Open Innovation, Problem Solving, and the Theory of the Firm

Professor Todd Zenger
Washington University

Felin & Zenger, 2012
My Unfair Characterization

• Much advocacy and description
  – User innovation is amazing, prevalent, and valuable in all kinds of settings that we never thought possible.
  – Crowdsourcing is amazing, prevalent…
  – Innovation contests…
  – ___________ are amazing, prevalent…

• We need to move from advocacy and description to a theory of the (innovative) firm.
  – We need to define limits to the use of these “open” governance forms.
  – We need a discriminating alignment, but what are we aligning to?
Why important?

- **Theory:** We have no well developed theory of the firm that explains the organization of innovation—a theory of the boundaries of various governance forms.

- **Empirical:** Ignoring sample selection effects. We are examining the effects of treatment (i.e. crowdsourcing) on the treated (crowdsourced), or comparing the treated to the untreated, but the selection of those to treat is not random.

- **Practice:** Advocacy (or effectiveness studies) absent boundaries encourages mismatches in governance.
Waves of Advocated Governance

- **Era of Big Firm Innovation (Chandler and the M-Form)**
- **Japan, Alliances, JVs, and Cooperation**
- **Open/User/Community Innovation**

- **1900**
- **1980**
- **2000**
## The First Step: Choosing a unit of analysis

<table>
<thead>
<tr>
<th>Unit of Analysis</th>
<th>Choice</th>
<th>Limitation</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Firm</td>
<td>More or less open</td>
<td>Too general; limited guidance; struggles to explain what to make more open</td>
</tr>
<tr>
<td>Knowledge (KBV)</td>
<td>Internal vs. external transfer</td>
<td>Knowledge to transfer is unknown when the design choice must be made. Too disaggregated.</td>
</tr>
<tr>
<td>The Innovation</td>
<td>Internal vs. external vs. community</td>
<td>Unknowable in advance</td>
</tr>
<tr>
<td>Transactions (TCE)</td>
<td>Make vs. buy</td>
<td>Exchanges unknown \textit{a priori}; guides production not innovation</td>
</tr>
<tr>
<td>The Problem (problem solving perspective)</td>
<td>Internal vs. external</td>
<td></td>
</tr>
</tbody>
</table>
The Problem Solving Perspective as a Theory of the Firm (Nickerson and Zenger 2004)

PROBLEMS

Problem 1
Problem 2
Problem 3
Problem 4
Problem 5
Problem 6

GOVERNANCE FORMS

Markets
Hierarchy
Partnerships
Community
Match Problem Attributes to Governance Attributes

PROBLEMS
• Complexity
• Decomposability
• Modularity
• Knowledge dispersion

GOVERNANCE FORMS
• Incentives
• Property rights over solutions
• Knowledge matching mechanisms
• Communication channels
• Dispute resolution mechanisms
The Problem Solving Perspective

Theoretical Work

• Nickerson and Zenger, 2004
• Hsieh, Nickerson, and Zenger, 2007
• Nickerson, Silverman, and Zenger, 2007
• Tushman, Lifshitz, and Lakhani, 2012
• Afuah and Tucci, 2012
• Felin and Zenger, 2012
• Nickerson, Yen, and Mahoney, 2012
• [related: Baldwin & von Hippel, 2012]

Empirical Work

• Kapoor and Adner, 2012
• Macher, 2006
• Macher and Boerner, 2012
• Lakhani and Jeppeson, 2010
Parameterizing Problem Types

• Knowledge Dispersion
  – How dispersed is the knowledge deemed relevant in solving the problem?

• Problem Complexity
  – Problem complexity = degree to which design choices are interdependent in their contribution to solution value.
  – Problem complexity defines the degree to which knowledge recombination and sharing is required in problem solving.
Knowledge Dispersion

- **External Actors**
  - Narrow: Centrally selected
  - Broad: Self selected
Problem Complexity and Search

Decomposable Problems

Non-decomposable Problems
Solution Search

Local Search/Trial and Error

Heuristic Search
Hypotheses

• As problems become more complex, the firm adopts governance forms that facilitate the knowledge sharing necessary to form search heuristics.

• As problems require more dispersed knowledge to solve, the firm must induce a process of self-selection to uncover relevant knowledge.
Matching Governance Forms to Problems

Hierarchy | Partnership | Markets | User/Community Innovation

Problem Complexity | Knowledge Dispersion
# No Simple Continuum of Choices

<table>
<thead>
<tr>
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<th>Hierarchy</th>
<th>Partnerships</th>
<th>Markets</th>
<th>User/Community Innovation</th>
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</thead>
<tbody>
<tr>
<td><strong>Property Rights over solutions</strong></td>
<td>Focal firm owns property rights</td>
<td>Property rights negotiated</td>
<td>Property rights dispersed</td>
<td>None or ceded to focal firm</td>
</tr>
<tr>
<td><strong>Incentives to solve</strong></td>
<td>Low powered</td>
<td>Moderate</td>
<td>High powered</td>
<td>Lower powered and self determined</td>
</tr>
<tr>
<td><strong>Knowledge Selection (matching mechanism)</strong></td>
<td>Centrally selected</td>
<td>Centrally selected or bilaterally identified</td>
<td>Mixed</td>
<td>Self-selected</td>
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How do we explain dynamic change?

• Innovation in governance
  – Investments in open, particularly user-based governance
  – Peer communities
  – Innovation platforms
  – Network externalities in innovation platforms
    • Problems and solvers

• Investments in modular design
  – R&D focused on problem formulation and not problem solving (Baldwin & von Hippel, 2012)

• Reductions in communication costs (knowledge transfer costs)
Governance costs and problem allocation

Costs to govern problem solving vs Problem Complexity

- Community
- Partnership/Alliance/Market
- Integration
Alliances and innovation governance

Costs to govern problem solving

Community

Partnership/Alliance/Market

Integration

Problem Complexity
A Call for Empirical Work

• What are the attributes of problems that drive governance choices?
• What are the attributes of governance forms that shape their functionality in governing problems?
• What is the array of relevant governance forms?
• What governance innovation and exogenous factors shape the dynamics of governing problems?
• How do firms efficiently organize problem formulation?
• How are problems interdependent in governance?
Conclusions

• Open and user innovation needs theory of when and in what form (not a panacea).

• The problem provides a compelling and *a priori knowable* unit of analysis.

• Governing innovation involves a process of matching problems to governance forms which differ in governance attributes and therefore support alternative forms of solution search.

• Approach delivers testable hypotheses and the potential for compelling guidance to managers.
Thank you
The “open” problem

• What does open mean?
  – Generally open vs. community based innovation

• How about?
  – Open and open open
  – Open and really open
  – Not closed and open
  – Open and Öpen
Temporal Dimension

Problem → Solution → Production
## Matching Problem Attributes to Governance

<table>
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<th>Highly Dispersed</th>
<th>Simple Decomposable</th>
<th>Complex Non-decomposable</th>
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<td>Market/Lead user</td>
<td>?</td>
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Big Business and Innovation Governance

Costs to govern problem solving

- Community
- Partnership or Alliance
- Integration

Problem Complexity
Too high...too low...just right

Firm

Knowledge  Knowledge  Knowledge  Knowledge  Knowledge  Knowledge  Knowledge  Knowledge  Knowledge