

# INNOVATION NETWORKS AND CLUSTERS

THE KNOWLEDGE BACKBONE

Blandine Laperche, Paul Sommers &  
Dimitri Uzunidis (eds.)

P.I.E. PETER LANG

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藏书章

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In Economics, networks are increasingly used to describe the many links created between independent companies, as well as between them and other institutions (universities, banks, venture capital, etc.). In the current global and knowledge-based economy, they can be characterised as knowledge factories and knowledge boosters. They feed the internal processes of innovation (collaborative innovation) or the external processes of innovation, created by the propagation effects that come from inter-firm collaboration.

The book explains how innovation networks are at the origin of the production of new knowledge that will be transformed and used in common as well as in separated production processes. This characteristic of networks as knowledge factories gives incentives to further investment in the production of knowledge and ensures the cumulativeness of the innovation process. Some of the authors clearly take a territorial point of view and study how clusters (in different parts of the world: Europe, Eastern Asia and North America) propelled by the quality of the innovation networks they enclose, can be characterised as knowledge pools into which the local actors will be able to draw to reinforce their individual and collective competitiveness. This book also includes analyses of the quality of the networks built within clusters, which may help their identification.

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# **Innovation Networks and Clusters**

## **The Knowledge Backbone**



**P.I.E. Peter Lang**

**Bruxelles · Bern · Berlin · Frankfurt am Main · New York · Oxford · Wien**



**Blandine LAPERCHE, Paul SOMMERS  
& Dimitri UZUNIDIS (eds.)**

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## INTRODUCTION

# The Knowledge Base of Innovation Networks

Blandine LAPERCHE and Dimitri UZUNIDIS

At first beyond the scope of economics, the notion of a network is increasingly used to describe the many links created between independent companies, as well as between them and other institutions. As a matter of fact, these new organisational forms continue to develop. There are several reasons for this rapid development: the globalisation of the economy and the strategies of firms contribute to the building of links to other firms around the world. The opening up of national markets to competition creates a global market on which firms compete. In order to win, they are encouraged, if not obliged, to cooperate with other firms (whether big or small) and with other institutions (universities, local authorities, non-profit institutions).

Moreover, the growing complexity of modern technology considerably increases the diversity of competences that have to be mastered in order to create, produce and commercialise new and/or improved products. The cost of innovation rises continuously, which in turn increases the financing needs of enterprises. It therefore becomes difficult for a single firm to hold all the necessary resources and competences to adapt to the evolutions of the market. Even if a firm were able to do so, its specialisation advantages would vanish because of the growing problems of coordination arising from its big size. This aspect is all the more important as harsh competition exists between firms for the reduction of costs.

Finally, technological convergence implies the creation of various forms of cooperation between different skills in order to benefit from new synergies. Horizontal and vertical networks between public and private actors of innovation are the result of the increase in the amount of capital invested in R&D, the pressure of competition on opened-up markets and the increase of the cost of innovation<sup>1</sup>. However, while the

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<sup>1</sup> On collaborative innovation processes see B. Laperche, D. Uzunidis and N. Von Tunzelmann (eds.), *The Genesis of Innovation. Systemic Linkages between Know-*

facts seem to show that networks are well established as the major institution of contemporary capitalism, they remain insufficiently defined by economic analysis and their economic consequences, notably in the field of innovation, are not well assessed.

In this book, the contributors aim to show that networks can be characterised as “knowledge factories” and knowledge boosters that feed the internal processes of innovation (collaborative innovation) or the external processes of innovation, created by the propagation effects that come from inter-firm collaboration. In this perspective, innovation induces the development of merchant relationships, but also non-merchant ones, prior to a confrontation in the markets. An example of this are the links established between the scientific milieu and other enterprises through information swaps. This means that networks are at the origin of the creation of new knowledge, tacit and codified, which will be used in innovation processes. Networks are therefore the knowledge backbone of contemporary innovation processes. For a long time now, technical progress and *a fortiori* knowledge have lost the exogenous and residual form they had in the neoclassical production function, and the endogenous growth theories have shown that they are the result of planned (public and private) investments. However, in the current context of collaborative innovation, it seems necessary to go a step further, showing how knowledge is generated within networks involving a variety of public and private institutions.

