

Inter-firm knowledge flows in innovation collaboration networks: an exploratory study in the aerospace metropolitan cluster of Rome

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Theoretical and empirical context

- The external way of growth for firms is becoming more and more crucial
- Through strategic alliances firms look for resources that it is not possible or convenient to develop internally
- This strategy is particularly effective when firms are looking for exchanging knowledge in innovative networks

Our 2 research questions

- 1) Do collaborating firms exchange more than one type of knowledge through the same collaborative relationship?
- 2) Do different types of knowledge follow the same pattern of exchange through the network of collaborating firms?

Methodology and setting of empirical research

- Social network analysis
- Direct interviews to 32 firms of the Aerospace (metropolitan) industrial cluster of the Lazio Region (Italy)
- Around 4000 employees and 93 employees of average size

Innovation-driven collaboration

- A voluntary arrangement between independent organizations to engage in a cooperative relationship finalized to any kind of innovation.
- This definition includes both informal and formal arrangements aimed to achieve incremental as well as radical innovations

Questionnaire question

- *“indicate the firms localized in the Rome metropolitan area with whom your firm has collaborated during the last 3 years, or still is collaborating with, in innovation initiatives”*

Questionnaire question

- *“indicate how much has your firm acquired from, and how much has transferred to each collaborating partner you have cited (Please indicate the intensity of knowledge exchange in both directions on a scale from 0 to 3)”*

3 types of knowledge are distinguished

- **Technological knowledge:** know-what, know-why and know-how necessary to the process of development and production of technology and innovation
- **Market knowledge:** competencies and know how centered on customers' preferences, needs and characteristics which firms are requested to satisfy
- **Managerial knowledge:** competencies necessary to efficiently and effectively coordinate and supervise organizational resources and processes

Table 3. Occurrence of knowledge exchanges

<i>Type of knowledge exchange</i>	<i>Occurrence</i>
No exchange	0/36 = 0%
Simple exchange (1 type of knowledge only)	3/36 = 8%
Multiple exchange:	33/36 = 92%
2 types of knowledge	8/36 = 22%
3 types of knowledge	25/36 = 70%

RQ1 - Results

- 92% of firms exchange more than one type of knowledge
- mostly technological knowledge

