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Innovation networks and local and regional development policy

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Introduction

Localized innovation networks are related to the advantages of geographical agglomeration, in which spatial proximity facilitates the generation of externalities and localized learning processes critical to local and regional development. The role of agglomeration in the innovation networks is epitomized by notions of industrial district, cluster and milieu innovateur. These territorial innovation models highlight the particular territorial conditions that promote localized knowledge generation and diffusion through networks of innovative firms, universities and other institutions.

However, there are arguments concerning the effectiveness of distant networks in the creation and diffusion of knowledge (Oinas, 2000; Boschma, 2005; Torre and Rallet, 2005) as a result of the increasing use of ICT and lower transport costs that enable the effective operation of powerful communities of practice (e.g. engineers, entrepreneurs, computer experts, etc.) across space. Distant networking has been crucial for producing new knowledge and innovation. Production networks are often multi-scalar, ranging from local to global and the other way around (Dicken and Malmberg, 2001). Therefore, we may ask if non-geographically bounded innovation networks imply different local and regional policies.

On the other hand, the absence of a clear understanding of different types of knowledge enrolled in the innovation process has been a constraint to design adequate innovation regional policies. According to Asheim and Gertler (2005), certain types of knowledge travel more easily across space than others. In fact, analytical knowledge type (know why) is essential codified knowledge, highly abstract and universal and to a certain extent less sensitive to spatial context when compared with synthetic (know how) and symbolic (know who) types that travel less easily because tacit knowledge is more relevant (especially on the symbolic type) and as a result both show certain levels of discrepancy between places. Considering that sectoral differences are related with distinct knowledge types it is quite clear that policy response needs to address these differences and respond effectively to firms and institution needs.

Current perspectives on regional innovation systems (Cooke, 1992; Cooke and Morgan, 1998) became the benchmark for innovation policy at regional level in a way complementary to the cluster approach. Both perspectives identify geographical proximity as a key...
element on the innovation process at regional level. The regional innovation system (RIS) perspective has been very influential in the policy design of important organizations such as the OECD and the European Commission. The EU innovation policy is based on the RIS and therefore addresses the knowledge transfer university-firm, IPR, training, local and regional partnerships and alliances, as well as traditional mechanisms centred on incentives systems, venture capital, etc. Nevertheless, we argue that local and regional policy has to focus on local-distant networking and encompass different actions on knowledge ‘pipelines’ (Bathelt et al., 2004), knowledge mobility and anchoring, and institutional development, which have to be coherent with the dominant knowledge types of each innovation network.

This chapter discusses precisely the adequacy of local and regional development policies to support innovation networks at regional level considering the globalizing economic world and the easier access to certain knowledge types, questioning the cluster-type policy orientation and the limitations of Regional Innovation Systems policy instruments. First, we review theoretical debate about the role of space in knowledge creation and why and how firms combine local and distant knowledge sources considering the implications of the global economy and the knowledge creation processes to localized innovation networks. Second, we examine the local and regional policy-relevant literature concerning knowledge and innovation in the region emphasizing the cluster and RIS policy orientations. Finally, we point out new directions to regional knowledge dynamics and innovation in multi-scalar spaces of innovation networks.

**Space, knowledge and innovation networks**

Innovation is a key element on the regional economic development. It is also a social process in the sense that it relates to capital, labour and the state, whose actors’ interactions are precisely the basis of geographical inequality (MacKinnon et al., 2009). Therefore, innovation isn’t immune to capital accumulation dynamics, labour relations and institutions. Knowledge is a fundamental input to innovation and regional economic growth. Knowledge and innovation have a determinant role on the introduction of new products to the market, new production processes and organizational practices that are critical to the competitive advantage of firms and regions (Feldman and Stewart, 2006). However, the innovation network is perhaps the most relevant element to understand the innovation dynamics in a region:

innovation is an emergent process based on gradually introduction interactions that link agents, knowledge, and goods that were previously unconnected, and that are slowly put in a relationship of interdependence: the network, in its formal dimension, is a powerful tool for making these connections.

