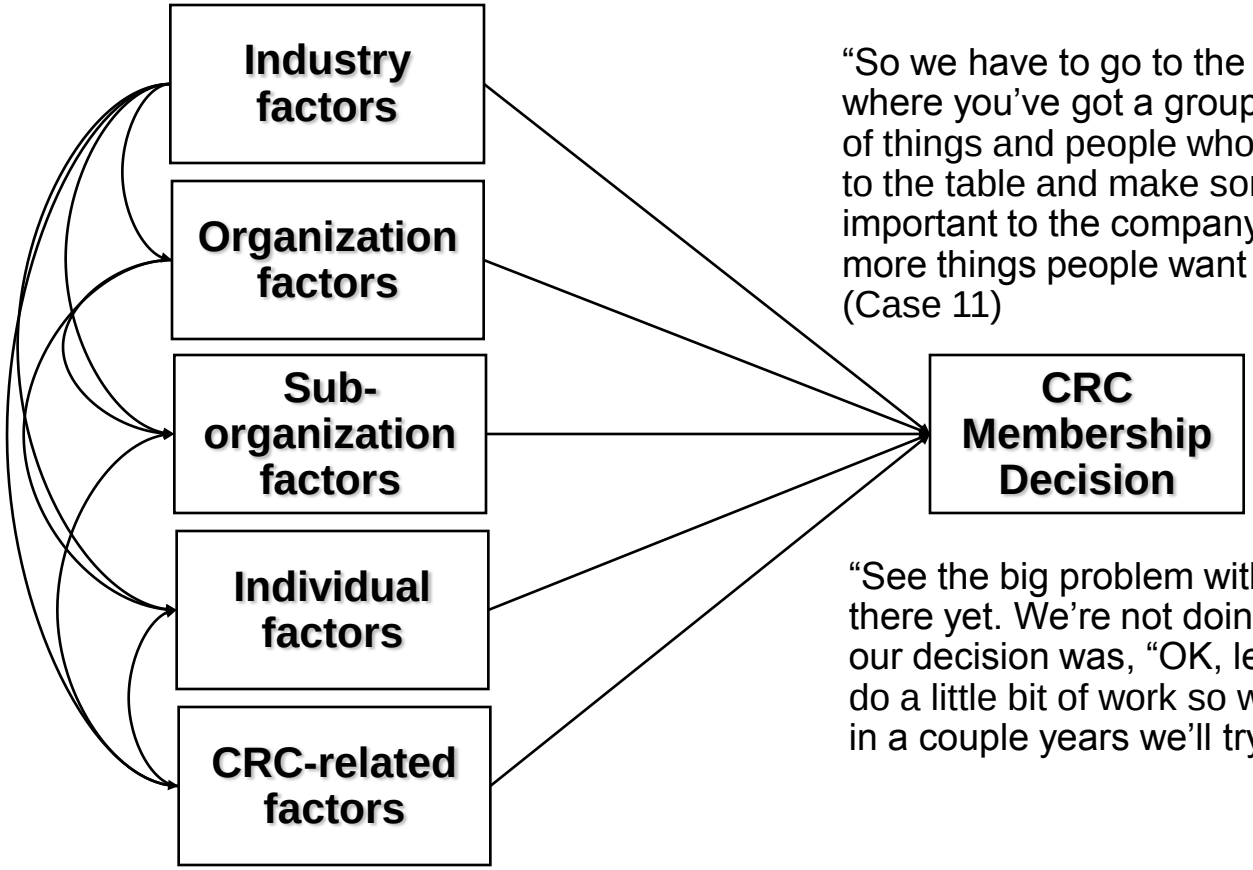
- Industry-level and organization-level factors affect the likelihood and frequency of collaborations, in general.

- Some clues about what's going on inside the organization:
  - Multiple stakeholders and actors
  - Funding can originate from different groups/ departments
  - Product lines and legal staff can disrupt the decision
  - IP agreements, past experience with Universities influence decisions

- There's an absence of research on organization decision-making regarding formal research joint ventures

Organization Interviews- Multiple Factors

- Factors affecting the decision are multiple and interacting



"So we have to go to the table with everybody else… where you've got a group that decides on these kinds of things and people who want to do them bring them to the table and make some kind of pitch as to why its important to the company, because of course there's more things people want to do than there's money." (Case 11)

"See the big problem with [CRC] is that we're not there yet. We're not doing a whole lot ourselves, so our decision was, "OK, let's start it by ourselves and do a little bit of work so we understand it better, then in a couple years we'll try them out." (Case 6)

Research Questions & Methodology

Research Questions

- 1. How does the membership decision process unfold inside organizations, and to what degree does the process vary across organizations?

