Clusters and networks as learning devices for individual firms

Evert-Jan Visser and Ron Boschma

Utrecht University
Faculty of Geographical Sciences
Department of Economic Geography
PO Box 80115
3508 TC Utrecht
The Netherlands

Email:

e.visser@geog.uu.nl
r.boschma@geog.uu.nl

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Introduction

Knowledge, learning and innovation are increasingly critical to the economic performance of firms, regions and nations. Learning is often observed to be confined to specific regional settings, inducing the level and pace of innovation-driven economic development to differ across regions. The relation between learning and regions has been subject to discussion in regional economics and economic geography (cf. Boschma 1999, Maskell 2001, Cooke 2001, Keeble and Wilkinson 1999). This literature stresses the importance of social capital, the institutional context—in its double role of directly providing stimuli or constraints to innovative behaviour and influencing the intensity and nature of interaction between parties, and learning by interaction—between firms and organizations (Boschma 1999: 339). Regions matter because differences in social (capital) and institutional endowments influence the intensity and nature of interaction, spatial proximity enhances collective learning (Camagni 1991, Capello 1999) and localized capabilities may exist, based on place-bound, tacit knowledge and cognitive structures (Maskell and Malmberg 1999). Hence, there are direct and indirect relations between regions, learning and innovation.

These explanations fall short of analytical precision, however. Often, the argument runs from structural regional endowments (a common culture, social capital, structural trust, institutional proximity and effectiveness), via intermediary processes (enhanced interaction, sharing of information, co-ordination of practices, feedback of results, and other forms of B2B co-operation) to the dependent variable: the innovative performance of (firms in the) regions. The precise mechanisms, constraints and risks of these processes remain unclear, while in reality some regions suffer from lock-in whereas others are platforms of excellence. It is hard to predict what makes the difference, what makes a ‘learning region’ tick and what causes another region to become a one more case of lock-in.

We propose two steps to remedy this situation. One is to use cognitive theory to deepen our understanding of the learning process; the other is to relate this process with various region-specific external organisational contexts of firms: clusters, networks and industrial districts. We may thus disentangle the issue of how learning is enhanced in specific regional contexts, considering cognitively different steps in the learning process in the light of the various information exchange and knowledge generation effects produced in these contexts. Regional settings may differ in terms of the type of interaction between actors (absent, market-based, or co-operative), firm-level effects of these interactions (externalities, static or dynamic effects), the presence of intermediary organisational structures (geographical...
concentration of firms, inter-firm networks, public-private partnerships, etc.) facilitating these interactions, and socio-cultural, institutional and linguistic preconditions making interactions more productive in terms of learning, or directly enhancing regional learning and innovation.

On the other hand, we will examine the possibilities and scope of embedding Nooteboom’s cycle of discovery—‘a heuristic procedure that combines exploitation and exploration in a process that leads up to (...) radical novelty’ (2000, 13) along with Nonaka and Takeuchi’s (1995) knowledge conversion processes in the context of regions with specific cultural, institutional, social and organisational endowments. Here, we aim at:

1. Explaining the formation of industrial districts, which in Nooteboom’s cycle of discovery appear as deus ex machina favouring the key stage of novel combinations. In this paper, we consider various knowledge conversion and generation processes of industrial districts;
2. Distinguishing between different types of regional clustering processes, so as to allow for the possibility of locked-in regional development.

The paper is structured as follows. Section 1 introduces learning as a process of change in cognitive structure, and considers the learning model of Nooteboom (2000). Section 2 discusses the genesis of Italianate industrial districts, analysing the role of social capital in this regard and considering their innovation performance. Section 3 addresses the importance of dissimilar regional clustering processes for learning, focusing on a case of locked-in cluster development. Section 4 considers the impact of various regional clustering and networking processes in the light of Nooteboom’s learning models. Section 5 presents some conclusions.

1. **Learning**

In this paper, learning is not considered to be a rational process.\(^1\) People make decisions under conditions of bounded rationality beyond the Williamsonian sense of ‘intendedly rational, but only limitedly so’, and more in line with Simon’s claim that “if we accept the proposition that both the knowledge and the computational power of the decision-maker are (...) limited, then we must distinguish between the real world and the author's perception of it and reasoning

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\(^1\) The first part of this section draws on advances in cognitive science as reflected in the work of Nooteboom (1992, 1993 and 2000), North (1994), Visser (1996) and others.
about it. (..)” (in North 1994: 362). The ‘mental model’ concept makes it possible to deal with the gap between perception and reality; it refers to people’s perceptions, the preferences that people have for these perceptions, and the control they exert over these preferences. North (ibid.) argues that the direction of learning depends on ‘the expected payoffs to acquiring different kinds of knowledge [while] the mental models that the players develop shape perceptions about the payoffs’, but these payoffs are also perceived and subject to preferences (Nooteboom 1992). Hence, people may regard or disregard information so that preferences persist over some time (cf. Philips 1988). In terms of bounded rationality, this means that people do not only lack computational ability but are often also unwilling to compute. Reversing the argument, learning requires an act of will—a conscious decision to deviate from one’s preferences, collecting and interpreting divergent and challenging information (Visser 1996). Strong will is indeed required when taking into consideration the control mechanisms: emotions, norms and values (Nooteboom 1992).