(Amin and Cohendet, 2004: 153)

Hence, the localized innovation systems have captured the attention of economists, geographers and regional scientists where proximity and relatedness of agents have been considered essential to understand their success. The industrial district (Bagnasco, 1977; Becattini, 1987), clusters (Porter, 1990, 1998) and milieu innovateur (Aydalot, 1986; Camagni, 1991) approaches illustrate the role of the industrial agglomeration and the innovation networks in localized systems. These theoretical underpinnings highlight the particular territorial conditions that promote localized knowledge generation and diffusion through networks of innovative firms, universities and other institutions (Antonelli, 1999; Cooke, 1996; Peck, 2003; Moulaert and Sekia, 2003; Amin and Cohendet, 2004). Although there are relevant differences among
these theories of localized innovation, one can identify a common claim of prominence of tacit knowledge and localized learning. This particular type of knowledge and the intense local learning process cannot exist beyond the agglomeration of economic activities and institutions even in a globalized era:

What is not eroded, however, is the non-tradable/non-codified result of knowledge creation – the embedded tacit knowledge – that at a given time can only be produced and reproduced in practice. The fundamental exchange inability of tacit knowledge increases its importance as the globalization of business markets proceeds. [...] the more easily codified (tradable) knowledge is accessed by everyone, the more crucial does tacit knowledge become in sustaining or enhancing the competitive position of the firm.

(Maskell and Malmberg, 1999: 16)

Precisely, the cluster approach illustrates the relevance of spatial proximity to firms’ competitiveness, as well as the organizational and productive structures that are essential to the cluster performance (Porter, 1998). Although social relations do not appear to be relevant in the theory, the innovation processes show intense local networking at least in the cases of high technology clusters, like Route 128 and Silicon Valley (Saxenian, 1991), involving suppliers and customers, all playing a crucial role in new ideas and technology development. Furthermore, highly specialized workers pool and local institutions favour knowledge generation and innovation dynamics in the cluster (Glasmeier, 1988).

The Marshallian industrial district generates localized knowledge that relies on the social relations, local labour market mobility and the local and regional institutions and, in this sense, the innovative agglomeration is a socio-territorial entity which is composed by a community of individuals and a set of firms both interrelated (Becattini, 1987). Social capital, trust and local actors’ networks are the foundations of the industrial district, where untraded knowledge flows stimulate collective learning processes. The benefits for the local producers arise from the localized externalities which constitute a common good to entrepreneurs, like the existence of local labour market skills and competences that evolved largely based on localized learning processes. The collaboration and cooperation among local actors is another specific element of the industrial district organization, as well as the relative high number of spin-offs that consolidate the local innovative agglomeration capabilities.

More important than innovative isolated firms is the local network of actors and institutions to support knowledge creation and use and localized learning processes that are critical to the agglomeration as a whole. This is quite evident on the GREMI’s innovative milieu perspective where firms benefit from strong institutions’ interaction to provide the right infrastructure and especially the adequate environment to sustain collective learning processes and the reduction of firms’ risk and uncertainty (always inherent to an innovation process) (Camagni, 1991). The geographical outcome is a mosaic of competing and differentiated innovative regions with poor inter-regional mobility of knowledge since its generation and use is context specific and developed through localized social interactions (Crevoisier and Jeannerat, 2009).

Recently, the spatial proximity role on the knowledge and dynamics innovation has been contested by several authors that claim substantial changes occurred on the process of how firms and regions develop their knowledge and innovation strategies. Hence, arguments concerning the effectiveness of distant networks in the creation and diffusion of knowledge have been put forward (Amin and Cohendet, 2004; Boschma, 2005; Torre and Rallet, 2005). There are three reasons commonly stated to sustain the claim. The first one refers to the increasing use of ICT and lower transport costs that allow for the...
increasing mobility of capital and people and the effective operation of powerful communities of practice (e.g. engineers, entrepreneurs, computer experts, etc.) across space. Second, the growing importance of knowledge in the creation of economic value compels firms and institutions to seek outside their limits relevant knowledge to generate innovation and strengthen competitive advantage in the international and national markets, especially because innovation processes are increasingly more complex (Feldman and Stewart, 2006). Third, socio-cultural dynamics become more central in innovation and therefore interactions between firms and customers are more important (Grabher et al., 2008) and consequently symbolic knowledge is required to produce and sell new products and services in several industries (and not only consumer-end industries).

