



**METHODOLOGICAL DIVERSITY IN THE STUDY OF INNOVATION.
THE PLACE AND ROLE OF INNOVATIVE INDUSTRIAL CLUSTERS
RESEARCH METHODOLOGY**

Camelia Moraru* and Romana Emilia Cramarencu

Camelia Moraru

Babeş-Bolyai University Cluj-Napoca,
Faculty of European Studies,
Department of European Studies and Governance
Cluj-Napoca, Romania

E-mail: camelia.moraru@ubbcluj.ro

*Corresponding author

Biographical Notes

Camelia Moraru is assistant professor at the Faculty of European Studies, Babeş-Bolyai University Cluj-Napoca and a PhD candidate in the field of anthropology. Her research interests are change and innovation in urban communities with a specific focus on the way in which the organisational culture and individuals representations are shaping innovative processes on diverse settings and at different levels (community development, cluster development, institutional innovation and change and RDI systems).

Romana Emilia Cramarencu is a lecturer at the Faculty of European Studies, Babeş-Bolyai University Cluj-Napoca and PhD in International Economic Relations. Her research interests cover European Economic Integration (courses and seminars on Internal Market, European Economic Integration), labour mobility (1 book, more than 10 articles and reports), RDI systems (1 co-authored book), and the role of university in regional innovation.

Abstract

The evolution of the disciplines studying the innovation phenomenon (especially economics, European studies, geography and sociology) generated, in the last decades, an extended amount of theoretical approaches and methodologies aiming to foster the in-depth description of a complex reality. This paper presents a synthesis of the approaches used nowadays to describe the phenomenon of regional innovation in the context of economic competitiveness and proposes a mix of methods to be validated regarding innovative industrial clusters' analyses.

A specific focus of the paper is on defining the role and importance of qualitative and quantitative mixed methodologies in investigating innovation at industrial cluster levels.

Keywords: competitiveness, regional development, innovative industrial clusters, in-depth case studies, multi-level methodologies

JEL Classification: O31, R58

1. Introduction

The inter-linkages between competitiveness, innovation, growth and regional development have been extensively investigated, within economic, sociological or geographical framework. Despite the efforts to develop a comprehensive multi-level, multi disciplinary methodology that can provide data for an exhaustive analysis of the innovative industrial cluster life cycle, a methodological approach able to do this is still to be achieved.

Still, the evolution of research in the field of economic competitiveness at regional level as well as on innovation and clusters from various fields allows researchers nowadays to choose a mix of both qualitative and quantitative methods, for generating new data and new insights on the field evolution.

The article aims to present the evolution of methodologies based on the specific concepts of economic competitiveness, growth, regional development, innovation, and innovative industrial clusters. A special focus was given to the presentation of the methodologies related to innovative industrial clusters research and to the importance of mix methodologies in the study and practice of innovative clusters development.

2. Theoretical considerations on economic competitiveness and regional innovation

Identifying a generally accepted definition of national competitiveness might be considered a *mission impossible*, a general consensus not being achieved yet. Still, two core elements can be found in almost all available definitions: a nation's capacity to create the wealth of its citizens and the capacity of its companies to discover and exploit technologies and products in the global market.

The economic competitiveness has been defined by the World Economic Forum as “the set of institutions, policies, and factors that determine *the level of productivity of a country*, taking into account its *level of development*. Thus a more competitive economy is one that is likely to sustain growth” (World Economic Forum, 2013) while according to Scott and Lodge (1985) the national competitiveness refers to “a country's ability to create, produce, distribute and service products in the international trade while *earning rising returns on its resources*”.

The latter definition is extended in the World Competitiveness Report (2013) – “competitiveness of nations is a field of economic knowledge, which analyzes the facts and policies that shape the *ability of a nation to create and maintain an environment* that sustains more value creation for its enterprises and more prosperity for its people”

Nevertheless, we add Krugman's (1994) critique to the conceptualisation of national economy's competitiveness – “Competitiveness is a meaningless word when applied to national

economies. And the obsession with competitiveness is both wrong and dangerous.” Krugman supports the idea of competitiveness at micro level, because competitiveness refers mainly to productivity.