- 2 - 5. To what extent do variables at different levels influence decision outcomes?
  - Industry and organization level variables
  - Objective & perceived CRC characteristics
  - Sub-organizational factors
  - Individual factors

- 6. Do models containing variables from multiple domains explain more variance in decision outcomes than any single domain?

- 7. How do the variables fit together in a causal model?

Methodology

- Sampling through IUCRC network
  - Invitation to IUCRC directors to provide contacts
  - Invitation to contacts for survey participation
- Web-based survey
  - 15 minutes
  - 50+ variables and scales
  - SurveyMonkey (professional account)
  - Fielding: March – September 2008
- Data reduction
  - SPSS 16.0 (EFAs, reliabilities)
  - AMOS 16.0 (CFAs)
- Analyses
  - SPSS 16.0 (descriptive, predictive)
  - Mplus 4.2 (path models)

Domains and Measures

Outcomes

Organizations' decision (DV_dec)

Participants' recommendation (DV_rec)

Industry
-Appropriability (C)
-Sector (D)

Organization
-Size (D)
-Financial health (R)
-R&D intensity (C)

Key
D = Dichotomous
C = Continuous
R = Rating
OC = Ordered categorical
* Data reduction

CRC Objective
-Age (D)
-Structure (D)
-Funding (C)
-Students (C)
-Staff (C)
-Members (C)

CRC Perceived
-Strategic Fit (C)*
-Technical attributes (C)*
-Non-technical, various (R)

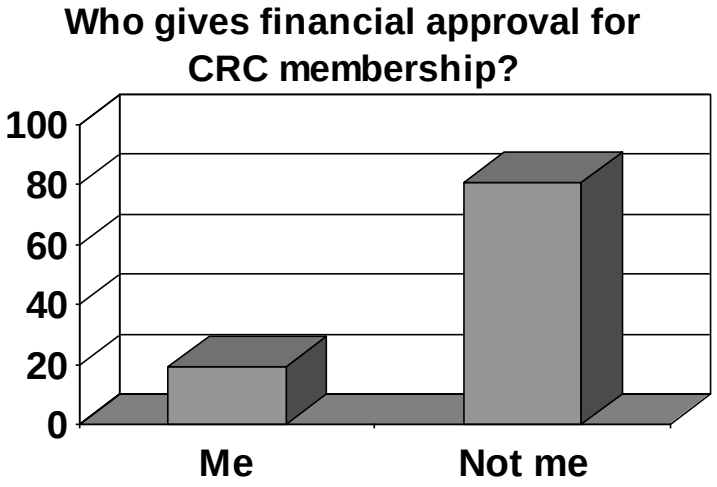
Sub-organization (DM) process
-Decision complexity, various (R)
-Decision timing (R)
-Champion (D)
-Opposition (D)
-Number involved (C)
-Decision initiator (D)

Sub-organization context
-Open innovation (C)*
-Partner manager group (R)
-Absorptive capacity, various (R)
-Research need (D)
-Research interest (OC)
-Prior relationship (OC)

