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## CALL FOR PAPERS

### « CLUSTERS AS THE DRIVING POWER OF THE EUROPEAN ECONOMY »

*European Clusters Days - 18-19 March, 2015*

#### Clusters and external knowledge linkages:

#### The only solution for survival in the globalisation context?

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**Algoé Consultants** is a management consulting firm, provides assistance to companies, organisations, and local governments so as to deal with their major challenges in terms of governance, performance, and transformation.

**Laure Piquemal** assists the public sector, especially regional authorities, French competitiveness clusters and university and research consortium, to elaborate and deploy their strategies in order to foster innovation and sustainable competitiveness.

#### **Abstract**

This paper will question the traditional rationale of clusters based mainly on the crucial role of geographical proximity and local knowledge, allowing us to introduce the risks of *`cognitive lock-in`* and *`over-embeddedness`* of clusters, which are obstacles to local learning and innovation. While the traditional literature of clusters and industrial districts claimed that geographical proximity is a key driver for production and transfer knowledge processes, this central role of closeness have been questioned since, arguing that knowledge is not only local and that external knowledge can even be valuable to clusters. If globalisation might be seen as a threat limiting, by the entry of Multinational Corporations (MNCs), the specialised knowledge possessed by firms localised in clusters, this *`destructive force`* has been moderated and provides new challenges and answers to clusters. It seems that technological and global economic conditions changes give even more legitimacy to non-local knowledge relations in order to maintain and vitalize the local characteristics of clusters.

2678 words

## **1. INTRODUCTION**

Based on the idea that knowledge externalities are *'in the air'* and can be beneficial to districts firms and not to the one those are outside (Marshall, 1925), the traditional literature of industrial districts or clusters claimed that geographical proximity is a key driver for production and transfer knowledge processes (Beccatini, 1979). This central role of closeness have been questioned since, arguing that knowledge - understood *'as comprising all cognitions and abilities that individuals use to solve problems, make decisions and understand incoming information'* (Daring and Schnellenbach, 2006) - in not only local and that external knowledge can even be valuable to clusters (Boshma and ter Wal, 2007).

While the geography of clusters is in constant evolution, linked to various directions types of innovation, knowledge creation, growth, disclosure or decline (Markusen, 1996), the role of knowledge in the process of growth is crucial. If globalisation might be seen as a threat (Maskell, 1999) limiting, by the entry of Multinational Corporations (MNCs), the specialised knowledge possessed by firms localised in industrial districts or clusters, this *'destructive force'* has been moderated and provides new challenges and answers to clusters (Guerrieri, Iammarino and Pietrobelli, 2001). It seems that technological and global economic conditions changes give even more legitimacy to non-local knowledge relations in order to maintain and vitalize the local characteristics of clusters (Bathelt et al, 2004).

The second section of this paper will question the traditional rationale of clusters and industrial districts based mainly on the crucial role of geographical proximity and local knowledge, allowing us to introduce the risks of *'cognitive lock-in'* (CLi) and *'over-embeddedness'*(OE) of clusters, which are obstacles to local learning and innovation, leading to their decline. The third section will argue on the need for clusters to establish forms of cooperation based on knowledge sharing and transfer from the outside to wrestle with OE and CLi and sterilization of cluster. The fourth section will provide a conclusion.

## **2. COGNITIVE LOCK-IN AND OVER-EMBEDDEDNESS, THE DANGERS OF THE TRADITIONAL RATIONALE'S LIMITS?**

Firms are traditionally clustering for two main reasons that are sources of competitive advantage. In clustering together, firms have an access to a wide range of available resources - agglomeration advantages -, such as specialized inputs, high-skilled specific labour, strong research and high-quality information infrastructures. Moreover, communication with main suppliers is enhancing by the fact that repeated interactions allow

repeated transactions, based on trust and tacit knowledge transfer (Gertler and Wolfe, 2005). Another part of the literature supports that the second competitive advantage for firms located in clusters is their access to local knowledge. This argument is based on the idea that production and transfer knowledge processes occur most easily and effectively among actors located close to each other (Lundvall, 1988; Storper and Venables, 2004). Marshall (1923) was the first one claiming that geographical proximity allowed to observe, to adopt and to adapt new ideas from other individuals or firms in the innovation process. Porter, in line with this strand of literature, assumed that a large share of firm's competitiveness is explained by external factors, dependant on the firm's location and its specific context. He argued that the geographical clustering raises the competition process and thus, the innovative vitality arising from it, by linking the commonalities and complementarities of the cluster, creating externalities (Porter, 2000).

