



IKINET
International Knowledge and Innovation Networks
for European Integration, Cohesion and Enlargement

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**The Governance of
Knowledge and Innovation Networks**

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IKINET partner institutions:

Università di Roma "Tor Vergata"
(coordinator)

University of Wales, Cardiff

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**Centrum Badan Przedsiębiorczosci i
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Applica sprl

Aims of the IKINET project

The IKINET project studies how SMEs could develop **interactive learning networks** and may transfer **tacit knowledge** at the international level.

Key research questions:

- Why the process of innovation is different in **SMEs and in medium tech sectors** ?
- Why the **territorial dimension** is important in the process of knowledge creation and innovation ?
- How the **process of interactive learning** is different in the various clusters of SMEs ?
- Which **institutions** are relevant in promoting interactive learning at the regional level
- Which institutional innovation may help the **enlargement of knowledge and innovation networks at the European level** ?
- Which types of **innovation indicators** are required to monitor the process of knowledge networking within regional clusters ?

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Methodology

The research has focused on **seven sectoral clusters** specialized in “**medium-tech**” technologies and with an high importance of **small and medium size enterprises (SMEs)**:

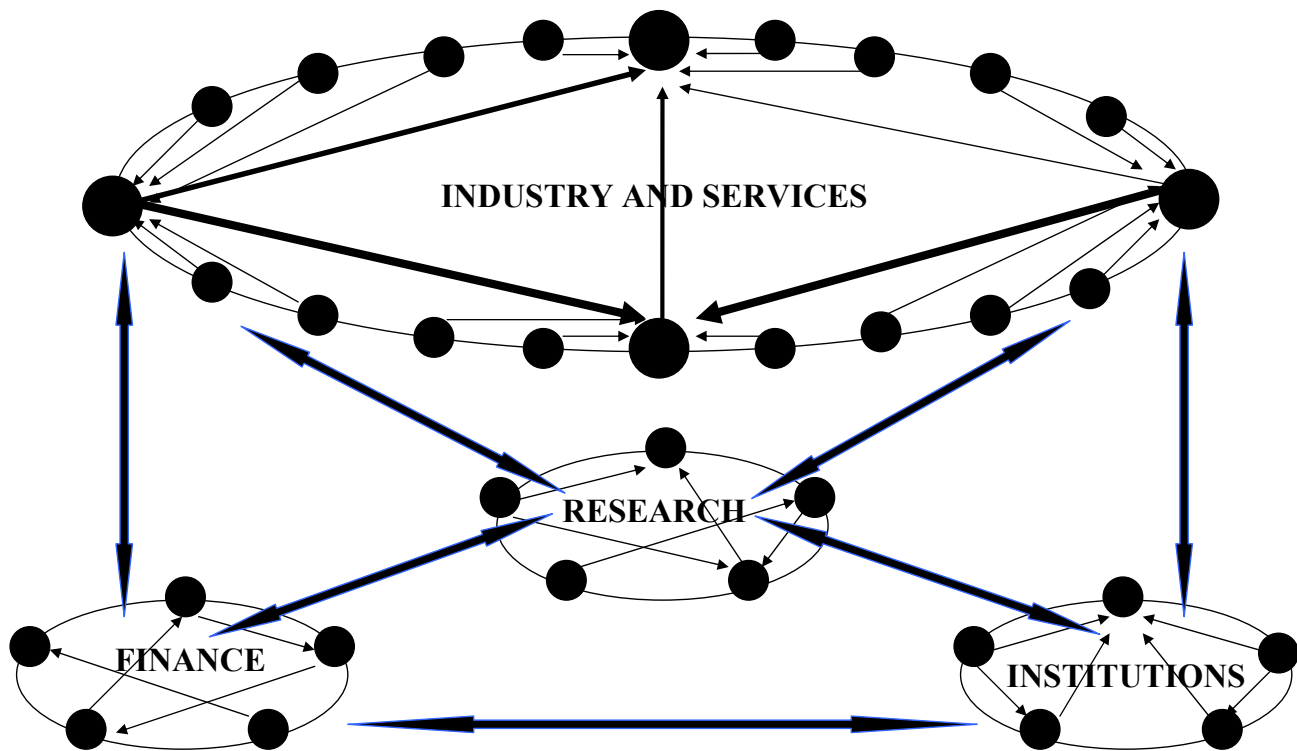
- Campania region (IT): **Aeronautic cluster**
- Wales region (UK): **Aeronautic cluster**
- Hamburg region (DE): **Aeronautic cluster**
- Slaskie region (PL): **Mining Machinery cluster**
- Steiermark region(AT): **Automotive cluster**
- Ile de France region (FR): **Optics cluster**
- Madrid region (ES): **Aeronautic cluster**

