UNIVERSITÉ DU LITTORAL-CÔTE D'OPALE
Laboratoire de Recherche sur l'Industrie et l'Innovation

REPORT ON THE THESIS OF

IWONA ŻABINSKA

PROCESS OF TECHNOLOGICAL CLUSTER FORMATION AND DEVELOPMENT IN POLAND AND FRANCE

Report written by
Dimitri UZUNIDIS, University of Littoral Côte d'Opale (France)

This thesis presented by Iwona Żabińska is co-directed by two supervisors from two universities: The Silesian University of Technology (Poland) and Ecole Nationale Supérieure des Mines Saint-Etienne (France). The thesis counts 158 pages, taking into account the bibliography and the annexes. It has 13 chapters. The chapters 2 to 6 constitute the theoretical part of the thesis (as the candidate announces it) and the chapters 7 to 13 form the empirical part (observation, analysis, results).

The thesis is well written. The style, very straightforward, has certain similarities with the one of a report. The hypotheses, the critical points of the analysis, the indicators and the results are succinctly presented. The reader has thus difficulties to understand the reasoning of the candidate as well as the empirical and theoretical links of the studied facts (see for example the motivations of the cooperation between actors within a cluster, p.21 and following – or the phases of the life cycle of a cluster, p.25 and following, without critical explanation and complete reasoning).

The author uses references backed up by figures that are linked to a numbered bibliography. The demonstrations and the links with the theory are not always evident.

The author states that "technological clusters, especially high technology ones, play a significant role in the process of stimulating competitiveness and innovativeness of regions; this is the reason why public authorities show great interest and engagement in creating and developing structures of this kind" (p.10) (but, for what reasons? With which theoretical basis?). The principal subject of the research is the analysis of technological cluster formation and development process in the reality of Polish and French economies. The author makes a panorama of clusters in these two countries and studies more particularly the French chemical cluster « Axelera » in the Rhone-Alpes region and the « Green chemistry » chemical cluster in

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Zachodniopomorskie Voivodeship (West Pomeranian Voivodeship). The choice of these clusters is due to a) their specialization in the high and medium high technology (the author refers to OECD classification, in the annexes, without explanation and criticism of this classification) and b) the similarity of industries that are located within the cluster.
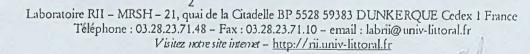
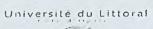In this thesis, the author tries to answer to four questions:
1) What is a technological cluster?
2) How are technological clusters in Poland and in France concentrated?
3) What stages and activities are involved in the process of technological cluster formation and development?
4) Which factors have a decisive influence on the formation and the development of technological clusters?

The candidate proposes on the one hand different quantitative methods of studies and of analysis of clusters, however because of a lack of data, she led an enquiry with a questionnaire administrated to the enterprises and the institutions located in the two clusters. On the other hand, the secondary data came from internal sources such as the following: data from statistical offices, data from government administration authorities (including information from the Internet), Internet information published by the analysed clusters, promotional materials from technological clusters, studies and publications listed in the bibliography.

The research leads the author to the following statements: "The 'Green Chemistry' chemical cluster from Zachodniopomorskie Voivodeship has a typical structure of a local mainly made up of small and medium enterprises. The majority of enterprises within the group are Polish-owned. In terms of competitiveness the cluster holds an average local position" (p. 110). Then, there is a list of limits that show that this cluster is in an embryonic phase. The author recommends different more clear objectives, more developed systemic links, better enhanced knowledge, etc. The State (?) should then intervene to impose directly or indirectly clusterisation...

Dealing with the Axelera cluster in France, this one « operates on an international level and has a strong competitive position in France. The cluster is made up of a combination of domestic and foreign firms. The large number of enterprises indicates that the cluster has achieved its critical mass...". This author recommends to develop the attractiveness of clusters and to facilitate technology transfers. She also recommends fighting bureaucratic barriers (pp.112 and following). Then, how to combine the development of clusters in France or in Poland with less State intervention?
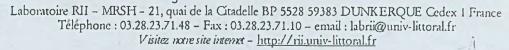
The problem of this thesis lies in the lack of thorough theoretical analysis. The author defines the cluster in relation with two attributes: « geographical proximity of connected entreprises operating in related sectors; interactions and horizontal and vertical interconnections between firms and public and scientific research institutions" (p. 18). The main author used in this thesis to discuss the issue of clusters is M. Porter. Is it sufficient? The nature of the actors and of their productive, financial and commercial relations or the role of the state and of local public authorities require complementary and thorough analysis.
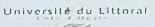
The notions of "clusters" and "innovation clusters" (or "innovation networks") are far from being unified and grounded in solid analytical frameworks. Also, some key issues related to the clusters' spatial/geographical scaling and to the nature and the forms of actors' interaction within innovation clusters (and networks) are still pending though widely debated in the literature. Moreover, one can only but recognizes that, all by large, our comprehension of the mechanisms underlying the dynamics of emergence, structuring and evolution of innovation clustering and networking phenomena rests on partial, fragmented and rather fragile theoretical and analytical grounds. My conviction is that it is only through these efforts towards better analytical grounding and strong interdisciplinary integration that social scientists may be able to prove that clustering and networking processes are neither illusions nor mysterious phenomena, but rather constitute real structuring forces of innovation dynamics within and across creative spaces.