Later on, James Rinehart (as cited by Fougner, 2006) claimed that “the necessity of competitiveness has been hammered home by governments, corporations, and the media to the point that it is taken for granted, a fact of life that is so obvious that we unthinkingly acquiesce to its dictates”.

Still, we need a bigger picture, mainly because competitiveness may be supported by an environment favouring entrepreneurial activities, and a country’s national competitiveness can be influenced by subsidiaries of foreign firms operating within the country (O’Donnell and Blumentritt, 1999, p. 188). Moreover, we share the belief that that „efforts toward more holistic improvements of the investment climate of the nation will better serve a country’s industrial base than will initiatives directed at aiding any particular industry” (O’Donnell and Blumentritt, 1999, p.189).

Focusing on knowledge economy and on enhancing the environment for high value-added innovation-driven entrepreneurship is considered the main policy guidelines for creating and maintaining competitiveness and innovation. To create Porter’s diamond, any economy should pass from the passive approach based on inherited factors (land, location, natural resources, labour and local population size) to a pro-active approach, based on specialised factors such as skilled labour, capital and infrastructure. The model developed by Porter generates as methodological approach the *Global Competitiveness Index*, one of the most referred systems of measuring national competitiveness. It gathers 12 pillars that foster competitiveness, the last 2 sub-indexes characterising the *innovation-driven economies*.¹

From evolutionary economics² to neoliberal approaches³ and new growth theory⁴, competitiveness was defined as an important source for growth, clearly linked to productivity (for a part of the economist competitiveness and productivity become interchangeable concepts). Thus, several studies (Amin, 1999; Cooke, 1997; Malecki, 2007; Scott, 1995; Werker and Athreye, 2004

¹We mention that in 2011-2012 Global Competitiveness Report, Romania was in a *transition stage* from *efficiency-driven economy* to *innovation-driven economy*, while the last report refers to Romania as an *efficiency driven economy*.

² We refer mainly to the *economic evolutionary theory* as the one understanding “the economy as always in the process of change, with economic activity almost always proceeding in a context that is not completely familiar to the actors, or perfectly understood by them”(Nelson, 2007).

³ According to David Kotz, *neoliberal theory* claims that a largely unregulated capitalist system (a free market economy) not only embodies the ideal of free individual choice but also achieves optimum economic performance with respect to efficiency, economic growth, technical progress, and distributional justice.

⁴The *New Growth Theory* often called “endogenous” growth theory views technological progress as a product of economic activity, internalizing technology into a model of how markets function. The theory is based on the assumption that knowledge and technology are characterized by increasing returns, and these increasing returns drive the process of growth, on the long run.

in Huggings et al, 2013) are linking national competitiveness to productivity and, mainly, to a nation's ability to innovate, so the attention was turned to competitiveness at a more regional level.

Recent papers on the geographical distribution of the research activity results show that in time the research results tend to concentrate geographically (Cortrightand, 2002 in Fagerberg et al., 2004, p. 292). This effect could be explained by the accumulation of implicit un-encoded knowledge (practical experiences, soft skills, communication, relations between individuals and organisations). The innovation process and the production of research results is thus, mainly generated by implicit learning through face to face interaction facilitated by partners cultural background, language, communication codes, unwritten codes of conduct (Lundvall and Johnson, 1994; Florida, 1995; Asheim, 1996, 2001; Morgan, 1997; Cooke and Morgan, 1998; Lundvall and Maskell, 2000 in Fagerberg et al., 2004, p. 293; Lam, 2000 in Fagerberg et al., 2004, p. 295). Even in high-tech domains where innovation is based on analytical processes, generation of new models and theories the tendency is towards geographical concentration: patents authors use references from the same geographical area (Jaffe, 1993 in Fagerberg et al., 2004, p. 297); the concentration of high tech spin off companies is higher in the areas with highly rated researchers of the specific field (Zucker and Darby, 1996 in Fagerberg et al., 2004, p. 297).

The geographic argument generated also approaches such as regional innovative systems as well as national innovation systems, models proposing systemic quantitative approaches in the study of the innovation process and different levels of analyses.