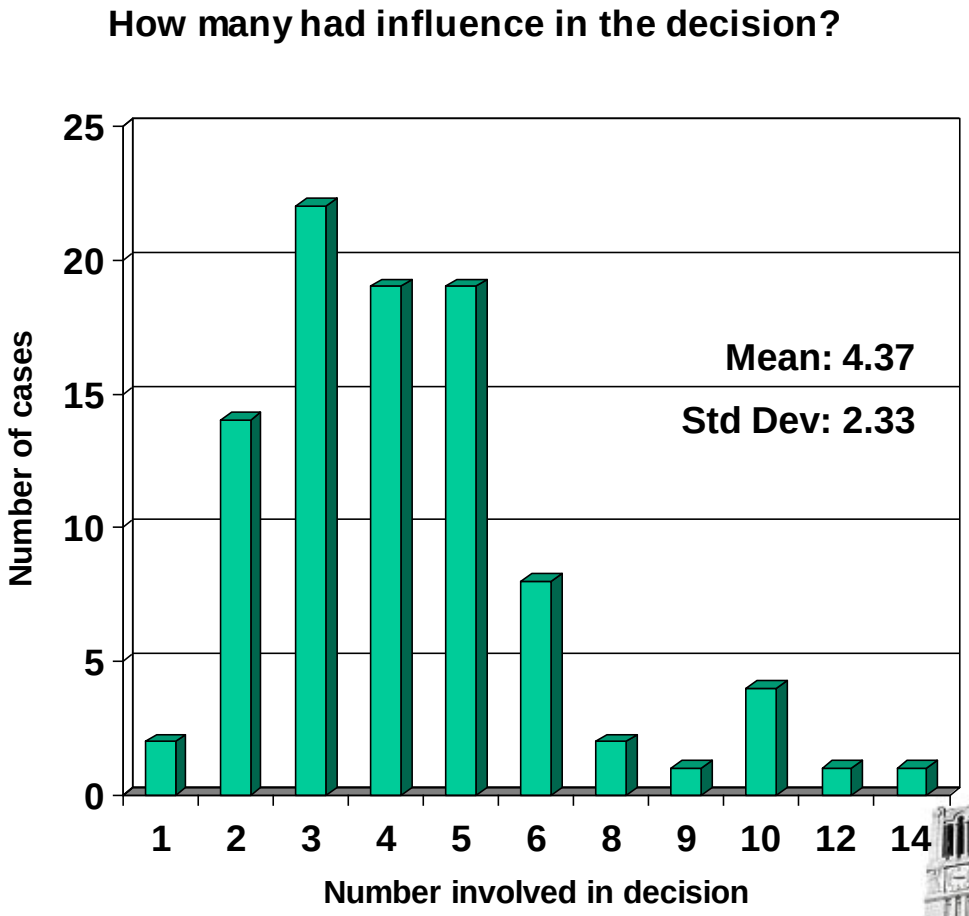
Individual
-Role behaviors, various (C)*
-Experience, various (C)
-Management level (D)
-Financial authority (D)

Results

RQ 1: Decision Process



- Decisions often required financial approval at higher levels of management
- On average, four organization members had influence in the decision.



RQ 1: Champions and Opposition

- Neither a champion nor opposition is guaranteed
- The presence of one does not affect the emergence of the other

		Champion		
		No	Yes	Total
Opposition	No	18.6%	55.7%	74.2%
	Yes	6.2%	19.6%	25.8%
	Total	24.7%	75.3%	100%

RQ 6: Participants' Recommendation

- CRC Perceived only: R^2 = .45, *Adj*. R^2 = .44, $p < .01$
- Aggregate Model: R^2 = .58, *Adj*. R^2 = .55, $p < .01$
- Incremental: ΔR^2= .134, p < .01