These two competitive advantages create economic relations, with a set of social and institutional characteristics, which are *'complex processes of embedding' that involve trust, reciprocity, loyalty, collaboration and cooperation rooted in place'* (Taylor and Leonard, 2002). This concept of embeddedness is essential to understand the important role of geographical proximity (Storper, 1997) and to clarify the theoretical differences between a cluster and an ID, often used interchangeably, although they are two distinct concepts. While Porter defined a cluster (2000, p.16) as *'a geographically proximate group of interconnected companies and associated institutions in a particular field'*, an industrial district is defined by a homogeneous system of values and a strong influence of the social dimension and has developed networks based on high-trust relationships embedded in social relations, with a high degree of collaboration (Zucchella, 2006).

The role of embeddedness on the economic performance of firms has been demonstrated by a wide range of authors (Taylor and Leonard, 2002). First, trusted and shared-norms relationships reduce opportunistic behaviour and as a result, are more efficient and effective (Putnam, 1993). Moreover, the need of cooperation for Small and Medium Enterprises (SMEs), which lack specific resources, can be filled in by these trusted relationships (Dei Ottati, 1994). It also enhances flexibility and the transfer of knowledge and therefore, the process of learning and innovation (Asheim, 1996). Recent contributions have highlighted the role played by *'local buzz'* (Storper and Venables, 2004) or *'noise'* (Grabher, 2002), referring to the *'information and communication ecology created by the co-presence and co-location of people and firms within the same industry, place or region'* (Bathelt et al., 2004).

However, an increasing awareness saying that this rationale overemphasizes the role of geographical proximity in the knowledge production and transfer between firms has been shared recently among authors (Breshi and Lissoni, 2001; Guilianani and Bell, 2005). Firstly, geographical proximity is not sufficient to explain local knowledge spillovers. A wide variety of others conditions foster the effective transfer of knowledge across and within firms (Breshi and Malerba, 2001). Secondly, others types of proximities are crucial in the knowledge transfer process, such as the cognitive, organizational, social and institutional proximities. If *'geographical proximity per se is neither a necessary nor a sufficient condition for learning to take place'* (Boshma, 2005), proximity can have negative impacts on local learning and innovations (Uzzi, 1997), leading to CLi and OE. According to the embeddedness literature, the OE of a cluster can lead to a risk of CLi, when *'routines in inter-firm relationships obscure the view on new technologies or new market possibilities'* (Taylor and Leonard, 2002, p.29), illustrated by a progressive sterilization of the district or cluster.

The case-study of the Ruhr industrial district illustrates *'the weakness of strong ties'* (Granovetter, 1973) in the process of knowledge production. The Ruhr was the spatial driver of German industrial take-off, via the production of coal, iron and steel. Whereas in the 1950s, this industrial district represented nearly 15% the country's GDP, twenty years later this industrial district faced a severe crisis that can't only be explained by a drop in the demand. A CLi has resulted from intensive personal ties of long standing that limited the recognition of new ideas and opportunities, and impacted the district's adaptability (Grabher, 1993). Instead of shifting to more promising markets thanks to openness to external sources of knowledge, the Ruhr industrial district continued to invest in physical infrastructures innovations in the steel industry, preventing these firms from leaving the coal, iron and steel market. This phenomenon has been called the *'sailing-ship effect'* (Rothwell and Zegveld, 1985), which means that the most important progress to the sailing ship happened after the invention of the steamship, because of strong ties, limiting the perception of innovative insights: *'the initial strengths of the industrial district of the past - their industrial atmosphere, highly developed and specialized infrastructure, the close interfirm linkages, and strong political support by regional institutions - turned into stubborn obstacles to innovation'* (Grabher, 1993, p.256).

