Accumulation of knowledge capabilities: The perspective of knowledge-based view and network theory

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More than social network

• In spite of the growing consensus that network structures do matter (Chen & Wang, 2008; Shipilov, 2009; Zheng et al., 2010), the specific effects on innovative performance of network content that is exchanged between firms remain unclear
  – A debate has arisen over the content of inter-organizational relationships that can appropriately be regarded as comprising beneficial activities (Gulati et al., 2002; Hoang & Antoncic, 2003; Kilduff & Brass, 2010; Wincent et al., 2010).
  – With regard to network content, inter-organizational relationships are viewed as the strategic decisions by which firms coordinate their exchange activities to create value and access various resources held by other firms (Hoang & Antoncic, 2003; Wincent et al., 2010).
What should we explore

• Clarifying the implications of
  – *Why* to cooperate,
  – *What* to exchange, and
  – *How* to connect with firms for enhanced innovative performance is critical to our understanding of network research according to two aspects.

• Concerning the relationship between the structure of the network and the content of the network in which a firm cooperates with others for reserving knowledge and exchanging resources to acquire heterogeneous knowledge.
Purpose of this study

• Our research integrates network structure and network content with social network theory and knowledge-based view regarding organizational innovativeness.
  – We explore knowledge networks and the characteristics of network structures
  – We also explore network content that is focused purely on inter-organizational cooperation and heterogeneous knowledge accessed from partners (Bell & Zaheer, 2007; Gulati et al., 2002; Kogut & Zander, 1992; Rodan & Galunic, 2004; Wincent et al., 2010).
How firms channel resources by network structures

• The structural characteristics of networks emphasize the strategic benefits and advantages that firms derive from their relationships.
  – Occupying a central location in the industrial network (Wasserman & Faust, 1994) gives the firm a competitive advantage for resources and power.
  – A structural hole between two firms increases the likelihood of diverse views and an increase in the number of gaps in a firm’s network means that the knowledge available to the firm increases (Burt, 1992; Tiwana, 2008; Zaheer & Bell, 2005).

Hypothesis 1: The position a firm occupies in the network will correlate positively with its level of knowledge cognition in terms of searching for and acquiring such knowledge.
What firms choose to exchange

• Knowledge heterogeneity is defined as that diverse knowledge, know-how and expertise to which the firm has access through its network partners.
• By acquiring knowledge from partners, a firm can leverage its R&D expenditure, not only to improve product development (Rindfleisch & Moorman, 2001), but also to obtain a greater understanding of its technology and knowledge (Spencer, 2003).

Hypothesis 2: A high level of heterogeneous knowledge that a firm accesses from its different partners will correlate positively with the level of its knowledge cognition and how it searches for and acquires knowledge.
Research sample

High-technology firms can develop encouraging technological diffusion through industrial networks in the science park boundary.

Science parks define the network boundaries clearly.

According to the Science Park Business Directory (AISP, 2009), there are 750 high-technology firms in HSP, CTSP, and STSP.

After investigating the firms via the TWSE, we found 164 high-technology firms with initial public offerings (IPO).
Data collection

Archival database

- From Taiwan Stock Exchange Corporation (TWSE)
- Company’s profile and financial data
- A firm’s position in the network structure (e.g., Ahuja, 2000a; Baum et al., 2000; Gulati & Gargiulo, 1999)

Quantitative survey

- Initial questionnaire
- The questionnaire pre-testing with ten of the high-technology firm’s top management team members
- The final questionnaire with three times mailing.

<table>
<thead>
<tr>
<th>Conditions of population</th>
<th>Numbers</th>
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<tbody>
<tr>
<td>Total samples from science parks (HSP, CTSP, and STSP)</td>
<td>750</td>
</tr>
<tr>
<td>Non-IPO technology firms</td>
<td>(549)</td>
</tr>
<tr>
<td>Merged with other firms</td>
<td>(4)</td>
</tr>
<tr>
<td>Listed in OTC</td>
<td>(33)</td>
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<tr>
<td><strong>Core samples from science parks after investigation</strong></td>
<td>164</td>
</tr>
<tr>
<td>Core samples from shareholders in science parks</td>
<td>180</td>
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<tr>
<td><strong>Final samples in the network boundary of the knowledge network</strong></td>
<td>344</td>
</tr>
<tr>
<td>Returned questionnaires</td>
<td>144</td>
</tr>
<tr>
<td>Response rate</td>
<td>41.86%</td>
</tr>
</tbody>
</table>
Discussion

• These three dimensions of knowledge networks provide perspectives on the “black box” of social networks, or the information content flowing through the network structure, that network research studies (Gulati et al., 2002; Wincent et al., 2010).
  – *how* a firm connects with partners, which is a manifestation of *network structure*,
  – *what* the essence of exchange is in a network, a manifestation of *knowledge heterogeneity*
  – *why* a firm requires cooperation and exchange with others, a manifestation of *knowledge cognition*. 
Limitations

• First, both academic researchers and managers may benefit from a more comprehensive outlook stemming from the conceptual framework of this study; this can be obtained by considering the contexts of different countries.

• Second, while we assessed knowledge heterogeneity by using a five-point Likert scale, future studies should consider developing a more reliable measure of knowledge heterogeneity.
Thank you for your participation

Q & A