A cluster, as an innovation system, describes the relationships (scientific, technological, industrial, commercial, financial, political) between private and public institutions (enterprises, research and engineering labs, administrations...). In general, the relationships consist of financial and information flows and the movement of persons. The purpose of that system is to produce innovations (new organizations, new goods and processes, new resources, new combinations of productive resources). This system facilitates business creation on the local level and contributes to define the competitive advantage of the whole and its members. The role of the State and of local public authorities should be better understood: how does the fiscal policy, the attractiveness policy or the industrial and innovation policy could create the systemic and changing relations between actors and potential insiders? How do the mechanisms of selection and inter-industrial links develop within a cluster (or before its emergence)? What are the most pertinent governance methods? The systemic nature of the relationships that characterize an economic and social milieu makes it possible to identify what contributes (or not) to the clustering of activities (and of innovation).

We suggest to the author a non exhaustive list of publications that could be useful to continue her research on this subject:

Ahuja G. (2000) Collaboration networks, structural holes and innovation: A longitudinal study. *Administrative Science Quarterly*, 45 (3): 425-455.

and the Anchor Hypothesis. *Industry and Innovation*, 10 (3): 311-328.

Audretsch D., Feldman, M. (1996) Knowledge spillovers and the geography of innovation and production. *American Economic Review*, 86 (3): 630–640.

August.

Baptista R., Swann, P. (1998) Do firms in clusters innovate more? *Research Policy*, 27: 525-540.

Beccatini G. (1990) The Marshallian Industrial District as a Socio-economic Notion. In Beccatini G., Pyke F. and Sengenberger W. (Eds.), *Industrial Districts and Inter-firm Co-operation in Italy*. Geneva: International Institute for Labour Studies.

Bekele G. W., Jackson R. W. (2006) Theoretical Perspectives on Industry Clusters. *Regional Research Institute*, Research Paper 2006-5, West Virginia University, 26 p.

Bresnahan T., Gambardella A., Saxenian A. (2002) Old Economy' Inputs for 'New Economy' Outcomes: Cluster Formation in the New Silicon Valleys. *DRUID Summer Conference on "Industrial Dynamics in the New and Old Economy– Who is Embracing Whom"*, Copenhagen / Elsinore, 6-8 June, 31 p.

Casper S. (2007) How do technology clusters emerge and become sustainable? Social network formation and inter-firm mobility within the San Diego biotechnology cluster. *Research Policy*, 36: 438-455.

Casper S., Murray F. (2005) Careers and Clusters: Analyzing the Career Network Dynamic of Biotechnology Clusters. *Journal of Engineering and Technology Management*, 22: 51–74.

Castilla E., Hwang H., Granovetter E., Granovetter M. (2000) Social Networks in Silicon Valley. In C.

Chiaroni D., Chiesa V. (2006) Forms of Creation of Industrial Clusters in Biotechnology. *Technovation*, 26: 1064–1076.

Cooke P. (2002) Biotechnology Clusters as Regional/Sectoral Innovation Systems. *International Regional Science Review*, 25 (1): 8-37.

Den Hertog P., Roelandt T. J. A. (1999) Cluster analysis and cluster-based policy making: the state of the art. In T. J. A. Roelandt and P. den Hertog (Eds.), *Cluster Analysis and Cluster-based Policy: New Perspectives and Rationale in Innovation Policy*, Paris: OECD.

Eto H. (2005) Obstacles to emergence of high/new technology parks, ventures and clusters in Japan. *Technological Forecasting & Social Change*, 72: 359-373.

Feldman M. P. (1999) The New Economics of Innovation, Spillovers and Agglomeration: A Review of Empirical Studies. *Economics of Innovation and New Technology*, 8: 5-25.

Feldman M. P. (2003) The Locational Dynamics of the US Biotech Industry: Knowledge Externalities

Gordon I. R., McCann P. (2005) Innovation, agglomeration, and regional development. *Journal of Economic Geography*, 5: 523-543.

Ketels C., Sövell Ö. (2006) *Clusters in the EU-10 new member countries*. Report, Europe INNOVA

Marshall A. (1903) *Elements of Economics of Industry* (First Volume of *Elements of Economics*), Third Edition (First Edition: 1892), London: Macmillan and Co., Limited.