These changes are not a clear sign of the dismissal of proximity learning processes, however. According to Morgan (2004), three reasons can be put forward against the dichotomy proximity vs. distant learning. First, the organizational and social learning has always been related with geographical proximity, since the latter operates through the former type of proximity. Second, distant networking hardly replaces trust, stability and richness of close relations – like face-to-face contacts. Third, the benefits of local buzz cannot be fully replaced by the professional communities of practice; otherwise the geography of innovation would be less spatially concentrated.

Although spatial proximity is extremely important to innovation networks, distant networking aiming at the production of new knowledge and innovation is emerging and allegedly “successful clusters are the ones that are able to build and maintain a variety of channels for low cost exchange of knowledge within relevant hot-spots around the globe” (Bathelt et al., 2004: 33). The cluster external communication channels are called ‘pipelines’ and can take the form of different sorts of organizational arrangements, such as strategic partnerships, communities of practice, projects, temporary clusters, etc. Examples of multi-local innovation systems range from more traditional industries – see Uzzi (1996) about the New York garment industry or Vale and Caldeira (2007 and 2008) on the footwear-fashion innovation networks – to creative industries (Scott, 2002; Grabher, 2002) and high technologies (Owen-Smith and Powell, 2004; Fontes, 2005). These local-distant networks are not confined only to Europe or North-America. In fact, North-South evidences on automobile industry related with flex-fuel technologies indicate knowledge networks irradiate from São Paulo (Brazil) and involve large system producers like Robert Bosch, Magneti Marelli and Delphi which develop further networks with OEMs, bio fuel producers, suppliers and research institutes (Van Winden et al., forthcoming). On a different angle, Coe et al. (2003) refer to the transnational elite professionals from South-East Asia moving repeatedly around the globe through the East Asia–Vancouver/San Francisco corridor, thus articulating “South” and “North”.

To a certain extent, distant networking does not go up against local relations; on the contrary it complements firms’ local networks with distant relations, particularly in the initial stages of cluster formation, although distant networking may avoid lock-in effects on later stages (Bathelt et al., 2004). As Mackinnon and Cumbers (2007) suggest, local buzz and global pipelines reflect the complementary rather than contradictory nature of localization and globalization processes. Therefore the argument illustrates a rather peculiar combination of local and non-local learning processes underlying both geographical and organizational proximities in the learning processes of cluster-based firms and institutions (Amin and Cohendet, 2004).

Thus the question is to know if distant networking may replace co-location, local buzz and tacitness of certain types of knowledge in the clusters (Storper and Venables, 2004). In other words, are the agglomeration
advantages to local firms less relevant in a globalized and highly integrated economic world? Do vibrant local agglomeration with a proliferation of activities and events relevant to learning processes of actors in the cluster get replaced by more efficient distant networking to access new knowledge and increase firms competitiveness? Asheim and Gertler (2005) shed some light on these complex and rather arguable claims. According to the authors, the answer may be found on the type of knowledge that firms are generating and using to develop new products and services or to achieve innovative organizational processes. Therefore the adequate questioning is under what circumstances distant networking is likely to be more effective on firms’ learning processes or on the contrary what may prevent these forms of distant learning?