The story can also be told with the help of the concept of cognitive categories. In line with Piaget, Polanyi and de Saussure, Nooteboom (1992 and 2000) gives this concept a central role in his theory of learning when stating that ‘perception, interpretation and evaluation are performed on the basis of categories that condition knowledge in the double sense of enabling and limiting it’. Once acquired, knowledge may sink to the level of tacitness, while cognitive categories may harden into epistemological obstacles (Bachelard, in Nooteboom 1992). Tacit knowledge is bound to a person's cognition (emotions, norms and values, preferences and perceptions) and specific context (requiring particular know-how for dealing with competitive problems). By nature, it is hard to make explicit, express, communicate, transfer, monitor and evaluate, and thus may obstruct reflection, (self) criticism and learning. Cognitive categories give rise to cognitive conservatism, in its extreme form inducing people to stubbornly neglect information that does not match their preferences over perceptions of payoffs to alternatives.

What may, then, offset tacit knowledge and cognitive conservatism and trigger learning? The basic factor is compelling experience, of a physical or economic kind. Once sufficiently challenging, ongoing preferences may not be sustainable and the will may arise to give up old perceptions about the utility of acquiring different kinds of information. Hence, awareness takes the place of tacit knowledge; the decision is made to collect, analyse, assimilate and apply new information in the form of new technology; and path dependent behaviour makes room for new practices. A second factor is more catalyst in nature, enabling experience to play its part in eroding and finally breaking through the walls of cognitive conservatism. In this regard, Lundvall (1988) and Nooteboom (1998, 2000) emphasize the importance of
*interaction* between firms and organizations. Nooteboom’s argument runs as follows. Data processing requires a certain absorption capacity: a ‘cognitive structure’ (synonym to the before-mentioned mental model). Cognitive structures differ across people and organizations—the senders and receivers of information. The thus relevant cognitive distance is important for knowledge development, as it provides for deviating experience and may require the parties involved in an information exchange to adapt their cognitive structures so as to be able to give meaning to the new data and transform it into applicable know-how. In sum, cognitive distance is relevant for learning-by-interaction, although the gap should not become so wide that the data be incomprehensible. Please consider the following framework with some variables relevant for learning:

**Figure 1: Learning model**

![Learning Model Diagram](chart)

- **External experience**
  - Preferences
  - Perceptions (payoffs)
  - Change in cognitive categories
  - Interaction in alliances

- **First-order learning**
  - Collective experience, history, culture
  - Emotions, norms and values
  - Decision not to acquire new information

- **Second-order learning**
  - Decision to acquire radically new information

**Source:** adapted from Visser 1996

Second-order learning is learning requiring a change in cognitive structure. First-order learning in fact refers to effects of experience: doing existing things better. In line with this, Nooteboom (2000) states that the primary function of the firm is to enable a common perception, interpretation and evaluation of information—against the lowest possible transaction costs. The firm in its function of ‘focusing device’ enables employees to enhance their core competence on the basis of first-order learning so as to efficiently exploit knowledge, survive and grow in the short term. Focus, however, implies a risk of myopia; missing out on crucial developments (not recognised as such) in the business environment. Hence, Nooteboom reasons that firms need complementary knowledge, explaining the
importance of inter-firm alliances in terms of the supply of 'external economy of cognitive scope' to myopic firms, stimulating second-order learning in networks, so that firms may develop new knowledge, innovate and grow in the long run.