Martin R., Sunley P. (2006) Path dependence and regional economic evolution. *Journal of Economic Geography*, 6: 395-437.

Martin, R., Sunley, P. (2003) Deconstructing clusters: chaotic concept or policy panacea? *Journal of Economic Geography*, 3: 5–35.

Moon-Lee, W. F. Miller, M. Cong Hancock and H.S. Rowen (Eds.), *The Silicon Valley Edge*, Stanford: Stanford University Press, 218-247.

Nooteboom B. (2004) Innovation, Learning and Cluster Dynamics. Discussion Paper No 44, Tilburg University, April, 24 p.

OECD (1999) *Boosting Innovation: The Cluster Approach*, Paris: OECD.

OECD (2001) *Innovative Clusters: Drivers of National Innovation Systems*, Paris: OECD.

OECD (2007), *Competitive Regional Clusters. National Policy Approaches*, Paris: OECD.

Passiante G., Secundo G. (2002) From Geographical Innovation Clusters to Virtual Innovation Clusters: The Innovation Virtual System. *ERSA Conference 2002*, Dortmund, 27-31

Preissl B., Solimene L. (2003) *The Dynamics of Clusters and Innovation*. Heidelberg and New York: Physisca-Verlag.

Prevezer M. (1997) The Dynamics of Industrial Clustering in Biotechnology. *Small Business Economics*, 9: 255–271.

Rallet A., Torre A. (2001) Proximité géographique ou proximité organisationnelle ? Une analyse spatiale des coopérations technologiques dans les réseaux localisés d'innovation. *Economie Appliquée*, LIV (1): 147-171.

Rallet A., Torre A. (Eds.) (1995) *Economie industrielle et économie spatiale*. Bibliothèque de Science Régionale, Paris: Economica.

Rallet A., Torre A. (Eds.) (2007) *Quelles proximités pour innover ?*, Paris: L'Harmattan.

Romanelli E., Khessina O. M. (2005) Regional Industrial Identity: Cluster Configuration and Economic Development. *Organization Science*, 16(4): 344-358.

Saxenian A. (1994) *Regional advantage. Culture and Competition in Silicon Valley and Route 128*. Cambridge (MA): Harvard University Press.

Saxenian A. (1999) The Silicon Valley-Hsinchu Connection: Technical Communities and Industrial Upgrading. Mimeo, University of California at Berkeley, 27 September, 34 p.

Saxenian A. (2006) *The New Argonauts: Regional Advantage in a Global Economy*. Cambridge (MA): Harvard University Press.

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Scott A. (2004) A Perspective of economic geography. *Journal of Economic Geography*, 4: 479-499.

Scott A. (2006) Entrepreneurship, Innovation, and Industrial Development: Geography and the Creative Field Revisited. *Small Business Economics*, 26: 1-24.

Despite the fact that the thesis suffers from a lack of solid theoretical basis and that the analysis is not sufficiently developed, the results seem satisfying (even if the mechanisms of cluster development are not well studied, cf. evolutionary economics). Thus, we can say that the candidate achieves the aim of resolving a scientific problem. However the candidate's knowledge in the scientific of management (of clusters) should be developed. The thesis can be presented but the author needs to continue her research, relying on the theory of the systems of governance on the one hand and on geographical analysis on the other hand.

ADDITIONAL REPORT ON THE THESIS OF

IWONA ŻABINSKA
(March 22, 2011)

PROCESS OF TECHNOLOGICAL CLUSTER FORMATION AND DEVELOPMENT IN POLAND AND FRANCE

Report written by
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The following report is a supplement to the report on the thesis of Ms ŻABINSKA. that I sent in July 2010. In my report I put the emphasis on structural problems of the thesis and on its theoretical weakness. The candidate has tried to improve her thesis by referring more often to theoretical advances and to the economic analysis on the clusters. This effort was embodied essentially in the section on the origins and on the principles of cluster theory (pp. 13-43) and pp. 74-77. The candidate has also put forward a list of recommendations for an efficient policy regarding clusters (pp. 51-57). This effort seems interesting and shows that the candidate has tried to better understand the interactive nature of the actors of the innovative milieu. She also tried to better define its field of study (the different clusters in France and Poland).

However a specialist in this topic cannot be completely satisfied by the analysis of the author. The author used some good references that were not highlighted in particular regarding the evolution of clusters and innovation policies. The author gives us the impression that she adopts the theory of the life cycle of clusters uncritically and without reference to the renewal of "old activities" through a combination of different technologies and new industrial organizations. The problem with this thesis is that the author does not follow a synergistic approach to show the limitations of clustering and the paradoxes of the "linear" theories. In this regard, and despite the advances, I am quite critical of this thesis. However, the data presented and the relevance of the references show that the jury should encourage Ms ŻABINSKA for further work thereafter. I give a favorable opinion to the presentation despite my many questions and doubts about the actual contribution of this research.

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