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Study **Configuration of Innovation Networks**  
on behalf of the Federation of the Austrian Industry

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## Executive Summary

Closed organisations are not the central places for innovation any more. Because knowledge and skills are widely distributed in the economy and society, time to market is crucial for product development and firms are obliged to stay flexible, networks are now the preferred structure for innovation. Networks have the advantage that knowledge and resources can be combined quickly and in multiple ways into new products, services or business models. Within these structures, innovations can also be tested, refined and finally brought to market.

This means that a paradigm shift from closed to open innovation has happened. However, firms and policy makers face a lack of knowledge about this new organisation of innovation processes and its consequences: How are such networks structured? Which ecosystems are needed? In this pilot study qualitative network analysis was used to examine 12 case studies in order to demonstrate

- how successful innovation networks are built by firms (structure),
- which partners (e.g. different types of firms, university institutes) are selected for which roles (functionalities),
- which communication patterns among members are successful,
- which limitations for innovation networks can be found in the environment (lessons for policy makers)?

The companies, which initiated the 12 case networks, had all registered offices in Austria. They operated as central actors in these networks. In the networks investigated, they had grouped between 4 and 15 direct cooperation partners around them.

The innovation networks investigated in this study can be characterised as temporarily set up project networks in order to develop a certain product, service or business model innovation. The whole process from idea generation to market launch took between 2 and 10 years. Some examples for final innovation outcomes were: airplane parts made of new material, vaccines against a dangerous virus infection in Asia or a chip plant working much more efficient due to the smart automation through multiple new technologies.

Main results:

### 1. **Innovation networks are heterogeneous.**

Especially 3 dimensions are important:

- A. **Small firms need large firms and large firms need small firms.** The reason for this symbiosis can be found in different functions and roles. As an example, Leading Competence Units<sup>1</sup> (LCU) use Small and Medium Enterprises (SME) as source for ideas and patents or as information brokers bringing new contacts and partners from outside into networks. On the other side, large companies are important for SME because they provide market power, reputation and distribution infrastructures. Overall, network partners are not selected according to their size. A competitive economy needs a vital mixture of firms of all sizes, organisational styles and sectors.

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<sup>1</sup> Leading Competence Units (LCU) are companies with multinational linkages, e.g. with subsidiaries in other countries, but possess important domestic decision-making competencies.

- B. **Firms need science.** It is a common misbelieve that science generates only knowledge. In the cases studies investigated, scientific organisations had a couple of important functions: They provided consultants (e.g. university professors), reputation in the market and future employees for innovative firms. Therefore, science should be seen as a strategic partner.
- C. **Networks are international with partners spread over several countries:** 11 out of 12 innovation networks had partners outside Austria, mainly in Western Europe (D, CH, and NL) and North America (US, Canada). Many foreign partners were other firms. However, there is also a tendency to select foreign university institutes as partners. Generally, remarkably few links to firm and science partners in CEE-countries very found.

## 2. **Trust is a key element in successful innovation networks.**

- A. The selection of cooperation partners is based on trust, which means that strangers are rarely included in innovation networks but previous partners (direct partners of trust) or new partners which had been recommended by previous partners (indirect partners of trust). This strategy ensures the central actors efficiency, speed and security.
- B. Although the innovation arena is highly dynamic and time to market is short, cooperation with key partners is consistent: Individual partnerships lasted between 1 and 5 years; approved partners are some times involved in further projects.

## 3. **Ideas for innovations usually come from outside the firm.**

- A. If ideas are tracked back to their origin, there is clear evidence that external idea generation is underestimated. About half of ideas in this study come from outside the firm and even from outside the value chain. This means: Firms, which are open, have ties to a heterogeneous set of other firms and organisations and visit fairs and congresses are most likely to get access to the distributed idea pool. Access to the international idea pool is of special relevance: Internationally oriented firms are important for the technology transfer to Austria and therefore strengthen the economy.
- B. For idea generation, intensive relationships (strong ties to a friend, high contact frequency) to the source of an idea are not so much required than loose relationships to acquaintances (weak ties to "friends of a friend"), which means that loose contacts to other firms, universities and organisations are of importance.

#### 4. Human resources are the single most important barrier for innovation networks.

In order to run successful innovation networks, firms have to allow heterogeneity on the one hand and to ensure a high level of trust on the other side. This seeming contradiction can be bridged only through creative, open-minded and network-compatible (meaning multilingual, communicative and mobile) employees. This means that the qualification profile for personnel in innovation and R&D has undergone a remarkable shift: Not excellence in single disciplines is required, but the above-mentioned set of characteristics.

Due to deficiencies in educational institutions, the low mobility of graduates and increasing recruiting problems in foreign countries, innovative firms do not get enough of these personnel.

For policy makers in Austria, **the most important future challenges** are the following:

- investments in the physical and intellectual mobility,
- the development of stronger linkages between firms and universities and
- further development of the research promoting system into an innovation promoting system.

Nevertheless, some areas need further investigation, especially the low involvement of firms and research institutions in CEE countries into the innovation networks of Austrian firms: Where are obstacles for cross-border collaborations exactly situated? How can they be overcome? Which incentive structures are needed? Gaining knowledge about these topics is of strategic importance for policy makers in the whole region: Having more crossborder innovation networks from firm to firm and firm to research organisations would strengthen economies in Central Europe in a remarkable way. As modern innovation systems are network based, one country alone cannot provide enough resources any more.