Thus, even if local buzz and geographical proximity play an important role in the knowledge and learning processes, few regions rely entirely on their local knowledge to

develop innovative ideas. Thus, it becomes relevant to raise this question: what can be the role of external knowledge linkages in the process of innovation? Under which conditions, external knowledge linkages can be beneficial to clusters?

### **3. EXTERNAL KNOWLEDGE LINKAGES AS AN ANSWER TO COGNITIVE LOCK-IN AND OVER-EMBEDDEDNESS?**

The first argument of this section emphasizes the fact that knowledge is not only local. In order to demonstrate it, it is necessary to explain how the process of knowledge creation and learning, understood as the '*result of interactive processes where actors possessing different types of competencies come together and exchange information with the aim to solve some - technical, organizational, commercial or intellectual - problems*' (Bathelt et al., 2004, p.32), takes place. The simple distinction between '*tacit=local*' and '*codified=global*' knowledge has to be criticised. First, these two types of knowledge are not exclusive but complementary to one another, challenging the argument saying that firms in which codified knowledge is important tend to be less clustered, whereas firms in which tacit knowledge requires face-to-face contacts will need to cluster spatially (Nonaka and Takeuchi, 1995). Secondly, the fact that the most important customers in clusters are local is not universal (Malmerb and Power, 2005). The cluster evolution in Canada has shown that in many successful clusters, a small proportion of the firm's total market is local whereas the most innovative markets are not local (Gertler and Wolfe, 2004).

The Barletta footwear cluster illustrates these assumptions (Boshma and ter Wal, 2007): first, if a strong local network has positive impacts on the innovative performance of the cluster, a limited number of local actors were part of the local knowledge network in the Barletta district. Secondly, firms those have external knowledge linkages brought into this local network non-local knowledge. If in the collective psyche, clusters' decline is explained by this looming globalisation process via the entry of MNCs for example, it also produce positive effects, such as widening cognitive distance within the network and avoiding lock-in effects (Zucchella, 2006). And even if proximity relationships are still a condition for clusters to stay innovative and keep their competitive advantage, external knowledge linkages are crucial for fostering '*local buzz*' (Belussi and Asheim, 2003).

Secondly, we need to understand under which conditions external knowledge can be beneficial to clusters and industrial districts in the process of innovation. Different kinds of external knowledge linkages can be mobilized by clusters. First of all, global pipelines,

referring to '*channels of communication used in distance interaction, between firms in clusters and knowledge-production centres located at distance*' (Gertler and Wolfe, 2005), can stimulate innovation and new ideas within the cluster or the industrial district. It is seen as one of the answer of CLi, establishing non-local networks (Asheim and Isaksen, 2002). One potential global pipeline can be university linkages. The case-study of Twente in the eastern Netherlands illustrates how the University of Twente, through its own external knowledge linkages can revalorised an old industrial clothing district suffering from lock-in and decline. Since the end of the 50's, the Twente industrial district suffers from the beginning of the market's opening and the increased competitiveness in the clothing sector (Lambooy, 1995). The University of Twente has played a crucial role in encouraging local buzz with the Twente industrial district, via the creation of '*a technology-transfer office (1979), an incubator unit (1982), student entrepreneurship schemes (1985), knowledge circles (1990), regional venturefunds (1996), an open innovation centre (1997) and a technology accelerator (2003)*' (Benneworth and Hospers, 2007, p.787). Within a dysfunctional cluster, the access to global pipelines via the University of Twente has helped the cluster to re-invent itself and being competitive again. Universities can foster regionally and even nationally innovations, through students and employees knowledge networks, improving the value of knowledge transmitted within the industrial district.