A similar story can be told for regions, because cognitive categories develop in interaction with the social and physical environment (ibid), which differs across space. Hence, mental models differ across space—in line with differences in the accumulated experience of people at different places, and develop in different ways at different places—in line with distinct trajectories of social and physical interaction. Maskell and Malmberg (1999) thus stress localized capabilities being responsible for regional advantage. Moreover, Hudson 1999 (in Boschma 1999:339) states that territorially defined tacit knowledge and cognition impedes transmission to those “who lack access to the unwritten codes of meaning in which such knowledge is embedded and upon which its meaning depends”. Still, this is a rather static approach to regional advantage, focused on lasting tacit knowledge and region-specific cognitive endowments. In terms of figure 1, the argument refers to a region-specific system of culture, norms, values, emotions, preferences and internal experience favouring the continued exploitation of tacit localized capabilities on the basis of first-order learning. In such a setting, growth lasts until external developments render the advantage obsolete. The question is then to what extent local actors are capable of effectively responding to the changes. A second argument concerning learning regions is dynamic and process-oriented, focusing on the intermediary role of entrepreneurship and external organisation in regional contexts. Here, a region-specific system of cognitive and institutional conditions favouring flexibility, curiosity, communication and co-operative interaction in clusters and networks across the public/private interface promotes second-order learning, which is conducive to the reinvention of regional advantage. Our paper concentrates on finding out how this last works. For this, we will now turn to a learning model based on the above view of learning.

**A cycle of discovery**

Nooiteboom’s (2000) learning model resembles a cycle of discovery. It is based on the assumption that the exploitation and exploration of knowledge need not be in conflict. The exploitation (consolidation and generalisation) of knowledge can develop into exploration (differentiation and reciprocation), which may induce radical novelty. The consolidation phase bears a risk of inertia, while reciprocation may end up in chaos before actors arrive at new combinations (figure 2):
We will briefly describe each phase in the cycle, as they are the hooks for our later work on the importance of clusters and networks for learning. **Consolidation** of knowledge entails a process of selection and improvement (first-order learning), defining and structuring a novelty, stripping it of old elements, etc. This makes the novelty applicable, at a large scale, requiring division of labour, codification, standardisation and explicit statements of all aspects of the new approach. **Generalisation** implies the application of the thus consolidated concept in various contexts. A technological standard is used as a prototype for linear reproduction, without modifications (for example: the use of neo-classical economics to deal with learning, divorce and other social issues). This phase leads to the discovery of elements that seem to work well under different circumstances, but also enhances the motivation and provides ideas for improvements, modification or change. Actors observe competing practices so as to improve their own, consider possibilities of incorporating elements of these practices in their own technology, and may start to reconsider the (cognitive) structure underpinning their present technology. In the generalisation phase, novelty behaves as the meaning of words in the context of language; meanings change as words are being used in different phrases. **Differentiation** refers to making different versions of a technology and product for different markets. Nooteboom: ‘one may need to adjust to a different availability of material inputs and tools, competencies of people, acceptance of products’ (2000, 180). Differentiation is a first step towards increasing variety. It may furthermore induce creative activities that lead towards the fourth phase: **reciprocation**—a term of the French development psychologist Jean Piaget (1970). People involve in an experimental mind game, building elements of an unknown technology in one's own concept, and vice versa, transferring elements of one's technology to the other approach. Reciprocation has a similar function as the metaphor in language.
These activities and stages of discovery may lead to a smooth assimilation of some new elements, adaptation of one’s technology, a merge of two practices, or to a more radical change: novelty. The precise outcome is unpredictable. If it happens to be a radically new combination, it may still have a background of long-standing experience and continuous improvements. On the other hand, radical change requires a change in the cognitive structure underlying the technology, implying that we can not know the result in terms of short-term survival, stability, continuity. Novelty has a certain background, but still represents an often lonely leap forward.

Certain organisational contexts support or accompany the above, not necessarily chronological steps in Nooteboom’s cycle of discovery. Mergers and takeovers may accompany the consolidation phase. Integrated networks are useful for generalizing a technology. Subsidiaries fit well with the differentiation phase, while strategic alliances are important at the stage of reciprocation. Flexible teams (within a firm) and industrial districts (from an external organisational perspective) are likely contexts for radical novelty (Nooteboom 2000, 211).

The concept of ‘industrial districts’ is introduced here as a sort of *deus ex machina*, while it in fact refers to very specific cases of regional clustering enhancing the dynamic capabilities of firms in various ways. Not all regional clusters are industrial districts. Hence, the next section deals with the formation of industrial districts, defining the concept and tracking its innovative performance so as to see what can be learnt about its role as context for radical change.

2. Industrial districts

The beneficial impact of clustering for SME competitiveness was first stressed by Marshall (1890), and elaborated in the literature on ‘industrial districts’ in industrialised countries (Pyke and Sengenberger 1991). This literature stresses the fact that many places in the world, in particular in the so-called Third Italy (the northeastern and central part of Italy) were characterised by local production systems that managed to conquer world markets (Porter 1990). In the 1970s, this was quite unexpected in a world where large corporations (reaping economies of scale) were supposed to dominate a globalising world economy in which geography seemed to have lost its economic relevance. So, what are the main features of industrial districts, and why is it that they perform relatively well?