Regional innovative systems are viewed as RDI networks with a central role of regional structures of governance in generating innovative processes. Regional systems include several actors at regional level with similar cultural orientation towards research, development, economic growth, competitiveness and innovation, definition that raise the role of culture in analysing regional innovative systems (terms like „regional culture” or „regional culture of innovation” entered the scientific discourse) (Fagerberg et al., 2004). A specific qualitative methodology that supports studies in the field was adopted.

Based on these findings the geographical proximity and the implicit processes at intra-organisational and inter-organisational levels are key factors in developing regional innovative networks or agglomeration of innovative firms. If the role of processes and interaction is crucial in generating innovative developments than insights and methodologies that are explaining and analysing the dimensions and dynamics of these processes should be part of the methodological mix used to evaluate and explain regional innovation. We can assume, in this specific context, that the development of the innovative regions and subsequently of regional clusters are highly dependent on a specific socio – economic, cultural and inter-institutional regional context,

dependency that made almost impossible the reproduction of a certain pattern of innovative development from a region to another. Meanwhile the effects of the specific variables at socio-economic, cultural and inter-institutional level are important to be studied and defined in the context of future specific regional policies and developments.

A last decades trend in research demonstrated the central role of socio – cultural factors in regional innovation, the strategic role of governance structure, the collaborative role of different entities at regional level (Cooke et al., 2000; Morgan and Nauwelaers, 1999; Amin, 1998) as well as the fact that the scope of regional policies is to support the creation and development of innovative networks of actors (Cooke et al., 2000; Landabaso, 1997) and industrial clusters (Porter, 2000; Doeringer and Terkla, 1995).

Innovation is a complex, difficult to measure reality. Due to its dependency as a construct and as a process on the socio-cultural characteristic of its actors (those that are investigating the phenomenon or those involved in generating the innovative results) what is known at theoretical level and measured by broadly extended surveys (Innovation Survey) as innovation can refer in fact to different realities. A rightful question might be - which are the limits and strengths of the existing methodologies and their origins?

3. Methodological approaches in the study of innovation at regional level. Specific methodologies for study innovative industrial cluster

Among different relevant phenomena at regional level that conduct to creation and development of innovative regions clusters was one of the most researched topic.

Clusters, defined by Porter as *”geographically proximate groups of interconnected companies and associated institutions in a particular field, linked by commonalities and complementarities”* (Ketels, 2005) were one of the most researched subject in regional innovation studies. As the research evolves the conceptualization of cluster become more and more extensive in terms of concepts use and of concepts use and broader?, clusters starting to be defined differently or approached differently in various EU member states: large and small firms in a single industry, representing a clear model of specialization to achieve the competitive advantage (industrial clusters) with firms in industry clusters benefit from synergies of association related to shared labour, sources of innovation, suppliers, markets, technology, and infrastructure or as networks of production, networks of innovation, networks of interaction, networks or chains of production, innovation and co-operation, systems of innovation. At EU level, we can find a huge diversity among clusters: they differ in terms of their development stage (the cluster life cycle); some are

networks of SMEs, some are organized around key anchor firms, and yet others have developed around universities, as spin offs, etc (EC, 2007).

Independently of the assumed conceptualisation of cluster, the use of specific methodologies revealed the following 4 common features (Ketels, 2004):

- *proximity* (geographical aggregation that favours positive spill-over effects),
- *linkages* (especially shared goal, business approaches, networking, etc),
- *interactions* (joint projects),
- *critical mass* (for a meaningful impact of the clusters' activities).

Later researches at EU level (INNO Germany AG, 2010) added another feature position in the cluster life cycle as a relevant aspect of cluster characterization.

Even so in more recent studies, the proximity feature fades away, clusters getting to be defined more often by relationships, and not memberships, with variable spatial boundaries not necessarily corresponding with political borders (EC, 2008).

A genuine cluster develops bottom up, as a natural geographic concentration of activities oriented towards competitiveness and innovation while we can also find a great number of clusters that fulfil a normative function, being easily taken for cluster policies.

Differences in theoretical definition of clusters as well as the emerging different models at regional level around Europe conducted to the use of very different methodologies in research and evaluation of various industrial clusters. The main methodologies implied (Roelandt and Hertog, 1999): quantitative methods such as I/O tables and inter-industry linkages, graph methods, statistic methods, scientometric methods, patent data or qualitative methods such as in-depth case studies.