Then, the role played by MNCs as knowledge infrastructure, in the knowledge governance model and the innovative performance of cluster and industrial district, is crucial. One of the main visible aspects of globalisation was the '*territorial fragmentation of the previous local value chain*' (Belussi and Asheim, 2003) that was locally bounded before the emergence of the globalisation process. As a result, the knowledge production and transfer processes are not anymore constrained spatially. In another hand, the number of FDI into clusters has increased. MNCs have certainly an interest of '*plugging into existing pools local production knowledge*' (Lorenz and Mahnke, 2002), such as clusters and industrial districts, because through this process, they are able to access and use outside strategic knowledge (Enright, 1998). This reciprocal process of delocalisation or spatial relocation permits local agents to avoid CLi due to OE in the industrial district. The case of the Montebelluna district, specialised in sport shoes, illustrates very well this argument. The process of globalisation started in the middle of the 80s with the intensification of FDI and the entry of MNCs, exporting about 70-80% of the ski boots production. However, this process has not led to a long term unemployable situation. On the contrary, entry and exits

processes were happening at the same time. The aim of MNCs was to tap local and technological capabilities related to ski boots production, via both tacit and codified types of knowledge. Local firms used these external sources of knowledge in order to access the '*pedestrian resources*' - such as logistic and managerial skills, marketing, communication and coordination abilities -, that can be seen as necessary conditions for sustaining local knowledge production (Belussi and Asheim, 2003). However, few authors have been more critical about this process and its impacts on the knowledge production and transfer processes (Bair and Gereffi, 2001; Lipsey, 2004). They showed that the impacts on districts and clusters are heterogeneous because it always depends on the nature of the MNC, the stage of the cluster life-cycle, the quality and intensity of linkages established, more than its quantity.

Finally, the role of global production networks (GPN) that integrate their '*dispersed supply and customer bases of a network flagship, that is, its subsidiaries, affiliates and joint ventures, its suppliers and subcontractors, its distribution channels and value-added resellers, as well as its R&D alliances and a variety of co-operative agreements*' (Guerrieri, Iammarino and Pietrobelli, 2001, p.137) is essential. It permits to encompass a wide variety of network actors, including a diversity of value chain steps, linking both intra- and inter-firm relationships, and creating a knowledge creation and diffusion '*virtuous circle*' at the international scale. The Silicon Valley example is a well-known case of how the GPN is fundamental in order to diversify and upgrade an initial cluster and being able to face the technological trajectories and global economic conditions change (Sturgeon, 2003).

To conclude this section, functioning clusters are the one able to build and organize a wide range of channels, in order to access and use outside and relevant knowledge (Barthelt et al., 2004). As, geographical proximity still matters, there is a sensitive trade-off - a '*theoretical optimum*' (Zucchella, 2006) - to reach between embeddedness/local knowledge base and the need of external knowledge linkages.

#### **4. CONCLUSION**

If globalisation is a powerful driver of destabilization and change for clusters and industrial districts, it also tends to multiply opportunities in order to re-invent themselves (Gereffi et al., 2005) and to foster a variety of logics of exchange and transfer of knowledge in order to promote innovation, widen cognitive distance and weakness lock-in processes. Self-sufficient local systems are over and clusters need to establish forms of cooperation,

reciprocal relationships based on knowledge sharing and transfer from the outside to adapt themselves to the technological trajectories and global economic conditions evolutions. If the role of geographical proximity still matters, local knowledge production and global channels of knowledge production are complementary not substitute. However, if the differentiation between codified and tacit knowledge will impact the needs of local knowledge-production and global pipelines (Nonaka and Takeuchi, 1995), it also depends on the territorial needs in capabilities and skills in order to translate this outside knowledge within the internal cluster knowledge' basis (Gertler and Wolfe, 2005). The context-specific characteristics of a cluster highlight the importance of qualitative - more than quantitative - external knowledge linkages. Cognitive lock-in is always a danger, even if the cluster develops external linkages. The quality of these latter is crucial in the process of learning and innovation. Moreover, despite the recent contributions of authors on the role of external knowledge, there is still a lack of empirical evidence (Gertler and Wolfe, 2005), showing the role of external knowledge linkages as a source of innovation and dynamism in industrial districts and clusters and as a complement as the '*local buzz*', showing that this field is still far from being fully explored.