Empirical analysis. In each cluster **case studies on 35 firms, business services, financial institutions, research institutions, public institutions** have been elaborated. Two **questionnaires**: a) **qualitative** analysis, b) **quantitative** analysis.

Theoretical work on three scientific fields: 1) **regional agglomeration** and international diffusion, 2) **knowledge creation** and innovation, 3) **governance** of the innovation networks.

Three diffusion conferences: 1) May 2006: Warsaw: on the role of **SMEs** and regional institutions; 2) November 2006, Graz: on the role of **large firms** in international transfers; 3) March 2007, Rome: on: **national and European policies** for knowledge creation and innovation.

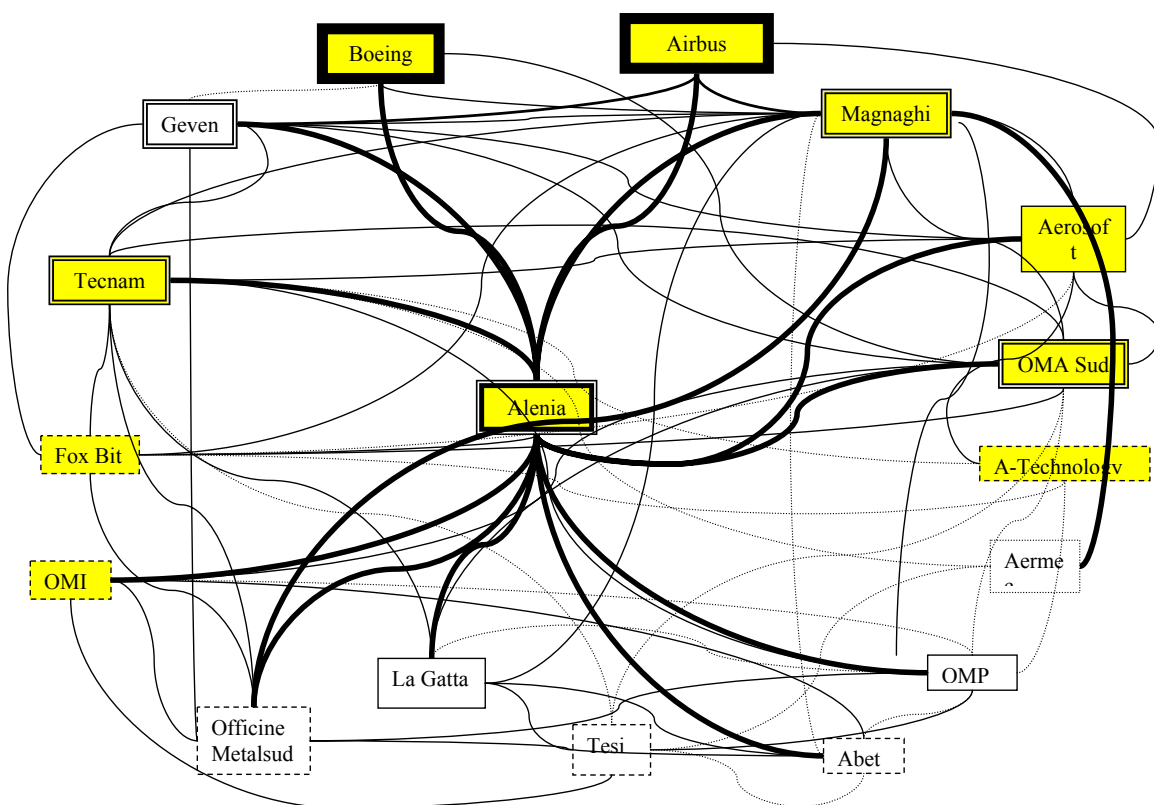
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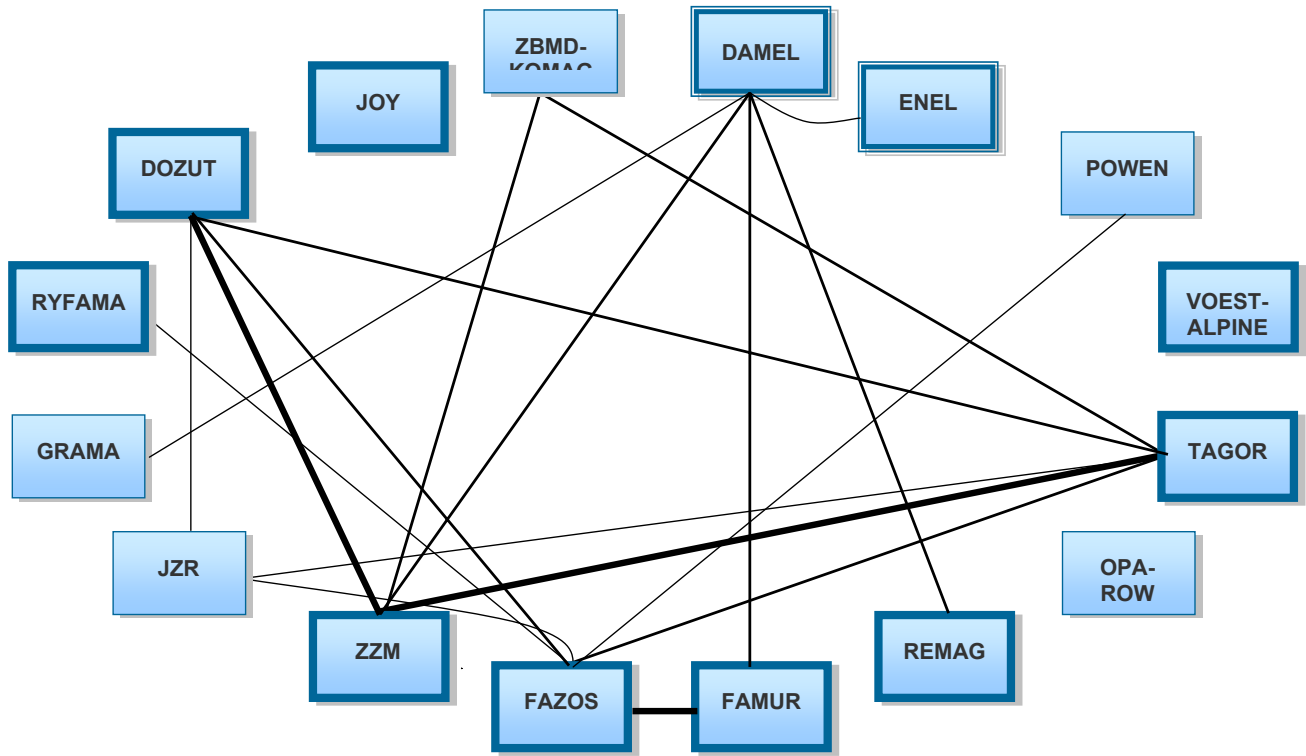


Tab. 1 - The network of links in the regional innovation systems

Source: R. Cappellin, IKINET - International Knowledge and Innovation Networks, Research for FP6, Università di Roma Tor Vergata, November 2004