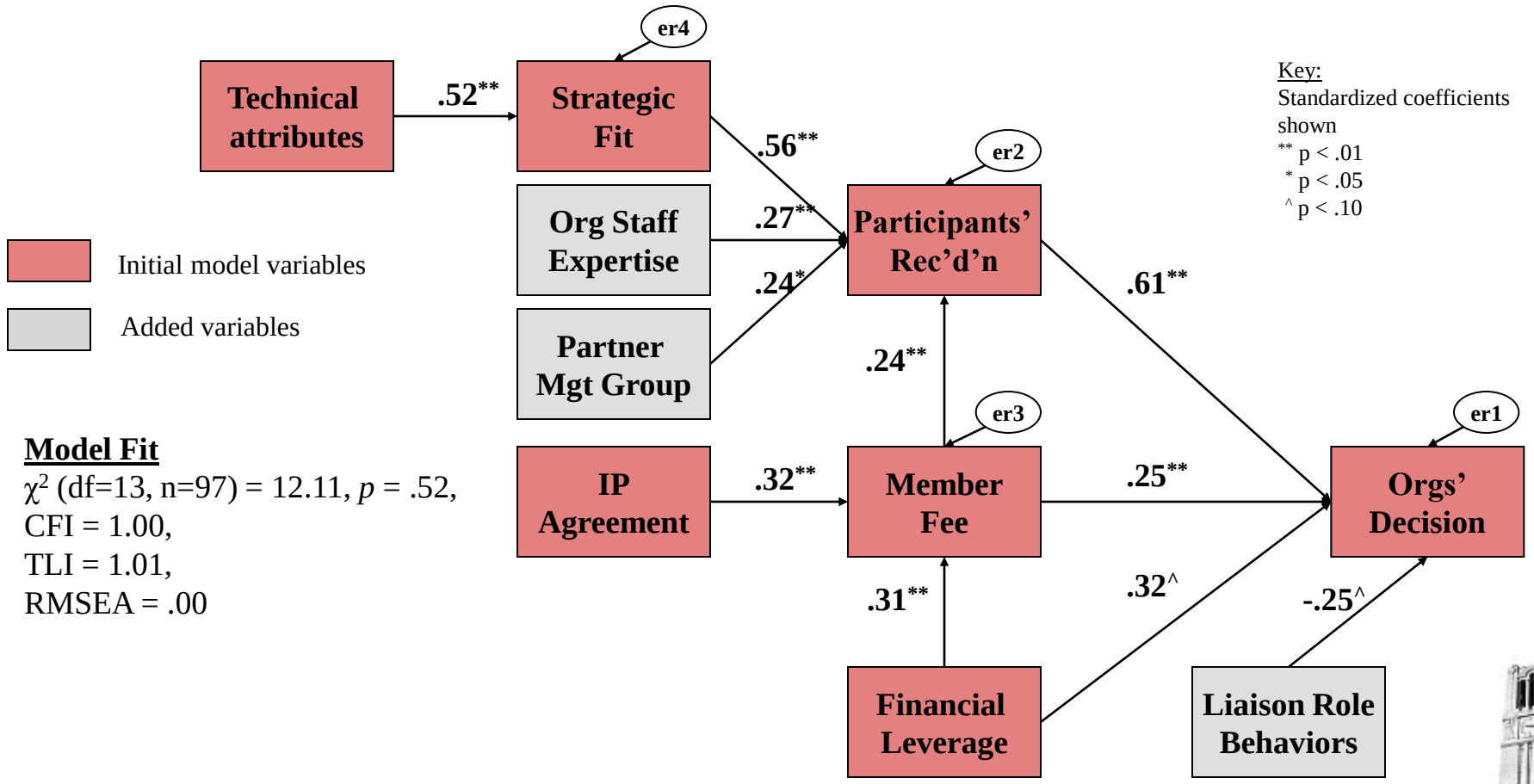
Domain	Variable	β	*p*-value
CRC-Perceived	CP_sfit – strategic fit	.421	.000
CRC-Perceived	CP_fee – membership fee	.176	.017
Sub-org Context	SC_grp – alliances group	.206	.005
Sub-org Context	SC_acint – interest in partnerships	.152	.058
Sub-org Process	SP_cham – champion emerged	.215	.004
Individual	ID_rgate – gatekeeper role	.051	.494
Individual	ID_finau – financial authority	.137	.056
	(Constant)		.138

RQ 6: Organizations' Decision

- CRC Perceived only: Cox & Snell R^2 = .37, p < .01
- Aggregate Model: Cox & Snell R^2 = .49, p < .01
- Incremental: Δ Cox & Snell R^2= .121, p < .01

Domain	Variable	Exp (B)	p-value
CRC-Perceived	CP_sfit – strategic fit	1.298	.022
CRC-Perceived	CP_fee – membership fee	2.121	.010
CRC-Perceived	CP_levg – financial leverage	2.824	.019
Sub-org Context	SC_acexp – staff experience	2.382	.020
Sub-org Context	SC_acint – interest in partnerships	1.429	.281
Sub-org Process	SP_opp – opposition emerged	0.181	.046
Individual	ID_rlia – internal liaison role	0.528	.011
Organization	ORG_finh – financial health of organization	1.496	.152
	(Constant)		.002

RQ 7: Revised and Final Model



Model Fit

χ^2 (df=13, n=97) = 12.11, p = .52,
CFI = 1.00,
TLI = 1.01,
RMSEA = .00

Discussion

Limitations

- Sample bias among non-member organizations
- Small sample size and Type II errors
- Possible memory retrieval failures (multiple events) and satisficing
- Time precedence in causal models
  - Recommendation and decision
  - Decisions tend to escalate and progress
- Superficial construct measures
  - Open Innovation
  - Absorptive Capacity
  - Individual role behaviors

General Findings

- Redeeming qualities
  - Actual decision case rather than a general propensity to partner
  - Variables addressing multiple domains of analysis
  - Non-member comparison group

- RQ 1: Understanding the decision process
  - Develops out of individual networks; relationship states
  - Tends to be a bottom-up process within the organization
  - Organizations vary in their decision complexity and criteria