## 5. BIBLIOGRAPHY

Amin A., (1993) The globalisation of the economy: an erosion of regional network?, in, Grabher G. (ed.), *The Embedded Firm. On the Socioeconomic of Industrial Networks*, Routledge, London.

Asheim, B.T. (1996) Industrial districts as 'learning regions': a condition for prosperity. *European Planning Studies* 4, 379-400.

Asheim, B.T., Gertler, M.S. (2005) The geography of innovation: regional innovation systems, in J. Fagerberg, D. Mowery and R. Nelson (eds) *The Oxford Handbook of Innovation*. Oxford: Oxford University Press.

Asheim, B. T., Isaksen, A. (2002) Regional Innovation Systems: The Integration of Local 'Sticky' and Global 'Ubiquitous' Knowledge. *Journal of Technology Transfer* 27: 77-86.

Bathelt, H., Malmberg, A., and Maskell, P. (2004) Clusters and knowledge: local buzz, global pipelines and the process of knowledge creation, *Progress in Human Geography*, 28:1, 3 1-56.

Becattini, G. (1979) Dal settore industriale al distretto industriale. Alcune considerazioni sull'unita di indagine dell'economia industriale. *Rivista di Economia e Politica Industriale* 5(1): 7-21.

Belussi, F and Asheim B, (2003) Industrial districts and globalisation: learning and innovation in local and global production systems, Paper presented at the conference on 'Clusters, Industrial districts and firms: the challenge of globalization', Modena, Italy. September 12-13, 2003.

Benneworth, P.S., Hospers, G.J., Jongbloed, B. (2006) 'New economic impulses in old industrial regions: the role of the University of Twente in regional renewal' in A Prinz, AE Steenge and J Schmidt (eds) *Innovation: technological, economic and institutional aspects*, Lit Verlag, Münster.

Bair J., Gereffi G. (2001) Local clusters in global chains: the causes and consequences of export dynamism in Torreon's blue jeans industry, *World Development*, Vol. 29, No.11.

Boschma, Ron A. (2005) Proximity and Innovation: A Critical Assessment, *Regional Studies*, 39(1): 61-74.

Boschma, R. A. and ter Wal A. L. J. (2007) Knowledge networks and innovative performance in an industrial district: the case of a footwear district in the south of Italy, *Industry and Innovation*, 14: 177-99.

Breschi, S. & Lissoni, F. (2001) Knowledge spillovers and local innovation systems: A critical survey. *Industrial and Corporate Change*, 10(4), 975-1005.

Breschi, S., Malerba, F. (2001) The geography of innovation and economic clustering: some introductory notes, *Industrial and Corporate Change*, 10:4, 817-33.

Dei Ottati, G. (1994) Co-operation and competition in the industrial district as an organizational model. *European Planning Studies*, 2, 463-485.

Döring T. and Schnellenbach J. (2006) What do we know about geographical knowledge spillovers and regional growth? A survey of the literature, *Regional Studies* 40(3), 375-395.

Gereffi, G., Humphrey, J., Sturgeon, T. (2005) The governance of global value chains. *Review of International Political Economy*, 12: 78-104.

Giuliani, E., Bell, M., (2005) The Micro-Determinants of Meso-level Learning and Innovation: Evidence from A Chilean Wine Cluster. *Research Policy* 34 (1).

Grabher, G. (2002) The Project Ecology of Advertising: Tasks, Talents and Teams. *Regional Studies*, 36 (3), 245-262.

Granovetter, M., (1973) The Strength of Weak Ties. *American Journal of Sociology*. 78:6, pp. 1360-380.

Granovetter, M. (1985): Economic action and social structure: The problem of embeddedness. *American Journal of Sociology* 91,481-510.