These externalities have to be integrated in the notion of networks (the process of integrating outsourcing). The network is therefore organised around three poles: the scientific pole, whose main function is to produce knowledge; the technical pole, more oriented towards the elaboration of devices, and mobilising resources to apply knowledge to production in order to obtain anticipated results; and finally the market pole, which shapes demand. However, the economic consequences of the development of networks do not only refer to the creation of new knowledge, and of new entrepreneurs exploiting it. The web created by the links between firms of different sizes and institutions is also a “knowledge trap”. The collaborating organisations and institutions develop complex strategies aimed at appropriating core knowledge, which is essential to their current and future competitiveness, and thus design a hierarchy within the networks, where leaders and laggards cooperate and compete. Networks are systems in a state of constant evolution.

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*ledge and the Market*, Edward Elgar, Cheltenham, 2008 and on the impact of finance on Innovation processes, see B. Laperche and D. Uzunidis (eds.), *Powerful Finance and Innovation Trends in a High-Risk Economy*, Palgrave Macmillan, London, 2008.



Some of the authors of this book focus specifically on the functioning and the identification of clusters. To innovate, the network produces scientific, technical and organisational knowledge. At the other end of the chain, the needed knowledge to implement innovation processes is developed thanks to the geographical proximity of actors. This notion of proximity – first analysed by Alfred Marshall, who pointed out the “industrial atmosphere” existing within industrial clusters – has been recently rediscovered and refined in economic theories and policies. For about 40 years, the approach of innovation based on proximity (and, more precisely, the concept of cluster, considered as innovative milieu) has demonstrated its pertinence as a kind of model of decentralised economic growth, but also of the accumulation of the technological competencies of enterprises (knowledge pool). This approach is part of an interactive vision, which insists on the importance of the networks of actors, public and private, at a level – the local economy – recognised as pertinent for the study of the origins of various innovative networks. The study of the immediate environment of enterprises helps us to understand their innovation dynamics, but also their capacity to build scientific and technological relationships and to appropriate themselves, thanks to cooperative relationships, the knowledge produced by this geographically-situated milieu. In other words, location matters, and clusters cannot be instantaneously generated from scratch. Many ingredients need to be present, over some decades, to build a competitive cluster, which will differ from a mere aggregation of firms thanks to the quality of the network built.

The systemic nature of the relationships that characterise an economic and social milieu explains what favours or hinders the act of innovation. An innovative milieu, considered to be an innovation system, describes the relationships between institutions (scientific, technological, industrial, commercial, financial, political), whether private or public (enterprises, research and engineering laboratories, government agencies, training centres, etc.). More often than not these relationships consist of financial and informational flows and of individual’s movements. The aim of such a system is to produce innovations (new products, new services, etc.), spread by entrepreneurs acting in innovative start-up, as well as in bigger enterprises. This structure of the milieu does not only refer to economic interactions but also takes into account social structures at the origin of innovative behaviours. Institutions (state and local authorities, non-profit organisations) play a significant role in the organisation and the evolution of socio-economic structures. In turn, the innovative milieu contributes to the innovative performances of enterprises and of regions through the supply of scientific and technical resources.

This approach, of linking territories with innovation networks, influences national competitiveness policies throughout the world. The first well-known clusters were in the Silicon Valley and on Route 128 outside Boston, but they are now flourishing in all industrial and emerging countries. Many European countries have also developed cluster initiatives. This is, for example, the case in France with the “Pôle de Compétitivité” policy, which encourages the creation and growth of clusters throughout the country. This is also the case in Canada, Japan, South Korea, China, etc., as illustrated in some of the chapters of this volume. Even in the United States, clusters are still at the centre of innovation policies, as shown by President Obama’s recent call for a new federal effort to support regional innovation clusters<sup>2</sup>.

### **Innovation Networks and Clusters as Knowledge Boosters**

The first part of the book explains how innovation networks (territorially localised or not) can be considered as knowledge factories. This means they are at the origin of the production of new knowledge that will be transformed and used in common as well as in separated production processes. This characteristic of networks as knowledge factories gives incentives to further investment in the production of knowledge and allows us to define innovation networks as knowledge boosters, ensuring the cumulativeness of the innovation process.

In chapter 1, Abdelillah Hamdouch makes a critical analysis of the most visible pieces of literature on innovation clusters and networks. He suggests some possible pathways for a better grounding for the analysis of clustering and networking phenomena within innovative or creative fields. Besides defining the notions of clusters and innovation clusters or networks, a core topic within the literature relates to the analysis of the logic behind the emergence, structuring and evolution of innovative activities within various geographic areas. But despite the large amount of effort deployed, there are no consensual views among academics on the various key issues, conceptual and analytical, especially with regards to the spatial/geographical boundaries of an innovation cluster and the nature and intensity of the actors’ interaction that characterise it. The whole picture is also blurred as a persistent “disciplinary segregation”, which prevents the integration of the most valuable and converging insights that could be drawn from the various complementary social science perspectives. Abdelillah Hamdouch suggests that innovation

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<sup>2</sup> Sallet J., Paisley E., Masterman J., *The Geography of Innovation. The Federal Government and the growth of regional innovation clusters*, Center for American progress, sept. 2009.

clusters are the result of the dynamic articulation of various circles of relationships between actors, which he calls “multi-scaled networks”.