An industrial district is a local area specialised in a particular economic activity. In the Third Italy, this often means design-intensive, craft-based industries, such as clothing, footwear, leather goods or furniture (Boschma 2001). Moreover, an industrial district
comprises a multitude of small firms (‘stage firms’) performing specialized tasks. In other words, there is a local system of inter-firm division of labour based on vertical specialisation and subcontracting. This enhances productivity and produces technological spillovers—a lesson we learnt long ago from economists like Smith and Marshall.

The so-called Florentine school (Becattini 1987, 1989) highlights the importance of the organisational dimension of the local production system. In industrial districts, efficiency is enhanced by a mixture of (innovation-stimulating) competition and trust-based co-operation between local actors. The so-called social embeddedness of economic transactions minimises uncertainty and opportunism. Reduction of transaction costs is essential for the functioning of industrial districts because it enables the development of division of labour between increasingly specialised firms. Moreover, local relations of trust are a basis for co-ordination, co-operation and support mechanisms that are vital for the competitiveness of small firms. Generally speaking, small firms lack the resources to be successful on export markets, to invest in R&D, to negotiate loans at favourable terms with large banks, etc. Industrial districts enable SMEs to overcome these weaknesses by establishing collective support services: joint research facilities or consortia to enhance access to cheap capital and other inputs.

Harrison (1992) explains the building of trust in industrial districts on the basis of proximity, repeated interaction between the actors and hence experience they have with one another. However, this is a partial explanation. Harrison ignores the risk of lock-in associated with experience-based, process-based or earned trust; as this type of trust involves large sunk costs, actors may stick to the relation even if this is not convenient (Maskell 1999). A source of social capital at the community level may be a more efficient and flexible solution. In order to be effective, the social structure of a community should be characterised by norms and values that exclude actors that do not submit to these rules. Norms can only become effective when sanctions actually constrain the actions of actors conducting deviant behaviour. At the district level, misbehaviour will soon be known to others. What is important is that this does not go at the expense of flexibility. Firms in districts blessed with high stocks of social capital tend to have a minimal amount of relation-specific investments. Therefore, ending relations with partners when economic or other circumstances require so do not induce the loss of considerable sunk costs.

Another dynamic feature of industrial districts has been suggested by Camagni (1991) and Capello (1999). They claim that a collective learning process may take place in industrial

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2 Social capital is here defined as a rather stable, cohesive structure of social relations in which shared (often unwritten) norms and values constitute a resource for economic action (Boschma 2001).
districts, turning them into so-called innovative milieus. This occurs through various mechanisms at the district level. Local spin-offs (i.e. former employees starting up new firms) transforms previously acquired knowledge into new combinations. Moreover, job-hopping is very frequent, due to social networks guaranteeing a rapid flow of information about new job opportunities in the district. These two mechanisms make that knowledge and skills are rapidly transferred from one firm to the other. A third mechanism promoting collective learning are the trust-based relations among local firms and organisations, which favours the transmission and exchange of knowledge at the local level. This includes the transmission of non-codified or tacit knowledge which is by definition hard to communicate (Maskell and Malmberg 1999). A final feature of industrial districts is their openness to and links with the outside world, enabling them to assimilate new ideas in local networks and to avoid the risk of regional lock-in (Camagni 1991).

To sum up, industrial districts may be regarded as a regional organisational arrangement combining features of clusters (geographical concentrations of not necessarily vertically disintegrated SMEs able to reap external economies), of networks (inter-organisational interactions based on shared beliefs, norms and goals) and of innovative systems (collective learning based on various mechanisms). Below, we will disentangles these concepts in more detail so as to assess their dissimilar impacts on learning.

3. Regional clustering

Clusters are defined as geographical concentrations of firms involved in similar and related activities (Nadvi and Schmitz 1994, Porter 1998, Enright 2001). Differentiating between clusters and networks, clusters can be conceived as geographical concentrations of firms operating in a particular subsector, which may but need not be involved in a local system of specialisation, subcontracting and inter-firm co-operation. Networks represent repetitive and co-operative interactions between certain, often specialised firms that may, but need not, operate in close proximity (Visser 2000b). Regional clustering processes often take place at a location where industrial experience has been built up for some time, e.g. more than five years (Visser 2000a). Through time, social scientists have given at least three different