Despite the openness to multi-level analyses due to the specific systemic theoretical approach as well as its specific evolution context the research on / evaluation of clusters remain mainly focused on maximum 2 levels of analyses (meso and macro) failing to integrate in a comprehensive model the variables from all the three levels – micro, meso and macro level (Roelandt and Hertog, 1999). Also the micro level mainly investigated by psychological, organisational or anthropological researches offer relevant insights mainly regarding individual, groups and organisational level involved in specific inter-relations between actors in clusters (Table 1).

A potential solution to overcome the limits of addressing only one or two levels of analyses might be an interdisciplinary approach or a participatory research (Diez, 2001).

While defining the industrial clusters researches and the evolution of the field has generated a common framework of conceptualization of the industrial clusters, the definition of an *innovative*

industrial cluster is more elusive due to the use of innovative both for characterizing inputs and outputs (Riggi and Maggioni, 2008).

Table 1. Variables investigated at micro level using psychological methodologies

Individual level	Group Level	Organisational Level
Personality	Mood	Team processes
Motivation	Team structure	Leadership style
Cognitive abilities	Team climate	Structure
Job characteristics	Team member characteristics	Strategy
		Resources
		Culture

Source: compiled by authors based on Anderson et al., 2004

At European level innovative clusters were defined as being a group of innovative start-ups, small, medium and large undertakings as well as research organizations operating in a particular sector and region. Organizations that are actively oriented towards intensive interactions, sharing of facilities and knowledge, engaged in technology transfer and designed to stimulate innovative activity by promoting intensive interactions, sharing of facilities and exchange of knowledge and expertise and by contributing effectively to technology transfer, networking and information dissemination in the cluster (EC, 2006).

Even if a present and powerful constraint is present at the level of international research community towards opening up to multi-level and interdisciplinary approaches, the research methodology used in the study of innovative industrial cluster remains basically determined solely by the research aim and combines specific methods to assess innovation or cluster formation.

Table 2. Industrial clusters research methods based on research aim

Aim	Methodology	Specific research characteristics	Authors / Research / Projects
Characterization of innovative industrial cluster	In-depth case studies	Discover and characterisation of the interdependences between producers, suppliers, consumers, the identification of the value chain and its territoriality	LEED Programme 2001 – 2002 - a project on clusters in transition economies Automotive Cluster Upper Austria – www.automobile-cluster.at Automotive Engineering Network Southwest, AEN www.ae-network.de

Identifying relation , knowledge spillovers, identifying emergent clusters	Interviews, experts opinions, surveys, focus group, snow ball method	Identification of regional leaders opinion on business potential, concentration, business models, reconstructing/ understanding information and communication channels, reconstruction of value-added chains	Filiâtre J. P. and Desrousseaux A. - Netwin guide for cluster development – 2002 LEED Programme 2001 – 2002 - a project on clusters in transition economies Cluster Navigators Ltd (2001)
In depth description of cluster – in terms of relations between firms and industry groups, between actors, the strength of linkages, etc.	Graph analysis, input-output data, network analyses, Shift-share analysis	Higher costs – a large amount of disaggregated data and matrices from surveys are needed	DeBresson and Hu (1999) Andersen et al. (2006) Kiese (2008) Kiese and Schätzl (2008) Danish identification of agro-industrial complex - Drejer et al. (1999) Nazara and Hewings (2004) Dirzu and Nijkamp (2013)
Macro-behaviour of innovative industrial clusters at national level	Statistics, econometric analyses – national or European industrial data aggregation based on geographical filters	Approach is based on a standard definition of cluster – concentration on a given geographical area of a significant numbers of companies from a specific industry Indexes used / calculated refer to: geographical concentration (index of localization, spatial concentration – GIS techniques), size of the geographical area; defining the affiliation of a certain company to a specific industrial sectors; industrial concentration; time stability of the firms location, etc.	Harvard Business School Project - US Cluster Mapping European Cluster Observatory Koschatzky and Lo (2007)
Global relevance of an industry	Export data	Usually national share of a commodity is compared to the average national share of exports, the world market share or the export growth. Rarely used for cluster identification due to the inaccessibility of national export data at international level	Industrial Performance Scoreboard (2013)