Chapter 2 focuses on the dynamics of networking innovation at the company level. Blandine Laperche explains that within the innovation network developed by the big firm, intellectual property rights play crucial roles, not only in terms of strategy but also in terms of organisation. Laperche shows that IPRs have a growing ‘coordination role’, making the relationships between the fragmented parts of the networked enterprise easier. The coordination role is also gaining ground in the context of collaborative innovation (innovation networks). Reducing the cost of cooperation, IPRs support the creation of innovation networks. The second role is the ‘incentive/defensive role’ aimed at protecting and giving incentives to the constitution of the networked firm’s innovation potential, called here ‘knowledge-capital’. In other words, IPRs secure innovation networks and therefore support them in their function of knowledge boosters. The third role is an offensive one, as IPRs largely contribute to define the place of the firm(s) (owner(s) of the IPRs) within the innovation network to which it (they) usually belong(s). The chapter concludes by stressing the relationships between the roles of IPRs for networked enterprises and the strengthening of IPRs on a global level.

In chapter 3, Francis Munier shows that something other than contractual relationships boosts or hinders innovation processes. He studies the specific management of Chinese firms, called Guanxi, based on the network of relationships among various parties that cooperate together and support one another. Ever since China’s new period of openness, it seems that a contradiction has appeared between the constraints of corporate governance and the cultural and traditional behaviour in business. As a consequence, most Western analysis considers that Guanxi is merely a form of corruption and should therefore be eliminated. The originality of Francis Munier’s work is to frame these questions in the context of recent concepts such as communities of practice and epistemic communities. Based on these concepts, the author considers that the firm can be analysed from a dual perspective: cognitive and organisational. The first one belongs to the Guanxi logic and the second one to corporate governance. According to these frameworks, Francis Munier points out that Guanxi provides an innovative network in order to enhance and spread knowledge.

Many forms of entrepreneurship are described in strategic management literature. For high-tech firms, the most fitting forms of entrepreneurship are the so-called plural form and the network/distributed form of entrepreneurship. These forms are often overlapping, and in many

cases, for high-tech firms, they probably evolve continuously from one form into the other. In chapter 4, Thierry Burger Helmchen develops a representation of the dynamics between the two forms and uses a longitudinal case study on a small high-tech firm to test its relevance. In particular, he looks at the cause and consequence relationship of the network position as a determinant of the firm's business model/market innovation capability and the technological/product innovation capability.

## **The knowledge Pool and Clustering Innovation**

The second part of the book clearly takes a territorial point of view and studies how clusters, propelled by the quality of the innovation networks they enclose, can be characterised as knowledge pools into which the local actors will be able to draw to reinforce their individual and collective competitiveness. This part also includes analyses of the quality of the networks built within clusters, which may help their identification.

In chapter 5, Maryann Feldman focuses on the importance of local factors in the emergence of innovation. After recalling the main definitions and characteristics of innovation and knowledge, she highlights the importance of the existence, in a particular location, of an ecology of actors and institutions (big firms and small entrepreneurs, incitative public policies) to explain the emergence and prosperity of innovative clusters. This alchemy between actors and institutions creates a social dynamic within a location and defines a spatially-bounded community of interests around a nascent technology or emerging industry.

Today, economists consider the regional economy as a geographical and economic platform for the organisation of production and, as a consequence, an opportunity to create new activities, goods and services, new employment and sources of income. In chapter 6, Sophie Boutillier and Dimitri Uzunidis examine the role of synergic relationships (spatial, organisational and cognitive – named proximity) in the innovation and entrepreneurial processes. The density of these relationships reinforces the capability of a local economy to generate small independent enterprises. But in the context of contemporary capitalism, the entrepreneur, as the owner and the manager of a small enterprise, has a specific function: he is not a hero (as Schumpeter noted) but he is a socialised entrepreneur. The former is at the origin of the development of big industries and new areas of activities; the latter is the result of the financial strategies and industrial policies of the major actors of the economy (big firms, financial institutions, central and local public administrations, etc.). As a result, Sophie Boutillier and Dimitri