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3 In the Netherlands, the cluster concept is sometimes used as a synonym for networks. In this paper, we treat clusters and networks as dissimilar, complementary and possibly synergetic structures. The cluster concept stresses the spatial dimension of the external organisation of firms, thus drawing attention to special competitive effects of spatial variables that are still relevant, to some extent, in modern economies. We refer to the work of Marshall, Perroux, Chardonnet, Myrdal, Jacobs, Piore and Sabel and others. The effects of spatial clustering may mingle with those of co-operation in a network context, creating dynamic synergies (Visser 2000).
explanations for regional clustering processes (cf. Gordon and McCann 2000): a) firms take advantage of the three ‘Marshallian’ external economies of enhanced labour skills, provision of infrastructure and specialized services, and information externalities; b) firms are part of a regional outsourcing system generating ‘Toyotian’ advantages of logistic and transaction cost reductions along with the various benefits of industrial subcontracting, just-in-time delivery and joint quality management; and c) firms join other firms in the generation of ‘Italianite’ cross-firm effects of learning and innovation on the basis of trust-based co-operation between firms, but often also involving local support and representative organisations.

These clustering processes differ from each other in terms of the number of relevant favourable location factors (one in formations, many in industrial districts), the intensity of inter-firm interaction (not required in Marshallian clusters, important in Toyotian clusters and industrial districts), the type of interaction (market-based in the Toyotian cluster, co-operative in industrial districts), the type of competitive effect (static in Marshallian clusters, static and possibly dynamic in Toyotian clusters, dynamic and also static in industrial districts), and the geographical scope and distribution of these effects (concentrated in Toyotian clusters, decentralised in industrial districts). Above all, however, differs the attitude of entrepreneurs in the cluster across the various processes. They may passively enjoy the benefits of clustering falling into their lap, or actively pursue competitive advantages through networking strategies (Nadvi and Schmitz 1999). Please note that clustering may thus be due to common denominators in the once-only location decisions of entrepreneurs who focus on passively enjoying favourable location factors—available to anyone present in the area. Not always is it based on a process of division of labour, development of complementary and co-operative inter-firm linkages, and exploitation of the associated benefits at the level of networks of firms, which may next spread across the cluster and attract external actors (investors, international buyers).

One important dividing line between different clustering models is inter-firm co-operation. A second important difference making a difference for clusters is collective learning (see the previous section). Integrating these ideas with Capello’s classification of ‘local systems’ (1999, 358), we arrive at the following overview of regional clusters:

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4 A subtype is the so-called ‘formation’, where firms cluster at a certain location for one reason—the availability of an important input in the production, distribution, marketing or development function of firms, such as a mineral, an airport, a good reputation of a place in the perception of customers, an R&D center.

5 The benefits of co-operation may be static or dynamic in nature. Co-operation oriented at solving problems of asset-specificity, indivisible investments, information asymmetries, measurement problems, externalities and public goods (Yong-Il and Wilkinson 1994) yields static advantages. It may also produce ‘external effects of cognitive scope’ (Nooteboom 2000), in which case we refer to dynamic advantages of co-operation between firms.
Capello (1999)’s classification includes ‘milieu innovateur’ on the basis of the ‘exploitation of collective learning’ variable. Moreover, she uses process-oriented variables to distinguish different local systems, while our classification is based on a distinction between different clustering effects: urbanisation and localisation economies, with the latter comprising spillovers (externalisations), static effects (of scale, scope, experience and sequence) and dynamic effects (of co-operative interactions between firms, local spin-offs and labour mobility enhancing novel combinations). For example, external effects of experience and knowledge spillovers are part of localisation economies that are external to the firm within a Marshallian cluster, whereas cross-firm learning on the basis of co-operation between stage firms falls in the category of dynamic efficiency in Italianite industrial districts.

All clustering processes thus have implications for learning, albeit different in nature and effect for long-term competitiveness. In Marshallian clusters, knowledge creation takes place through a finegrained process of ‘variation, monitoring, comparison, selection and imitation of identified superior solutions’ (Maskell 2001, 930) that is catalysed through proximity between actors and the associated information spillovers. At the very beginning of the
concentration process, firms may have different perceptive powers, develop different solutions in line with what they believe to be best, monitor the outcomes of their own actions and that of others, analyse differences in terms of cause and effect, discover their strengths and weaknesses, strengthen the former and eliminate the last, often by imitating more successful practices of other entrepreneurs. All this refers to an evolutionary process of first-order learning: efficiency-enhancing improvements and refining existing practice with only marginal changes in perceptions and cognitive structures. Through time, a risk of regional lock-in lingers. Below, we give an example of a clustering process causing dynamic inertia. In the next section, we will deal with the knowledge creating effects of regional settings in a more systematic manner.