Source: compiled by authors based on Riggi and Maggioni, 2008 and INNO Germany, 2010

For example Porter's strategy for evaluating clusters seems pretty simple, taking the spatial dimension (agglomeration effects) as well as employment and industrial structures into account. He looked at the actual distribution of economic activity across space to identify in which industries

employment is geographically concentrated rather than widely spread, and which individual industries tend to locate together, i.e. form clusters. „This process allowed the creation of 41 clusters, each defined by a set of detailed industries. For each region of the U.S., there is now data on the level and growth of employment and wages as well as other economic performance indicators (available at www.isc.hbs.edu). These cluster definitions have also been used to map the cluster structure in Sweden, and are currently applied to all 10 new EU member countries” (Ketels, 2005).

Apart from the already classic approaches in researching industrial clusters, the study of innovation brought certain useful methodologies that can contribute to an in-depth understanding of innovative industrial cluster.

The history of the research on innovation started with the extensive use of case studies and industry monographs as ways to offer perspective on multi dimensionality of the phenomenon and on creating a grounded based theory (Casper and Waarden, 2005). The limitations of case studies, especially the lack of the capacity to describe large scale, population level effects were partially removed by the use of quantitative surveys that could be designed to be representative (ex. The French survey on innovation in 1991 is the most extensive one, followed by several significant surveys that led to the large scale use of Regional Innovation Scoreboard at EU level). The surveys on innovation contributed on a large scale to the characterization of innovative clusters.

Also the studies on innovation bring into the research community the cultural impact on the innovative process at different levels. Models based on cultural factors are explaining the implicit, invisible dynamic of innovation, tacit knowledge (Meissner and Sprenger, 2010): Schein Culture Model, the Sackmann Iceberg Model, the Cultural Core Model or the Want Corporate Culture Hierarchy. These models explain the relevance of implicit, more or less hidden, or invisible dynamics of innovation within social structures and organizations, and are relevant especially for the description and evaluation of tacit knowledge, rules, and codes of conduct important at both organizational and network level (Nonaka and Takeuchi, 1995). With the use of cultural models in explaining the emergence of innovative behavior the research methodologies on innovation started to include qualitative cultural and contextual studies and ethnographic methods.

The advance of the evolutionary approaches on innovation studies generates models such as triple helix model of innovation (Etzkowitz, 1997). The model consists on converging institutional spheres of academia, industry and government each taking the role of the other has been read in different ways in various parts of the world. In countries where the interface is well underway, whether occurring from the bottom up, through the interactions of individuals and organizations from different institutional spheres, or top down, encouraged by policy measures, the triple helix

can be recognized as an empirical phenomenon and as an efficient frame for research and evaluation (Etzkowitz, 2002). The interpretative assumptions are that at local level the model's actors are engaged in economic growth through "generative relationships" (Leydesdorff and Etzkowitz, 1996, 1997) relationships that are fostering win-win relations, joint initiatives and projects and common understanding frame on how to influence and change the environment in which they are acting.

Furthermore, the *four clover model* proposed also an actor based model, including catalyst institutions: service providers in the field of innovation and technological transfer, centres for technological transfers, chambers of commerce etc. The authors differentiated between specialised service providers (experts in the industrial field of the clusters) and generalist consultants dealing with management, communication, project generation etc. (Guth and Cosnita, 2010).

These methodologies extends the analytic framework and through insights on the interactions and common goals of actors in the field are opening the time perspectives for research in the planned changes that are initiated at local and regional level as a result of multiple interaction between actors. Mainly used as a reference point, time can became an important agent as part of the planned innovation and changes at local and regional levels. Studies regarding the role of visions and assumed – wanted futures studies can offer an enhanced perspective on the study of innovative industrial clusters.