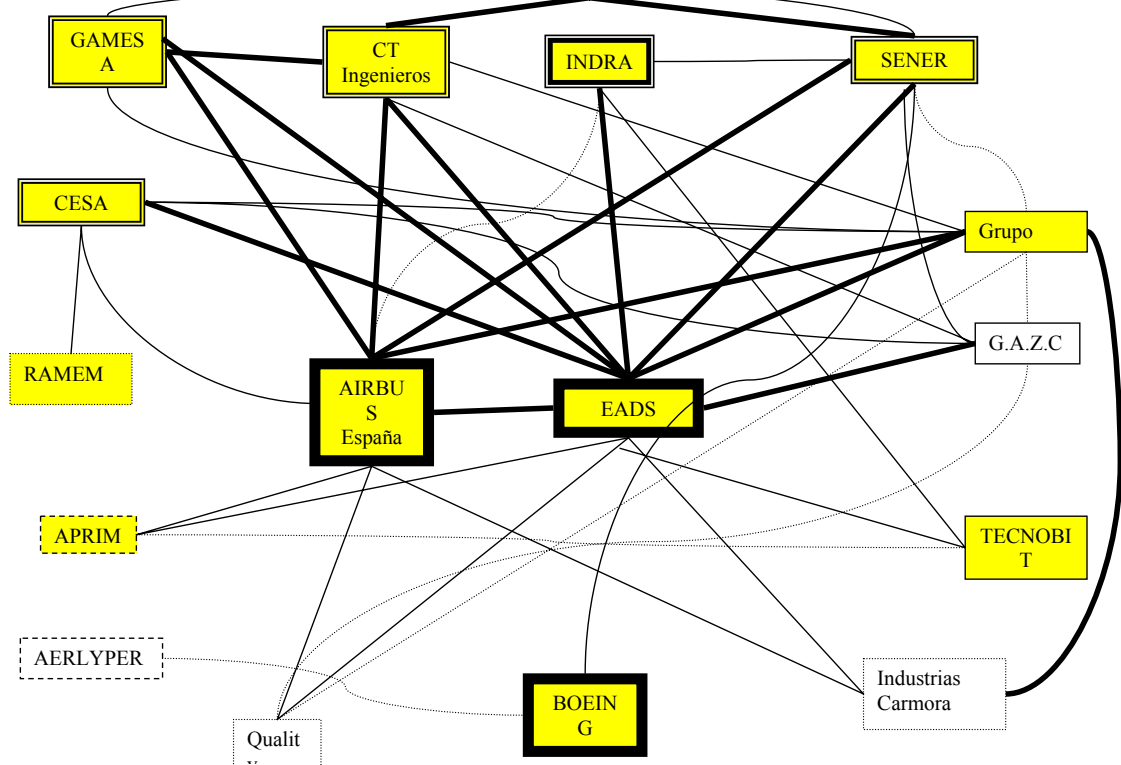
EU Framework Program – Project CIT2-CT-2004-506242
IKINET - INTERNATIONAL KNOWLEDGE AND INNOVATION NETWORKS
 Aeronautic Cluster in Campania Region: Map of Industrial Firms





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IKINET - INTERNATIONAL KNOWLEDGE AND INNOVATION NETWORKS
 Mining Machinery Cluster in Silesia Region: Map of Industrial Firms

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 Aeronautic Cluster in Madrid Region: Map of Industrial Firm



The complex nature of tacit knowledge

Tacit knowledge is represented by **various types of competencies, which are localized** and can not easily be transferred, and characterize **how each actor behave or how he interacts with other actors**, such as:

a) Tacit knowledge and the behaviours of the individual actor:

- **receptivity** or capability of **patternmaking and interpreting “weak information”**;
- **attitude to risk taking**, entrepreneurship and forward looking;
- **creativity** and capability to **combine different fragments of existing knowledge** in an **original or creative way** (i.e. synthetic or propositional knowledge);
- **problem solving** and the capability to **combine different technologies in solving applied problems** (i.e. prescriptive or procedural or symbolic knowledge);
- **capability to learn**, through the **creation of new routines and heuristic procedures** and combining “**exploration**” with “**exploitation**”.

b) Tacit knowledge and the interaction between different actors:

- **automatic coordination**, as actors jointly **react to external stimula in an automatic way** according to specific “**routines**”;
- **learn together**, through **interactive learning processes**;
- **reputation and leadership/governance** capabilities based on esteem and thrust.

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I. THE PROCESS OF INTERACTION

1. Focus on customers satisfaction

- **Innovations** in medium technology sectors are driven much more by **intensive interaction between clients and suppliers than by the transfer of technology from equipment providers**.

2. Manage accessibility and external links

- **Labour mobility** is an important means of exchanging knowledge, including through spin-offs by former employees of OEM and leading research organisations.
- The process of internationalization of SMEs requires tighter forms of **quasi integration with local specialized suppliers**.

3. Manage receptivity and human capital

- **Regional universities and vocational schools** are still the most important source for new human capital.