**Lock-in: an example**

Clusters are a worldwide phenomenon (Enright 2001). Also in developing countries, many examples can be found. In Peru only, the Ministry of Industry counted more than 130 concentrations of small firms within the national borders. Near the old centre of Lima (the capital city), the Gamarra cluster attracted attention due to its rapid growth and dominance in the domestic textile and clothing market (for background information, see Visser 1999 and 2000). By the mid 1990s, the cluster covered about 60 housing blocks, comprising over 150 shopping centres, 2000 small and medium-sized clothing firms, 4100 wholesalers and retailers of cloth fabrics and accessories and 150 sellers of equipment and components. In 1997, a square meter in the newest shopping centres was sold for 5,000 US dollars. In 1993, annual turnover of all firms in the cluster reached the sum of 800 million US dollars (tax administration estimate). Data collected in February/March 1994 showed that clustered firms performed significantly better than dispersed firms, on various indicators (see Visser 1996 and 1999). Analysis of the type of clustering advantages revealed that this advantage was largely due to passive clustering advantages. When import tariffs were lowered from an average of 63 per cent in 1985 to about 16 per cent in 1994, the question was how well the producers would fare in the new context. The answer was not encouraging; clustered producers seemed less able than their dispersed colleagues to effectively respond to the changed business environment. By 1995, monthly average sales per worker in clustered firms had decreased by 27 % (in real terms); the comparative advantage of clustered producers over dispersed competitors had disappeared in the course of two years. Clustered producers typically responded by adhering to locally well-known sales-boosting routines: buy a new sales outlet in the cluster area, undertake sales promotion trips to the countryside, etc. Yet, there was no sign of a
development of co-operative linkages with suppliers of inputs, specialist producers or established marketing agents capable of finding new markets. The only encouraging trend was an increase of multilateral co-operation in local self-help groups focused on achieving specific business goals. In 1995, a total of five such initiatives were recorded. By the end of the year, one group already had 150 members, divided in small, product-focused subgroups. This co-operation had significant awareness-raising effects, as for self-made producers, it takes a respected colleague to question one’s convictions, strengths and weaknesses, and discuss the threats and solutions. An outdated business model and supporting attitudes are relevant obstacles to change in a cluster where producers have been part and parcel of a long history of effective learning-by-doing and imitation. So, these attitudes and models are best tackled in peer discussions, with some selective and trusted outside support. Above all, however, the networks should first consolidate themselves in legal, social and organisational terms. This was where things went wrong. In 1997, the network SCG Gamarra suffered internal organisational problems that inhibited its further, intended operations. The group anticipated these problems by requesting support in various relevant areas (organisation, management, technological and marketing), but the expert hired by an international development agency became immersed in the same socio-cultural differences, mutual prejudices and misunderstandings that have been separating the cluster from its surrounding environment for decades. To the outsiders, producers in the cluster are ‘opportunistic’ and ‘individualistic’, while the former are seen by the latter as ‘inflexible’ and ‘academic’. These descriptions still exclude the ethnic and socio-cultural dimension, which is highly relevant. Analyzing the failures, Visser (2000a) arrived at three reasons why the efforts towards multilateral co-operation in the cluster did not meet the expectations: a) the organisational inexperience of leaders and group members; b) the large gap between market requirements, including export markets, and current capabilities of producers in all areas relevant to their business; c) a wider socio-institutional environment that does not favour co-operation. Regarding each of these points, there is a lot to say (see Visser 2000a and 1996). Here, suffice it to remark that the competitiveness of firms in the cluster has been based on passive forms of collective efficiency that long reinforced standard behaviour among producers in the cluster, expressed in a local mental model of ‘best business practices’ based on vertical integration (in the production, distribution and marketing of products), the manufacturing of simple mass products, a focus on price-based links with traders of inputs and output, and investment of surplus in the construction of shopping-centers. In terms of attitudes, self-reliance (as opposed to co-operation),
individualism (as opposed to trust) and short-term opportunistic behaviour (as opposed to strategic long-term gains) are key words.

What is apparent in this case is that dominant business practices in the cluster, once helpful and effective, can obstaculise further business development, because the old and proven practices are taken refuge to at a moment that change is required. The case described here does not stand alone. Worldwide, there are many survival clusters like the Gamarra cluster (Enright 2001, Knorringa 2000). In all these cases the warning is in place that if clustering is largely based on passive collective efficiency and merely generates Marshallian external economies, it may hinder rather than facilitate learning and business development. It thus makes sense to distinguish between different clustering processes, to complement a spatial view on the external organisation of firms in terms of geographical concentration with a functional approach that takes into account the complementary and possibly synergetic role of interf-rim networks, and putting all this in a perspective of regions with specific historical, cultural, institutional and thus organisational endowments.