According to Asheim and Gertler (2005), the three primary types of knowledge are analytical knowledge (know why), synthetic knowledge (know how) and symbolic knowledge (know who). The first one travels across space more easily than other types of knowledge since it is highly codified through IPR, published papers, etc. and it is relatively universal and available across regions and cities. Synthetic knowledge is about solving problems and is interactive learning oriented. Both codified and tacit knowledge are relevant to the firms and therefore it is more sensitive to space. The symbolic knowledge type is clearly an outcome of creative processes and for that reason it is very much place specific due to cultural and social-specific context that affects this type of knowledge creation. Hence, the types of knowledge may be related with sectoral knowledge bases, for instance, pharmaceuticals industry and analytical knowledge, mechanical engineering and synthetic knowledge and design and cultural production and symbolic knowledge. Precisely, Gertler (2008) shows that synthetic and symbolic forms of knowledge are less amenable to distant learning. Currently, the platform nature of new technologies – like clean technology (Cooke, 2008) – illustrates the increasing significance of combinatorial knowledge which tends to merge analytical, synthetic and symbolic knowledge and thus goes beyond the classical sectoral cumulative knowledge nature.

To a certain extent it seems evident that proximity and distant networking are not opposing categories, as it is evident that the type of knowledge being mobilized affects the geographical spread of the firms and institutions networks. As innovation is a social process, learning is based on interaction of myriad actors, often in the same geographical bounded space (the cluster, the industrial district, the innovative milieu). However, production networks – and we may add knowledge networks – are often multi-scalar, ranging from local to global and the other way around (Dicken and Malmberg, 2001; Coe et al., 2004; Yeung, 2009), especially if different types of knowledge are being used to produce a new product or deliver a new service, allegedly giving rise to a multi-local production system through the articulation of different local production systems (Figure 34.1) (Crevoisier and Jeanneret, 2009).

### Innovation and territorial development policies

In 2000, the Lisbon agenda aimed at a growth improvement through innovation, employment and social integration in the EU. Innovation policies were initially influenced by the linear innovation model principles but moved slowly to a more integrated approach. Accordingly, in the early 1990s the innovation policy stressed the RTD investment and expenditure, while currently it embraces start-up support, venture capital, technology transfer, etc.

At the same time, the territorial dimension of innovation policy has emerged in association with the regionalization process in Europe (Seravalli, 2009). The regional innovation system approach highlights the
territorial innovation networks, in which firms’ innovations depend on the “quality of ‘home-base’ institutions that act as a collective resource for both technological and non-technological innovation and learning” (Amin and Cohendet, 2004: 87). Accordingly institutional capacity of regions plays a central role in the innovation process, of which science and technology institutions, education and training organizations, entrepreneurial associations, and financial organizations (like venture capital) have been considered extremely relevant to regional innovation performance. The RIS approach argues that collective learning is critical to stimulate innovation in the region, since it is an interactive and cumulative process in which firms play a central role in the system, though they depend on other regional institutions to exchange and exploit different kinds of knowledge (basic/applied, generic/specific, tacit/codified) (Tödtling and Kaufmann, 1999). Furthermore, knowledge dynamics and collective learning are path dependent, reflecting the past options and technological trajectories of regional agents to the present and future innovation outcomes (Krugman, 1991).
Among several RIS in Europe (Braczyk et al., 1998), the Welsh pioneer case stands as a good example in the EU. The restructuring process of Welsh economy was supported by the EU through the RITTS (Regional Innovation and Technology Transfer Strategy for the South Wales) and RTP (Regional Technology Plan) (Morgan, 1997). However, some criticisms of RIS can be found in the literature of regional development. In general, authors point out the limits of localized learning to the regional development process (Hudson, 1999), the tendency to give ex-post rationality to the regional innovation system policies (Lovering, 1999) and the bounded region concept which does not encapsulate the multi-local nature of knowledge dynamics.