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II. THE PROCESS OF COMBINATION

4. Building a common identity and improve institutional/organizational proximity

- **Institutions and other forms of “social capital” play the role of immaterial infrastructures**, which organize the knowledge flows between SMEs within the clusters.
- SMEs differently from large firms **should not be considered individually**, but represent a **regional complex system**, characterized by **high sense of local belonging and of reciprocal trust**.
- **Clusters** do not correspond to the traditional local production systems or industrial districts and may **have a rather different and evolving nature in the various regions**.

5. Lever creativity and manage internal organizational capital

- Medium technology sectors need more a **problem solving type of knowledge**, than science based or high-tech sectors (i.e. symbolic knowledge);
- The knowledge base in medium technology sectors becomes **increasingly interdisciplinary and inter-sectoral**, and it requires strong **integrative/combinative capabilities** (i.e. synthetic knowledge).
- SMEs **invest too little in R&D** and are **too dependent from the large firms**.

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6. Promote institutional learning and multi-level governance

- Smes are increasingly integrated within **supply chains** managed by large firms where **quality certification and safety and environment protection regulations** are main drivers of innovations.
- The informal character of the relationships between SMEs may be inadequate for **the design and implementation of a long term strategy of the clusters considered**.

The governance of knowledge and innovation networks requires to **make the linkages between SMEs within the process of interactive learning faster and more strategically oriented**.

In particular, the adoption of the methodology of “**Territorial Knowledge Management**” aims to transform the flows of tacit knowledge into **formal linkages between the SMEs and the other local actors**, in order to allow the transfers of codified knowledge.

According to the approach of “**TKM – Territorial Knowledge Management**”, the process of **interactive learning** may be interpreted as the interaction of **six factors or phases**:

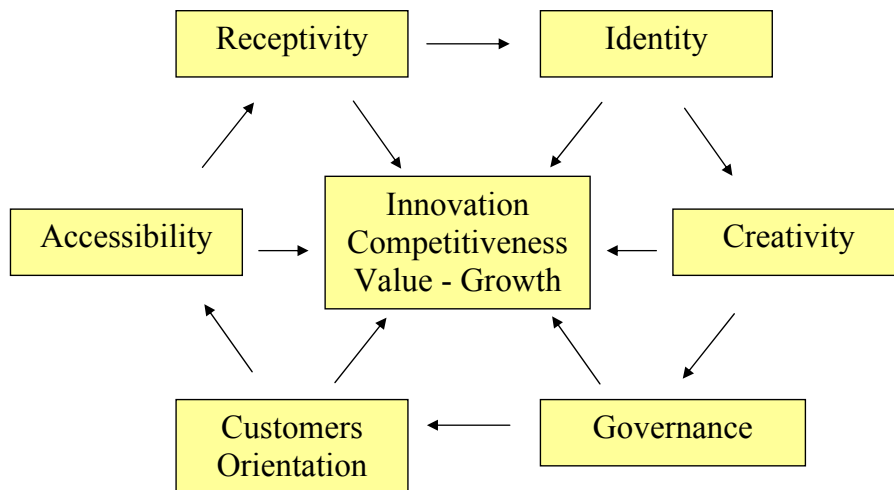


Figure 1 - The six factors TKM - Territorial Knowledge Management

The aims of Territorial Knowledge Management

The approach of **Territorial Knowledge Management (TKM)** is based on the concepts of cognitive economics, and it **aims to promote** the innovation capabilities of a regional production system through **the growth of the “territorial knowledge capital” (TKC) and the development of interactive learning processes**. In particular, TKM aims to:

- promote the creation of the Territorial Knowledge Capital**, by accelerating the speed of circulation of information between local actors and between these latter and external actors, by avoiding lock-in effects and by **managing the 6 levers**, described above;
- extract the value of Territorial Knowledge Capital** through the **enhancement of innovation**, which represents the key factor for the competitiveness and growth of a regional economy;
- create new innovation networks** within the regional innovation system and **build new formal and informal institutions**, infrastructures, norms, rules and routines, which may manage (“**governance**”) the innovation networks and the interactive learning process;
- provide a **quantitative accounting framework** to identify local strengths and weaknesses and to **monitor the progress of the local economy** in the perspective of the knowledge economy.