Guerrieri P., lammarino S., and Pietrobelli C. (2001) *The Global Challenge to Industrial Districts: Small and Medium-sized Enterprises in Italy and Taiwan*, Edward Elgar, Cheltenham.

Lambooy, J. (1995), *Regionale economische dynamiek: een inleiding in de economische geografie*, Countinho, Bussum.

Lipsey R., (2004) Home- and Host-Country Effects of Foreign Direct Investment, in Robert E. Baldwin and L Alan Winters, Editors, *Challenges to Globalization*, Chicago, University of Chicago Press, forthcoming.

- Lundvall, B-Å. (1988) Innovation as an interactive process - from user-producer interaction to national systems of innovation. In *Technical Change and Economic Theory*, eds G Dosi, C Freeman, R Nelson, G Silverberg and L L G Soete, pp. 349- 367.
- Malmberg, A. and Power, D. (2003) How do (firms in) clusters create knowledge? Paper presented at the DRUID Summer Conference, Elsinore, Denmark, June 12-14. [Available at [http://www.druid.dk/conferences/summer2003/Papers/MALM\\_BERG\\_POWER.pdf](http://www.druid.dk/conferences/summer2003/Papers/MALM_BERG_POWER.pdf)]
- Markusen, A. (1996) Sticky places in slippery space: A typology of industrial districts. *Economic Geography*, 72 (3): 293-313. Marshall, A. (1923) *Industry and Trade*, 4th ed. London: Macmillan.
- Marshall, A. (1925) *Principles of economics*, 8th ed. London: Macmillan.
- Maskell, P. (1999) Globalisation and industrial competitiveness: The process and consequences of ubiquitousness, in Malecki, E. & P. Oinas (eds.), *Making Connections: Technological learning and regional economic change*, Ashgate, Aldershot, 35-59.
- Nonaka, I., Takeuchi, H. (1995) *The Knowledge Creating Company*. Oxford: Oxford University Press.
- Porter, M. E. (2000) Location, Clusters, and Company Strategy. In G. Clark, M. Feldman and M. Gertler (Eds.) *Oxford Handbook of Economic Geography*. Oxford University Press, Oxford, pp. 253-274.
- Putnam, R.D. (1993) *Making democracy work: Civic traditions in modern Italy*. Princeton: Princeton University Press. Rothwell, R., Zegveld, W. (1985) *Reindustrialization and technology*. Armonk, N.Y.
- Storper, M. (1997) *The regional world. Territorial development in a global economy*. New York: Guilford Press.
- Storper, M., Venables A.J. (2004) Buzz: face-to-face contact and the urban economy. *Journal of Economic Geography*, 4(4), 351-370.
- Sturgeon, T. (2003) What really goes on in Silicon Valley? Spatial clustering and dispersal in modular production networks, *Journal of Economic Geography*, 3, pp. 199-225
- Taylor, M., Leonard, S. (2002) 'Approaching 'Embeddedness'', in Michael Taylor and Simon Leonard (eds) *Embedded Enterprise and Social Capital: International Perspectives*, pp. 1-18. Burlington, VT: Ashgate.

Uzzi, B. (1997) Social structure and competition in interfirm networks: the paradox of embeddedness, *Administrative Science Quarterly*, 42(1) pp. 35-67.

Wolfe, D.A. and Gertler, M.S. (2004) Clusters from the inside and out: insights from the Canadian study of cluster development, *Urban Studies*, 41:5/6, 1071-93.

Wolfe, D.A. and Gertier, M.S. (2005) Spaces of Knowledge flows: clusters in a global context. Paper presented at the DRUID Tenth Anniversary Summer conference on Dynamics of Industry and Innovation; Organizations Networks and Systems. Copenhagen, June 27-29, 2005.

Zucchella, A. (2006) Local cluster dynamics: Trajectories of mature industrial districts between decline and multiple embeddedness. *Journal of Institutional Economics*, 2(1), 21-44.