Besides the RIS approach, cluster theory is another dominant policy framework on innovation and regional development. Actually, it has become a central component of regional development strategy in several EU countries, reflecting endogenous development aims in combination with innovative activities, often centred on high and medium-high technology firms and support institutions (Burfitt and Macneill, 2008). Cluster policy has been a major policy framework to promote innovation in the regions (Martin and Sunley, 2003) and eventually became a dominant paradigm to which regional authorities cannot escape since Porter’s (1990) seminal work. Although it is not a straightforward concept, the cluster stresses the role of firms networking to generate and disseminate innovation in the regions and therefore “cluster policy emerged as a prominent economic development approach in numerous regions in Europe and beyond” (Burfitt and Macneill, 2008: 493).

Clusters include clients, suppliers, support industries, associated institutions and also competitors in a particular economic activity. These spatial agglomerations of related industries have been considered central to improve competitiveness of firms, regions and even nations due to transaction cost advantages and specialized inputs and their potential to generate dynamic learning effects through knowledge spill-overs, spin-offs, and higher rates of firm formation which have obvious benefits for the regional economies (Tödtling, 1999; Burfitt and Macneill, 2008). However, cluster policies have been in many ways vague and did not generate real positive effects in the regional economy. One of the reasons for this outcome results from a certain conceptual misunderstanding related to types, processes and spatial scale (Martin and Sunley, 2003). Moreover, the conceptual issues obstruct clear and realistic cluster policies and strategies formulation. In fact, this imprecision “generates arbitrary outcomes as policymakers struggle with imprecision and ambiguity at various stages of cluster policy development” (Burfitt and Macneill, 2008: 495).

Difficulties start early on with cluster selection and delimitation. As a matter of fact there is no metrics or rigorous NACE code-based analysis to identify a cluster (Martin and Sunley, 2003). Complications continue with the actors and organizations identification and/or new institutions formation that operate as active changing agents in the cluster and may design and implement new policies at cluster level (Cumbers and Mackinnon, 2004). Often an existing cluster’s actors tend to be supported leaving behind emergent actors in the cluster.

Although cluster policies may be positive in specific cases, there is a risk of considering the approach as a solution for regional economic development. The lack of firm cooperation, the dominance of certain actors or firms, the limited institutional autonomy are constraints to cluster policy implementation which are not always considered by unwary policymakers (Burfitt and Macneill, 2008). Moreover, cluster policy strengthens local relations among the cluster actors which have been considered fundamental to promote innovation in the regional economy and quite often doesn’t address properly the distant relations and global economic integration.
Hence, we discuss in the next section some critical policy orientations to promote innovation networks and regional development.

**Local and distant innovation networks and regional development policies**

In this section we point out some new directions to regional development policies in multi-scalar and multi-local spaces of innovation networks. Innovation systems approach has encapsulated a large part of the concepts discussed above. However, we claim that changing economic environment, producer–consumer relations and local and distant interrelations demand new policy orientations. The types of knowledge and its generation and use are much differentiated among regions and sectors. Knowledge dynamics have become more and more dependent on actors’ interactions, whether they are firms, enabling organizations, clients or suppliers, and consequently knowledge networks have evolved at an extraordinary rate, changing the regional innovation models and entailing new policy orientations.

Recently, in the context of the Barca Report (2009), Farole et al. (2009) distinguish region competences at European level and point out some directions to different region types. According to the authors, innovation policies via the Lisbon agenda are better suited to core regions and regions adjacent to the European core that are on or near the technology frontier and where agglomeration forces make a difference. However, the ‘picking winners’ policy risks forgetting other regions and hampering their participation in the knowledge economy (Asheim et al., 2007). These regions also have available resources that may be useful to economic development through adequate policy action.

The different regional capabilities ask for specific innovation policies although this doesn’t imply necessarily ‘uniqueness’ policies, especially in the cases of least developed regions where innovation and learning may benefit from the adoption of technologies from elsewhere (Lagendijk, 1999). Nevertheless, economic growth increasingly depends on the region innovation networks and its ability to reach distant innovative places and establish durable relations with other actors. The distant relations may support knowledge inflow in the region but in order to generate collective benefits it is necessary to anchor new knowledge in the region (Tödtling, 1999). Anchoring entails the local contextualization of new knowledge and learning through the local interdependencies of firms and institutions (Crevoisier and Jeannerat, 2009). Put simply, knowledge base, firms’ networks and institutions are the starting point to design an adequate and consistent regional innovation strategy and policy.