Innovation within SMEs and medium technology sectors is based on a different approach

	Linear approach	Interactive approach
Key word	Technology	Knowledge
Stimulus	Cost competition Supply New equipment	Market orientation Demand User needs
Process	In house R&D	Interactive learning
Outcome	Increase productivity	Continuous innovation
Policies	Public finance Public regulation	Multi-level governance Public-private partnership

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The role of institutions in the process of interactive learning

Due to their **interactive nature**, learning processes involve **groups of individuals** and calls for **the development of links, networks and social and cultural institutions and conventions among different actors**. The passage from the individual learning to the interaction among individuals implies **the co-ordination of the interaction process**.

According to cognitive theories, the creation of new connections or the **reinforcement of existing connections** implies **the compatibility with other actors**, the **success in the adaptation** and the **development of appropriate routines and institutions** (Hayek 1937). According to Marshall **order makes room for creativity, organization aids knowledge, as stable pattern may be used as euristics**. Institutions allow to save the limited cognitive capacity of individuals and organizations and **facilitate the process of reciprocal integration** (Rizzello, 2003 and Loasby, 2003).

The exchange of knowledge cannot be effectively insured coordinated by conventional markets. The role of institutions is that to create new routines or baseline, which **insure the adaptability of connections between actors**. Therefore **the creation of institutions** enhancing the connectivity of knowledge should be **a central concern of policy**.

Institutions include any form of constraint: formal and informal. They can be create or they may simply evolve over time.

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The role of institutions in regional development

New institutional theory argues that the strategic significance of institutions in development processes lies in the economies that its functioning provides. **Barriers hindering self-sustained growth processes are often attributed to deficiencies and poor performance of the institutional network**

The behavior of **institutions** can lead to:

- **generate external and internal economies of scale,**
- **reduce transaction and production costs,**
- **increase trust among economic and social actors,**
- **favor economies of scope,**
- **improve entrepreneurial capacity,**
- **increase learning and relational mechanisms,**
- **reinforce networks and cooperation among the actors.**

Knowledge networks depends on the development of **so-called intermediate institution, such as regional and local governments, local credit organisations, local education institutions, labour agencies, trade unions, chambers of commerce, and industry associations.**

Thus, a wide range of institutions is required in the process of innovation. The diffusion of knowledge and innovation creation in a specific network or sectoral/regional/national innovation system depends on the **“institutional thickness”** of the innovation system to be considered.

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The concept of “governance”

The **multiplication of players and layers of negotiation** – international, national, and local – demands for different models of government, called governance, based on organisational structures of interaction and partnership, that more and more characterise local societies. **Governance is the challenge of steering and positioning complex organizations.** These can be committees, research groups, firms, networks, communities, regions and international agencies.

The expression **governance** is used with respect to **decision making systems**, where the decisions are **not taken according to the traditional hierarchical processes** by a public authority (“government”), but rather **through open forms of collaboration between a plurality of public and non public actors**, which may differ between the various specific areas of policy and between the various levels of government.

Governance is made by complex policy networks. The decision making processes may include **forms of horizontal and vertical negotiation**, where the exercise of a hierarchical control is only one of the components and most often not the major one.

Economic development, then, is stimulated in those territories with highly evolved, complex and flexible institutional systems. That is why training and research institutions, entrepreneurial associations, unions and local governments can more efficiently use available resources and improve competitiveness when **firms are integrated into territories characterized by thick relational networks.**

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Conclusions: key preliminary results of the IKINET project

- Innovation processes in **SMEs** and in **medium technology** sectors have **very different characteristics than in large firms and in high tech sectors** and are characterized by a larger importance of **informal and interactive learning processes** than by **internal R&D activities**.
- The process of innovation in SMEs implies **very strong interactions with the external local environment**, made by an high diversity of private and public, local and non local actors.
- “**Tacit knowledge**” is **both an output and an input of the learning processes** and it may be better illustrated with the concept of “**competencies**” of **local firms and people**.
- The **interactive learning process** can be described as the result of the **6 phases of the Territorial Knowledge Management**.
- **Institutions facilitate the processes of interactive learning at the regional level and an higher institutional proximity may help to develop interactive learning at the international level**
- The **innovation policy of the European Union** could promote the **extension at the European level of the processes of interactive learning by SMEs**, by promoting the creation of **international networks between the regional “innovation platforms”, or “competence centres”**, rather than focusing on R&D and innovation within the individual firms.