Both the quantitative and qualitative methods have certain strengths as well as shortcomings. Using solely quantitative methodologies might be a proper answer for data accessibility and comparisons between various regions. Still, quantitative methods can better describe mature or declining clusters (INNO Germany, 2010). Koschatzky and Lo (2007) recommended a combination of an analysis of regional statistical data together with interviewing experts and actors involved (INNO Germany, 2010, p.29)

For the emerging or niche clusters, qualitative methods are recommended because they offer contextual information, despite their limitations in terms of relevant data provided by experts and stakeholders (the risk of biased opinion). Nevertheless, the data can be hardly organized in a standardized manner, reducing the relevance of inter-regional comparisons.

Therefore, a mix of quantitative and qualitative methods would better describe the creation and development of innovative clusters. However for a research that is oriented towards the formulation of conclusions and recommendations that can impact the strategies and policies at regional and national level a single methodological approach cannot cover the extend of information, variables, dimensions and themes that has to be considered when a public policy is issued. The recommendation for the applied research in this matter is to use a methodological mix

that combine – quantitative and qualitative methods, investigates facts and phenomenon at least 2 levels and use an interdisciplinary approach.

4. Discussions and conclusions

The analysis of innovative industrial clusters can be performed with the use of both quantitative and qualitative methods, to capture the complex system of transfers, joint projects, shared goals, values and practices.

We share the opinion that clusters, especially the innovation oriented ones, can favourably impact the regional development because they make use of regional policies, they exploit and/or create business opportunities, foster interactions of regional actors, increase the regions' attractiveness for labour mobility and FDI, and influence the regional competitiveness.

References

- Amin, A. (1998), “Una perspectiva institucionalista sobre el desarrollo economico regional”, *Ekonomiaz*, Vol. 41, pp. 69– 89. “An institutionalist perspective on regional economic development” (in Spanish)
- Andersen, T., Bjerre, M. and Hansson, E.W. (2006), *The Cluster Benchmarking Project*, Nordic Innovation Centre, Oslo.
- Anderson, N., De Dreu, C. K. and Nijstad, B. A. (2004), “The routinization of innovation research: a constructively critical review of the state-of-the-science”, *Journal of Organizational Behavior*, Vol. 25, pp. 147 – 171.
- Automotive Cluster Upper Austria (2014), “Automotive cluster”, http://www.clusterland.at/741_ENG_HTML.php
- Automotive Engineering Network SouthWest (2014), “Automotive Engineering Network SouthWest”, <http://www1.karlsruhe.de/Wirtschaft/Ae-Network/index.php>
- Casper, S. A. and Waarden, F.S. (2005), *Innovation and Institutions. A Multidisciplinary Review of the Study of Innovation Systems*, Edward Elgar, Cheltenham.
- Cluster Navigators Ltd. (2014), “Cluster Navigators”, <http://www.clusternavigators.com>
- Cluster Observatory Project (2011), “Cluster Observatory”, <http://www.clusterobservatory.eu/index.html#!view=regionalmapping;i=V16140;y=2011;r=NC10;rsl=0;rp=NC10;s=CC20-it;sp=CC20-STND;p=map;ll=56.3,26.1;z=4>
- Cooke, P. et al. (2000), *The Governance of Innovation in Europe*, Pinter, London.
- De Bresson, C. and Hu, X. (1999), “Identifying clusters of innovative activity: a new approach and a toolbox”, *OECD Proceedings, Boosting Innovation - The Cluster Approach*, OECD Publications.