Table 4 Structural features of the networks

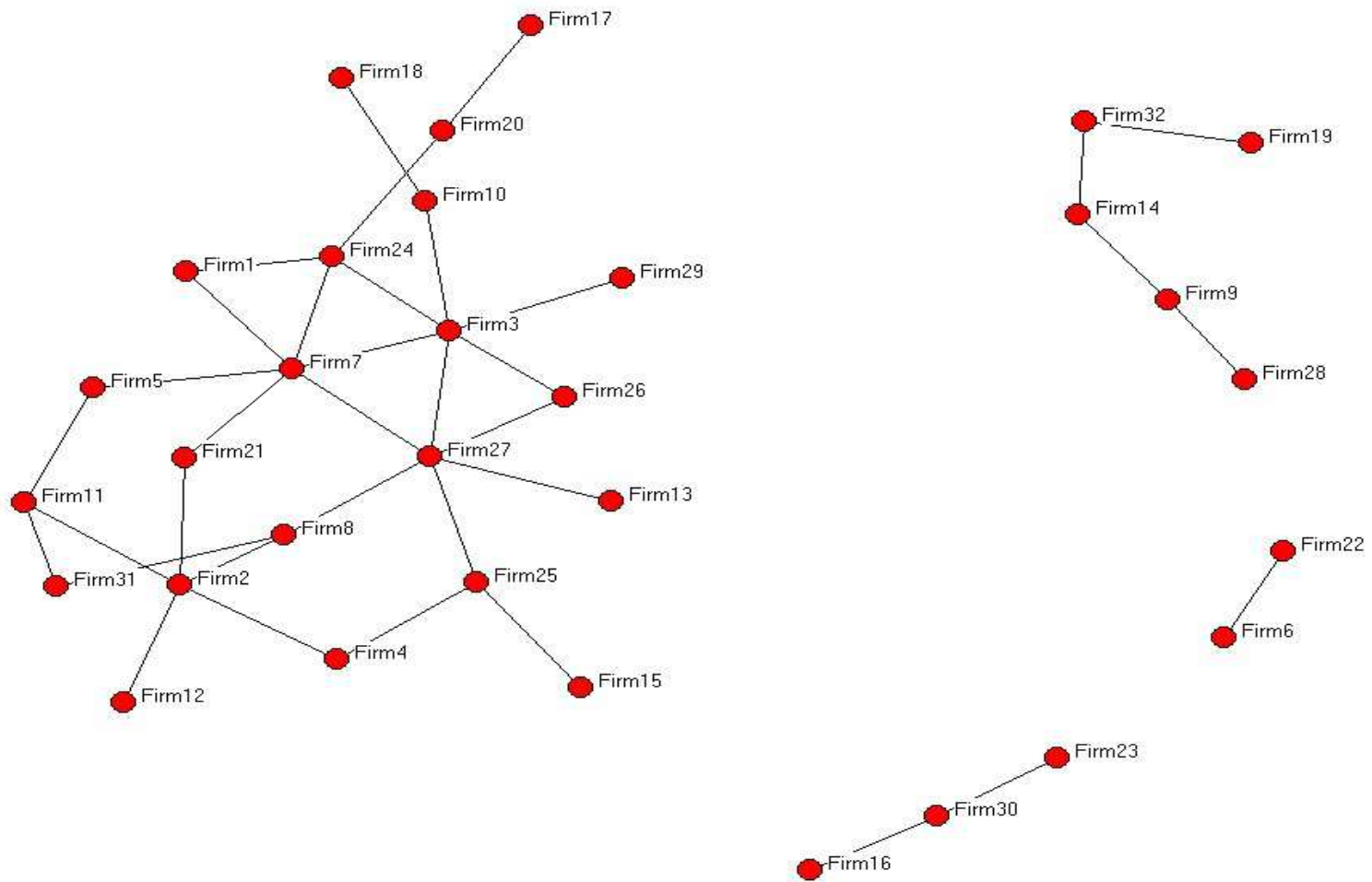
	Collaboration	Knowledge networks		
	Network	Market	Technological	Managerial
<i>Type of network</i>				
Direction of ties	not-oriented	oriented	oriented	oriented
Graph	symmetric	asymmetric	asymmetric	asymmetric
Value of ties	0-1	0-3	0-3	0-3
Graph	binary	valued	valued	valued

	Collaboration	market	technological	managerial
Direction of ties	not-oriented	oriented	oriented	oriented
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Value of ties	0-1	0-3	0-3	0-3
Graph	binary	valued	valued	valued
<i>Structural features</i>				
Size (N. of nodes)	32	32	32	32
Isolated nodes	0/32 = 0%	2/32 = 6%	0/32 = 0%	7/32 = 22%
Inclusiveness	1.00	0.94	1.00	0.78
N. of components	4	6	4	11
% of nodes in the main component	69%	66%	69%	50%
Fragmentation (prop. of nodes that cannot reach each other)	0.51	0.56	0.51	0.74