Copying ‘best practices’ and successful models from elsewhere has often limited outcomes and too often drains important public resources, as can be illustrated by many science and technology parks or elusive cluster-building strategies, particularly in peripheral regions. Moreover, most successful examples are based on localized non-transferable regional assets that simply cannot be dislocated, as it is the example of localized untraded interdependencies (Storper, 1995). On the contrary, regional policy based on related variety may be more effective in developing innovative activities related to existing sectors, encouraging knowledge spill-overs (Asheim et al., 2007). Hence, innovation networks may well combine local and non-local knowledge to reinforce innovation dynamics via increasing variety (even if some less competitive firms are destroyed throughout the process) (Boschma and Frenken, 2006).

The authors infer that spin-offs may be more enduring than other new entrants in the regional economy since this type of innovative firm will build upon existing...
regional knowledge and therefore may well foster the regional innovation networks. Labour mobility across sectors and firms in the regions is another crucial area of regional policy, because knowledge circulation and collective learning depend heavily on skills transfer between sectors and firms (Antonelli, 1999). Although regional assets are a basis to design an adequate regional development policy, a solely regionally bounded perspective has limitations (Pike, 2007). As mentioned above, knowledge circulation through distant innovation networks has strong benefits for the regional economy when there is a regional anchoring capacity to absorb and use collectively new knowledge acquired elsewhere. The related variety policy approach has necessarily to encompass this type of concern and avoid innovation policies based exclusively on the region itself.

Cooke (2008) has suggested that a policy platform approach might overcome traditional limitations of sectoral and cluster innovation policies and include the related variety and long distant innovation networks concerns. According to Asheim et al. (2007: 24–25), the platform approach “represents a strategy based on related variety, which is defined on the basis of shared and complementary knowledge bases and competences”. Policy response should promote those activities that may benefit from the local and regional skills and competences where cognitive proximity between existing and emerging activities may benefit the region’s economic development. External knowledge sources connections, particularly specific knowledge sources, may be positive for local firms and the region may even benefit from knowledge spill-overs and thus reinforce innovation networks in the region. As Asheim et al. (2007) mentioned in a recent paper, “constructing regional advantage” requires a new perspective on regional policy in which regional actors should build external networks to access new critical knowledge to foster a region’s related variety and increase the combinatorial and complementary knowledge (keeping in mind the differentiated spatial friction upon the mobility of different knowledge types).

Typically, the platform policy approach is not immune to risks and even failure. The regional knowledge anchoring capacity is essential to avoid the hollowing out of localized knowledge systems. Obviously we refer to the process of local and regional competences and skills draining by the “pipeline” due to the usually strong attraction of external innovative agglomerations or as the result of uneven relations between local and external actors, although we cannot ignore power relations in inter-firm interdependencies even at regional level (Christopherson and Clark, 2007). Innovation’s goal is to promote local and regional economic development; consequently knowledge connections require an integrated public policy because innovation networks are about both flows and agglomerations, meaning that both accessing and anchoring knowledge processes are critical to the regions’ innovation dynamics. Regional success is closely related to local institutions’ ability to articulate capital, labour and state interrelations within a local-distant interplay, but also with their capacity to disseminate knowledge in the region and ensure that benefits from knowledge inflow disseminate among actors to achieve collective gains at regional level.

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References


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Further reading

Asheim, B., Boschma, R. and Cooke, P. (2007) “Constructing regional advantage: platform policies based on related variety and differentiated knowledge bases”, Papers in Evolutionary Economic Geography, 0709, University of Utrecht. (Explores new avenues on regional development policies in the construction of regional advantage supported by the idea of platform policies based on related variety and knowledge bases.)