- Delgado, M., Porter, M. E. and Stern, S. (2010), “Clusters and entrepreneurship”, *Journal of Economic Geography*, Vol. 10, No. 4, pp. 495-518.
- Diez, M. A. (2001), “The Evaluation of Regional Innovation and Cluster Policies: Towards a Participatory Approach”, *European Planning Studies*, Vol. 9, No. 7, pp. 907-923.
- Dirzu, M. S. and Nijkamp, P. (2013), “The dynamics of agglomeration processes and their contribution to regional development across EU”, *Romanian Journal of Regional Science*, Vol. 7, No.1, pp. 17 – 35.
- Doeringer, P.B. and Terkla, D.G. (1995), “Business strategy and cross-industry clusters”, *Economic Development Quarterly*, Vol. 9, No. 3, pp. 225–237.
- Drejer, I., Kristensen, F. S. and Laursen, K. (1997), “Studies of Clusters as a Basis for Industrial and Technology Policy in the Danish Economy”, http://www.druid.dk/laursen/papers/position_denmark.pdf
- European Cluster Observatory (2014), “Clusters at your fingertips” <http://www.clusterobservatory.eu/index.html>
- European Commission (2006), “Community framework for state aid for research and development and innovation”, (2006/C 323/01), <http://www.innoviscop.com/en/definitions/innovation-clusters>
- European Commission (2007), “Innovation Clusters in Europe: A statistical analysis and overview of current policy support”, http://www.central2013.eu/fileadmin/user_upload/Downloads/Tools_Resources/Cluster.pdf
- European Commission (2008), “The concept of clusters and clusters policies and their role for competitiveness and innovation: main statistical results and lessons learned”, Commission Staff Working Document SEC (2008) 2637, Annex to the Communication from the Commission "Towards world-class clusters in the European Union: Implementing the broad-based innovation strategy", COM(2008)652
- European Commission (2013), “Industrial Performance Scoreboard. A Europe 2020 Initiative” Commission staff working document, Ref. Ares (2013)3771189 - 19/12/2013
- Etzkowitz, H. (1997), “The Triple Helix: academy-industry-government relations and the growth of neo-corporatist industrial policy in the U.S.”, in S. Campodall’Orto (ed.), *Managing Technological Knowledge Transfer*, EC Social Sciences COST A3, EC Directorate General, Science, Research and Development, Brussels, Vol. 4.
- Etzkowitz, H. (2002), “The Triple Helix of University - Industry – Government. Implications for Policy and Evaluation”, http://www.sister.nu/pdf/wp_11.pdf
- Fagerberg, J., Mowery, D., and Nelson, R. (eds.) (2004), *The Oxford Handbook of Innovation*, Oxford University Press, Oxford.
- Filiâtre, J. P. and Desrousseaux, A. (2002), “Netwin, a methodology to networking and cluster development”, <http://www.urenio.org/conference/presentations/Desrousseaux.pdf>

Fougner, T. (2006), “The state, international competitiveness and neoliberal globalisation: is there a future beyond the competition state?”, <http://www.sussex.ac.uk/Users/ssfa2/fougnercompstate.pdf>

Guth, M. and Cosnita, D. (2010), “Clusters and Potential Clusters in Romania. A Mapping Exercise”, http://www.minind.ro/presa_2010/iulie/MappingReport_230710.pdf

Harvard Business School Project – US Cluster Mapping (2014), “Cluster Mapping” http://clustermapping.us/-about/about-the-project/?d-set=db_mode:close

Huggings, R., Izushi, H. and Thompson, P. (2013), “Regional Competitiveness: Theories and Methodologies for Empirical Analysis”, <http://centrum.pucp.edu.pe/pdf/revistas/JCC-vol6-issue2-86.pdf>

INNO Germany AG (2010), “Cluster and clustering policy: a guide for regional and local policy makers”, <http://cor.europa.eu/en/Archived/Documents/59e772fa-4526-45c1-b679-1da3bae37f72.pdf>

Ketels, C. H. M. (2004), “European Clusters”, in T. Mentzel (ed.), Structural Change in Europe. Innovative City and Business Regions, Hagbarth Publications, Bollschweil, Vol. 3.

Ketels, C. H. M. (2005), “How we evaluate clusters”, http://www.larevueparlementaire.fr/pages/DS_juill05/DSpole_cketels.htm

Kiese, M., (2008), “Mind the Gap: Regionale Clusterpolitik im Spannungsfeld von Wissenschaft, Politik und Praxis aus der Perspektive der Neuen Politischen Ökonomie”, Zeitschrift für Wirtschaftsgeographie, Vol. 52, No. 2-3, pp. 129-145.

Kiese, M. and Schätzl, L. (eds) (2008), Cluster und Regionalentwicklung Theorie, Beratung und praktische Umsetzung, Verlag Dorothea, Rohn.

Koschatzky, K. and Lo, V. (2007), “Methodological framework for cluster analyses”, Working Papers Firms and Region, No. R1/2007, Fraunhofer Institute Systems and Innovation Research, Karlsruhe.

Kotz, D. (2002), “Globalization and Neoliberalism”, Rethinking Marxism, Vol. 12, No. 2, pp. 64-79.