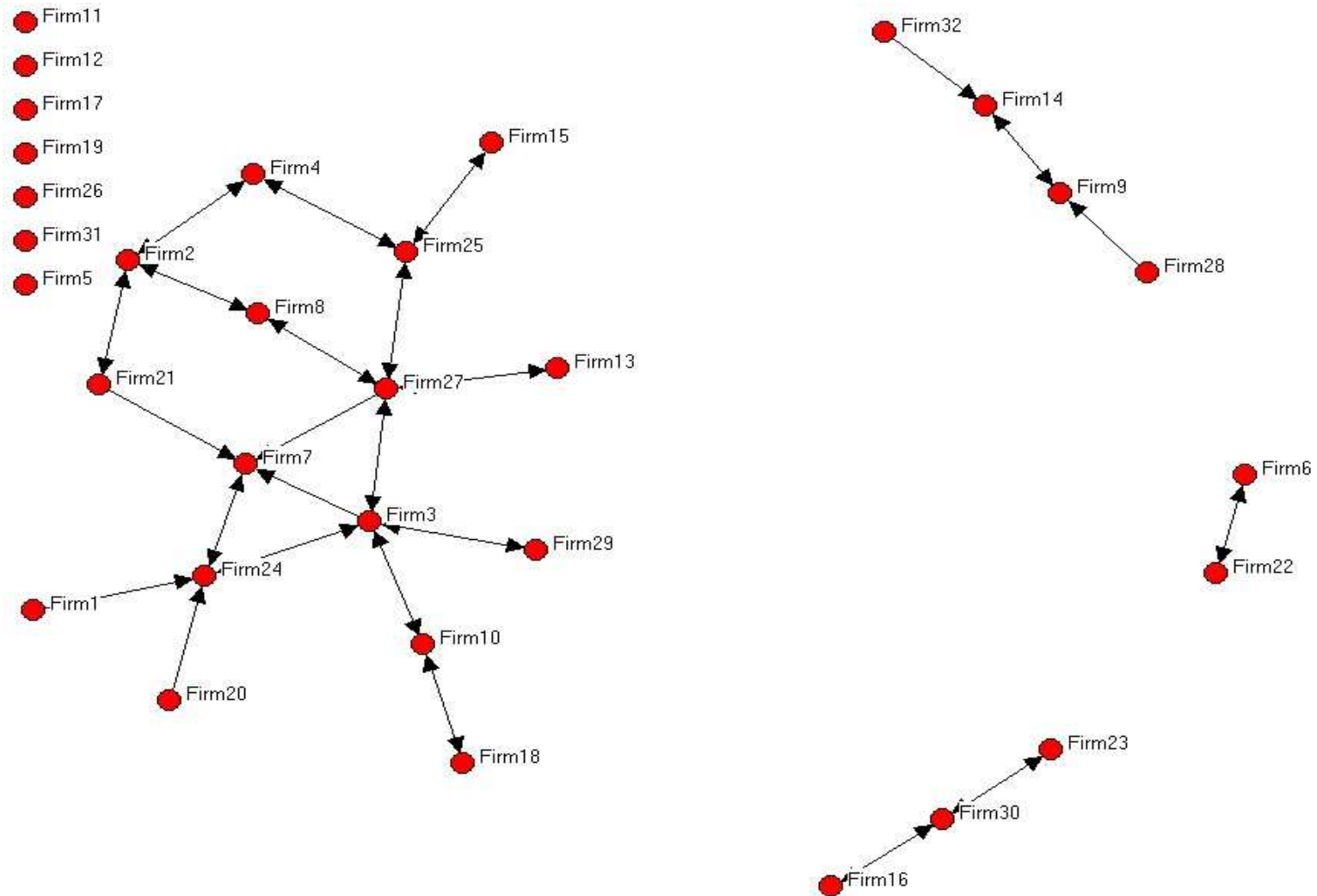
Table 5 Significance of structural differences between knowledge networks

<i>Density differences between:</i>	<i>t-test</i>
Technological and market	2.6731
Technological and managerial	3.3850
Managerial and market	1.5627