4. Learning in regions

In this section, we consider geographical concentration and local networking processes along with other features of industrial districts, analysing their relation with specific knowledge activities and processes on the basis of the learning model of Nooteboom (2000). We assume that the reader is familiar with Nonaka and Takeuchi’s (1995) knowledge conversion processes.

Above, clusters and networks have been defined as complementary external organisational structures. From a competence perspective\(^6\), clusters and networks indeed differ from each other. Visser (2000) previously argued that networking stimulates the explicitation and externalisation of tacit knowledge, thus opening up possibilities for more effective, efficient or new combinations. Novelty is more likely in networks comprising actors

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\(^6\) Governance of co-operative alliances and networks of firms is based on strategic insight in the gains to be achieved through co-operation, effective communication of these gains within and across organisations, a sense of inter-dependence in the organisations involved with a view to the achievement of joint objectives and gains, and the usual measures of transaction-cost economics (contracts, hostages, multi-user infrastructure, piecemeal investments, invitations to the other party to invest in the relationship, etc). Governance of inter-firm linkages in regional clusters is based on standard market price coordination, process-based trust (a result of face-to-face contact, higher transaction frequency and longer business experience in a setting of spatial proximity, and of enhanced reputation effects due to local economic concentration raising the value of potential loss of business following opportunistic behaviour), better communication (monitoring and enforcement) possibilities, lower switching costs (in case of clustering of similar industries and firms), structural trust (in the form of personal knowledge or social capital) and regional institutions (enabling constraints that reduce opportunism and mitigate the problem of bounded rationality).
with dissimilar backgrounds, e.g. in internationalising networks. Clustering enhances the internalisation of codified knowledge in the prevalent cognitive structures, which may (in our stylized version of Italianate industrial districts) or may not (in Marshallian clusters) include the import of new knowledge from elsewhere. Clustering also promotes the socialisation (diffusion) of knowledge within a specific geographical area (see figure 4).

Figure 4: Clusters and networks catalyzing knowledge conversion processes

If a clustering process is merely based on the geographical concentration of firms, i.e. Marshallian clusters, it is mostly local know-how that circulates. There, socialisation implies the transfer of local tacit knowledge within the cluster, which through time leads to diminishing external economies of scope and, possibly, lock-in. This is more likely in clusters missing the cognitive inputs of local and increasingly internationalised networks, and where the institutional and social environment is not favourable for inter-firm division of labour, co-operation between firms and public-private interaction to create support services for SMEs. There, local entrepreneurs may have to form co-operative networks, exploiting whatever trust be present in the cluster—reputations or of a more structural kind. With the participation of selected outsiders, they may try to enhance organisational, managerial and technical capabilities, thus counteracting lock-in and surviving in the long term. A first step away from the risk of lock-in in Marshallian clusters is that widespread, long-standing practices are no longer safe from scrutiny and become subject of discussion among peers. Routines are made explicit and questioned. This may, in a local context, provide a basis for combining elements of know-how of the different group members, supporting a process of deconsolidation of local business practices, but this is not guaranteed. A local group may substitute tacit routines for...
awareness… and still stumble on the road towards change. Yet, these groups are the basis for a change in perceptions of the costs and benefits of co-operation and of acquiring new and challenging information, at a moment when such change is hardest. The explicitation effects of local self-organisation preferably mingle with the knowledge combination effects of internationalisation, e.g. in the setting of global supply chains.

So far, we have merely dealt with regional clustering, local self-organisation and international networks in relation with Nonaka and Takeuchi’s knowledge conversion processes, without paying due attention to the cognitive mechanisms underpinning these processes on the one hand, and the various ways through which regional contexts may stimulate the conversion and creation of knowledge on the other. Hence, we run the risk of overlooking aspects of the importance of regions for learning. We therefore turn, once more, to Nooteboom (2000: 252-53), whose discussion of Nonaka and Takeuchi’s knowledge conversion in connection with his cycle of discovery is useful for our proposal on the importance of regions for learning:

1. Combination of the codified knowledge of two or more sources (aimed at a more efficient or systematic utilisation of knowledge) coincides with Nooteboom’s stage of consolidation;
2. Generalisation of a dominant practice—applying it in a standard form in new contexts, induces the internalisation of knowledge;
3. In the process of socialisation, tacit routines of a dominant practice mingle with tacit components of the knowledge encountered elsewhere, which may include cognitive activities that go in the direction of differentiation and reciprocation;
4. If so, technological opportunities may arise to be codified and combined for more efficient or systematic exploitation, resulting in a smooth process of assimilation, adaptation or accommodation of the two previous practices, or in radical change—the creation of something new, still incomplete and tacit as it emerges. In this last case, we arrive on top of figure 5, taken from Nooteboom (ibid), where novelty arises.
5. In figure 5, please note that there are two kinds of tacit knowledge: one based on a lack of scientific understanding of the reasons why an emerging novelty works, the other referring the outcome of a process of routinisation and generalisation of a well-understood, documented and codified practice.
This treatment of Nonaka and Takeuchi’s knowledge conversion processes in the light of Nooteboom’s stages of discovery is food for thought for regional scientists, especially those interested in the stylized industrial district model, which combines the features and effects of geographical concentration of firms, local networking (based on division of labour and bilateral co-operation between firms, multilateral co-operation or public/private interactions with a view to enhancing business support services), collective learning and the internationalisation of local networks in global chains. We can consider the above combined knowledge and learning activities in the light of Italianite industrial districts (treated here as the most advanced type of regional clustering processes, see figure 3), and state the functions of this last in terms of enabling these activities. Our proposal is summarised in figure 5.

Figure 5: Learning in regional settings: on clusters, networks and industrial districts

Two collective learning mechanisms in industrial districts (new start-ups and local labour mobility) join the tacit-knowledge spillover effect of geographical proximity in the possible creation of novelty. The consolidation of novel knowledge—a process of selection, purification
and elimination of error, takes place on the basis of ongoing specialisation and subcontracting of firms, i.e. inter-firm division of labour yielding economies of scale, scope and experience in specialist stage firms. Inter-firm cooperation between these firms is also helpful in this regard. The generalisation of knowledge takes place through a process of scale enlargement of the cluster, i.e. an increase in the number and scale of firms in the cluster, implying the transfer of dominant practices to firms already in or about to arrive and settle in the cluster. These two processes may entail either tens or thousands of small firms that, in the words of Nonaka and Takeuchi, internalize and socialize local best practices on the basis of the (tacit) knowledge spillover effects of geographical proximity. At this stage of the clustering process, we already discussed the risk of regional lock-in. Similarly, we dealt with the importance of local self-organisation and internationalisation of local initiatives towards multilateral co-operation. Depending on the quality of the social and institutional environment in the region, public support organisations may effectively co-operate with specific networks of selected small firms so as to upgrade their competitive capabilities and retain the district’s openness to the outside world, global markets and buyers. Only then does collective learning make sense.

The major difference between Italianite industrial districts and Marshallian clusters is thus that in the former, novelty enters the consolidation and generalisation process, with differentiation, reciprocation and the potential reproduction of novelty being possible on the basis of local and international networks and public/private interaction. Marshallian clustering also enables the consolidation and generalisation of knowledge, but it misses the ongoing influx of novelty. Hence, the knowledge creation processes may trivialise in the light of external developments and produce lock-in.

5. Conclusion

The above theoretical and preliminary attempt to use cognitive theory to deepen the understanding of learning processes in the context of dissimilar regional contexts is not only useful to deal with the complex relation between territory and learning, but also shows that:

a) industrial districts have various implications along Nooteboom’s cycle of discovery, from the creation of novelty through the consolidation and generalisation of knowledge towards differentiation and reciprocation in a local and increasingly international network context.
b) regional clustering can have positive (in case of Italinite industrial districts) or negative (in case of mere geographical concentration and proximity in otherwise rapidly changing business environments) for learning and innovative capabilities.

Next, our initial focus on intermediary spatial and functional organisational structures—clusters and networks respectively, helps to understand their complementary impact on knowledge conversion and creation activities. In industrial districts, the advantages of both merge to create synergy between their various knowledge conversion and enhancing effects.

This paper has some major constraints. First, the direct importance of the institutional context in providing stimuli or constraints to innovative behaviour has not been dealt with. Next, time was too short to write a short and more concise paper, which we plan to do on the basis of the above set of theoretical links between knowledge conversion and enhancing activities on the one hand and different regional settings on the other. This should be elaborated upon with a view to empirical analyses of the knowledge activities, learning bottlenecks and potentials of selected cases of regional clusters. Then, the issue will also crop up whether local sources of innovativeness are sufficient to compete in global supply chains. A cross-regional and national approach is helpful to consider the influence of socio-cultural, institutional, and public preconditions in upgrading the competitiveness of clusters. The authors acknowledge all other comments concerning this paper’s treatment of the issue of learning in regional settings.

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