Krugman, P. (1994), “Competitiveness: A dangerous Obsession”, <http://www.foreignaffairs.com/articles/49684/paul-krugman/competitiveness-a-dangerous-obsession>

Landabaso, M. (1997), “The promotion of innovation in regional policy: proposals for a regional innovation strategy”, Entrepreneurship and Regional Development, Vol. 9, No. 1, pp. 1– 24.

LEED Programme (2001 – 2002), “LEED-CEI-EBRD project on Industrial Districts and Local Clusters - Clusters in Transition Economies - Strategies for Innovation and Growth at a Cross-National Perspective”, <http://www.oecd.org/cfe/leed/leed-cei-ebdprojectonindustrialdistrictsandlocalclusters2001-2002.htm>

- Leydesdorff, H. and Etzkowitz, H. (1996), “Emergence of a Triple Helix of University-Industry-Government Relations“, Science and Public Policy, Vol. 23, pp. 279-286.
- Leydesdorff, H., and Etzkowitz, H. (1997), “A Triple Helix of University- Industry-Government Relations“, Industry & Higher Education, Vol.12, No.4, pp.197-258.
- Meissner, J. O and Sprenger, M. (2010), “Mixing Methods in Innovation Research: Studying the Process-Culture-Link in Innovation Management“, Forum: Qualitative Social Research, Vol.11, No.3, Art.13.
- Morgan, K. and Nauwelaers, C. (eds) (1999), Regional Innovation Strategies. The Challenge for Less-favoured Regions, Regions, Cities and Public Policy Series, The Stationery Office, London.
- National Governors Association (2013), “State Sector Strategies Coming of Age: Implications for State Workforce Policymakers”
<http://www.nga.org/files/live/sites/NGA/files/pdf/2013/1301NGASSSReport.pdf>.
- Nazara, S. and Hewings, G.J.D. (2004), “Spatial structure and taxonomy of decomposition in shift-share analysis“, Growth & Change, Vol. 35, No. 4, pp. 476-490.
- Nelson, R., (2007), “Economic Development from the Perspective of Evolutionary Economic Theory“, <http://dcs.h.xoc.uam.mx/eii/globelicswp/wpg0702.pdf>.
- Nonaka, I. and Takeuchi, H. (1995), The Knowledge-Creating Company, Oxford University Press, New York.
- O'Donnell, S. and Blumentritt, T. (1999), “The contribution of foreign subsidiaries to host country national competitiveness“, Journal of International Management, Vol. 5, No. 3, pp. 187–206.
- Porter, M. E. (2000), “Location, Competition and Economic Development: Local Clusters in a Global Economy“, Economic Development Quarterly, Vol. 14, No. 1, pp.15-34.
- Riggi, R. M. and Maggioni, A. M., (2008), “High-tech firms and the dynamics of innovative industrial clusters“, in C. Karlsson (ed.), Handbook of Research on Innovation and Clusters, Cases and Policies, Edward Elgrave, Cheltenham, pp. 54-79.
- Roelandt, T. J. A. and Hertog, P. (1999), “Cluster analysis and cluster based policy making: the state of the art“, in OECD Proceedings, Boosting Innovation – The Cluster Approach, OECD Publications.
- Scott, B.R. and Lodge, G.C. (1985), U.S Competitiveness in the World Economy, Harvard Business School Press, Boston.
- World Competitiveness Online (2013), “World Competitiveness Report 2013“
<https://www.worldcompetitiveness.com/OnLine/App/Index.htm>
- World Economic Forum (2012), “The Global Competitiveness Index Platform Data“
<http://www.weforum.org/issues/competitiveness-0/gci2012-data-platform>
- World Economic Forum (2013), “Global Competitiveness Report 2012-2013“
http://www3.weforum.org/docs/WEF_GlobalCompetitivenessReport_2012-13.pdf

Yang, G., Stough, R.R. and Haynes, E. K. (2008), “Spatial and functional clustering: a comparative analysis of the Baltimore and Washington DC metropolitan regions in the US”, in C. Karlsson (ed.), *Handbook of Research on Innovation and Clusters, Cases and Policies*, Edward Elgrave, Cheltenham, pp. 54-79.