KNOWLEDGE DIFFUSION: How do firms REALLY learn?

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Outline

• Non-R&D innovation
• Research issues
• Methodology
• Results
• Conclusion
NON-R&D INNOVATION

CIS - 1993, Manufacturing Firms

- Innovators
- R&D performers

Number of Employees

< 20 20-99 100-249 250-499 500-999 1000-1999 > 2000
Non-R&D Innovation

- Technology adoption
- Production engineering
  - Incremental improvements
- Imitation and reverse engineering
- Combining existing knowledge in new ways
  - ‘User’ innovation

Non-R&D Innovation (%)
Innobarometer Survey - 2007
(n = 4,395)

<table>
<thead>
<tr>
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<th>Non R&amp;D performers</th>
<th>In-house R&amp;D performers</th>
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<tbody>
<tr>
<td>N (unweighted)</td>
<td>1996</td>
<td>2093</td>
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<tr>
<td>Product innovations</td>
<td>68.4</td>
<td>42.9</td>
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<tr>
<td>Process innovations</td>
<td>82.2</td>
<td>38.4</td>
</tr>
<tr>
<td>Organisational innovations</td>
<td>49.1</td>
<td>34.2</td>
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<tr>
<td>Any of the above</td>
<td>99.5</td>
<td>63.0</td>
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2: Applied for a patent, but did not report the type of innovation.
New Knowledge: Where From?

• So, we know that there is non-R&D innovation
• We know that it is substantial
• We don't know much about how it is done:
  – If firms innovate without doing R&D, where does the new knowledge come from?
New Knowledge: How?

• Three knowledge capacities
  – Accessive capacity
  – Transformative capacity
  – Integrative capacity

ACCESSIVE CAPACITY

• Acquiring and recognising the value of new information (as in Absorptive Capacity)

• Establishment and maintenance of connections with other organisations to increase the amount of knowledge available and reduce the cost of collecting it (Lichtenthaler and Lichtenthaler, 2009).

• Gives greater weight (than absorptive capacity) to external organisations in the collection, and perhaps generation, of innovative knowledge.
TRANSFORMATIVE CAPACITY

- To be of value, new knowledge must be deployed as well as gathered and analysed.

- Much of the knowledge collected is of potential value but was developed for other purposes and is not immediately useable in different contexts in its original form.

- Transformative Capacity is the ability of a firm to take a new idea or artefact and reshape it to meet the firm’s own needs.

INTEGRATIVE CAPACITY

- Mature organisations face constraints => must fit innovations into current configurations
  OR
  Place other equipment into current productive systems.

- Integrative Capacity is the ability to adapt new and current equipment to build an efficient new productive system.
Knowledge Environment

- Relevant knowledge base of firm is in the firm, in the industry AND distributed across a range of technologies, actors and industries.

DISTRIBUTED KNOWLEDGE BASE

- A set of knowledges, maintained across an economically and/or socially integrated set of agents and institutions:
  - Enterprises do not depend on a single technology or on single sources of technological knowledge.
  - Knowledge is distributed: industrial source, geographical location, intellectual (scientific or technical) location, social location and chronology.
  - Knowledge must be blended from different knowledge bases.
METHODOLOGY

PILOT

• EU FP5: Policy and Innovation in (so-called) Low Tech
• 33 case studies of non- or low-R&D firms
• All with existing plant and equipment and some evidence of innovation
• Analysis of origins of new, mainly process innovation knowledge
Innovation in PILOT Firms

• For PILOT firms, innovation incremental

• Involved working within constraints set by current configurations.

• Unlike ‘greenfield’ situation where a full range of choices is open to the firm.

Analysis

• Close reading of the case studies to identify origins of new, mainly process innovation knowledge

• And the main knowledge capacity affected
Sources of Learning in LMT firms

- Internal: All 33
- External: Suppliers are by far the most important source of knowledge
Another Study

• José L. Hervas-Oliver and José Albors, ‘Resources and innovation in low-tech industries: An empirical study of clusters in Spain and Italy’, in Paul L. Robertson and David Jacobson, eds., Knowledge Transfer and Technology Diffusion (Cheltenham: Edward Elgar, 2011)

8 Low-Tech Clusters

• Textiles: Spain & Italy
• Furniture: Spain & Italy
• Ceramic tiles: Spain & Italy
• Marble: Spain & Italy
Interrelationships

- Within cluster: high degree of linkage
- External linkages: in particular with trade associations
- University linkages: not important

Support Industries

- The most significant finding of Hervas and Albors is that ‘the availability of strong support industries is vital.’
- When suppliers, in particular, are present and attentive to the needs of LMT firms, this improves innovative performance.
- Thus Italy, which has a strong machinery sector as well as concentrations in the four industries studied by H & A, has a substantial edge over Spain, where the domestic machinery sector is weak and even sales representatives are uncommon.
Conclusions

- Internal contribution is always present and generally substantial, but this generally does not involve what is normally classed as R&D.

- Suppliers most important external sources
  - When present and attentive to needs of LMT firms, this improves innovative performance.