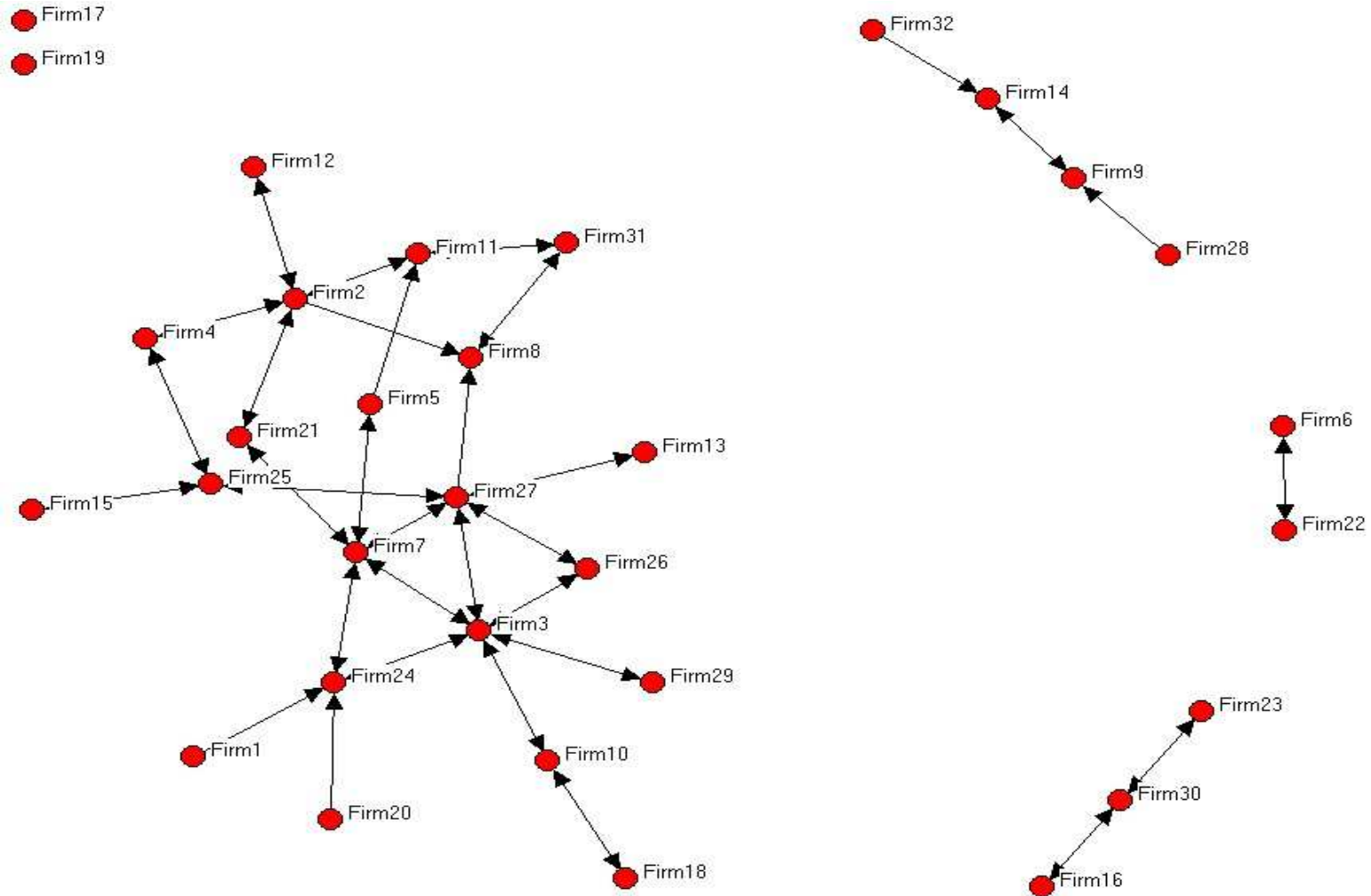
Network of collaborations



Managerial knowledge network



Market knowledge network



RQ2 - Results

- The patterns of knowledge exchange do differ substantially in terms of the 3 types of knowledge
- The network of the managerial knowledge transfer is the most fragmented and the less dense
- The network of the technological knowledge transfer is the most different from the other two