General Findings *cont'd*

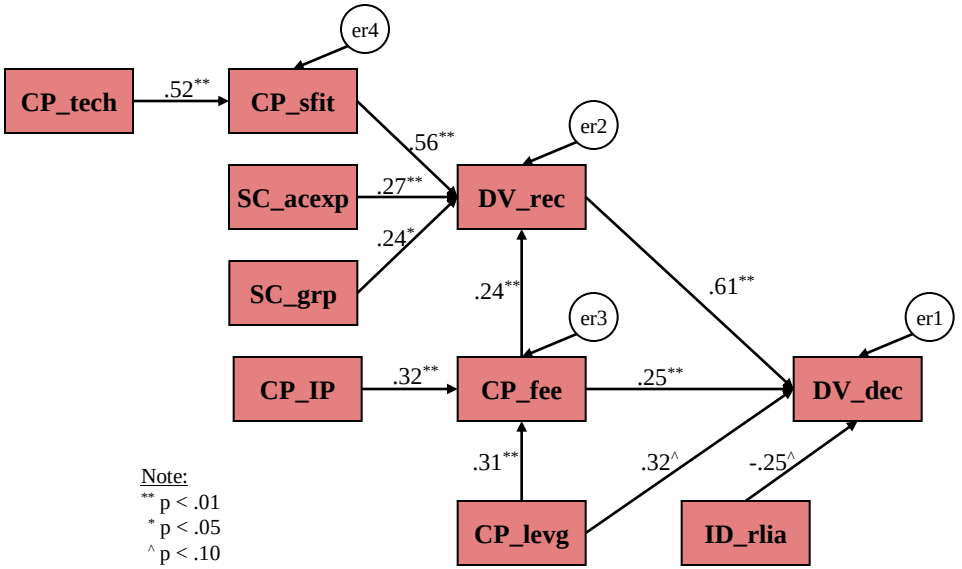
- RQ 2 – 5: Domain-specific models
  - Industry and organization level variables held limited influence
  - Perceived CRC characteristics explained highest levels of variance
  - Different variables affect the different outcomes

- RQ 7: Path models
  - Participants' recommendation played an important role in the decision
  - The recommendation is influenced by CRC and by sub-org factors
  - Internal liaison role behaviors can have a negative impact

Theoretical consequences

- Organizational networks get the CRC into a consideration set.
- Strategic behavior and transaction cost appear to drive the decision

Yeah, so if I spent $200,000 on a research project, that's not a lot of money…but I know what the result is. It's very easy to justify what the end result is. It's hard for me to go and justify "networking" as an end result. (Case 15)



Future Research

- Larger samples and balanced cells
- Test for possible moderators (org size, sector, specific technical need)
- Deeper exploration into particular aspects of the decision
  - What does “strategic fit” mean to organizations; what are the specific facets of “fit”
  - When is a champion or opposition expected to emerge; what factors in the environment operate as catalysts for these roles?
  - What is it specifically about internal liaison role behaviors that negatively impact decision outcomes?
  - Under what conditions do personal recommendations carry more weight in the decision outcome?

Implications

CRCs

- Complement network recruiting with more traditional marketing approaches
- Plan recruiting around organizations' budget planning
- Use collaborative selling and help the gatekeeper navigate the decision process
  - Know roles and barriers
  - Provide information

Policy makers

- Co-evolve CRC-oriented programs with industry needs
- Provide funding for marketing practices and financial leverage

Organizations

- Consider the role of universities and CRCs in technology strategy
  - Exploration versus exploitation
- Reduce emphasis of ROI in university/CRC partnership decisions

Contributing NSF-I/UCRCs

- Advanced Studies in Novel Surfactants
- Berkeley Sensor & Actuator Center
- Biocatalysis & Bioprocessing of Macromolecules
- Center for Advanced Computing & Communications.
- Center for Advanced Processing & Packaging Studies
- Center for Design of Analog-Digital ICs
- Center for High-Performance Reconfigurable Computing
- Childrens Injury Prevention Science
- Composite & Ceramic Materials
- Computational Materials Design
- Engineering Logistics and Distribution
- Friction Stir Processing
- Fuel Cell Center
- Information Protection
- Intelligent Maintenance Systems
- Nondestructive Evaluation
- Nonwovens CRC
- Particle Engineering Research Center
- Plasmas & Lasers in Advanced Manufacturing
- Power Systems Engineering
- Precision Forming
- Precision Metrology
- Repair of Buildings and Bridges with Composites
- Silicon Solar Consortium
- Silicon Wafer Engineering and Defect Science
- Smart Vehicle Concepts
- Wireless Internet Center for Advanced Technology

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