

# Chapter 7

## Clusters, Learning, and Regional Development: Theory and Cases

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The economy today is more globalized than ever before in the history of mankind. While the limits of electronic communication are continuously pushed beyond new horizons, globalization can only be expected to increase further (Friedman 2005). Paradoxically, perhaps, the economy is at the same time increasingly an economy of regions (Morgan 2004; Scott and Storper 2003). Obviously, there are stark contrasts between regions that have successfully linked up to the global economy and those that have not. Which begs the question why some regions perform better than others in the global economy? True to Porter's (1990) adage that not nations (or regions) compete but companies, and given the fact that successful companies are often embedded in strong regional clusters of companies (Dupuy and Torre 2006; Spencer et al. 2010), the question is more accurately rephrased as: why do some clusters perform better than others? The answer to this question must be sought along two related but distinct lines of inquiry. First of all the characteristics of clusters are important with regard to their success or failure in the global economy. Secondly, the characteristics of the region wherein a cluster is embedded must be considered. This chapter addresses both lines of inquiry based on the assumption that economic performance is fundamentally driven by innovation, learning, and knowledge creation. Therefore, the degree in which a cluster is successful in creating new knowledge and converting the outcomes of that process into innovations is of crucial importance for the understanding of the economic performance of that cluster. Similarly, the degree in which a region offers a favorable social and institutional environment for learning and innovation offers an important explanation for the economic performance of its companies.

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This chapter is structured as follows. The first section discusses recent theoretical considerations regarding clusters and their contribution to regional economic development. It does so against the background of the knowledge economy, where knowledge creation, learning, and innovation are of ever greater importance for economic development. This section discusses the conditions under which clusters may contribute to learning and innovation. The section pays specific attention to social capital. The second section discusses the regional dimension of clusters from a theoretical perspective. First it argues how the regional business environment is important for clusters. Secondly, it argues how spatial proximity between cluster partners may facilitate learning. Thirdly, it discusses norms and values in relation to learning. Certain values are more conducive for learning and regional development than others and the fact that norms and values differ from one region to another partially explains differences in regional development. The question is how these regional norms and values are enacted in clusters to facilitate, or compromise, learning. The third section discusses two examples of clusters: the Indonesian automotive cluster on West Java and the example of the Eindhoven region cluster scheme. These are in many respects very different clusters, but because of that they highlight different important aspects of clusters and their contribution to regional development. The final section sums up the conclusions on the role of regional clusters, or learning networks, with regard to regional economic development.

## 1 Clusters and Regional Development

Although various definitions of clusters feature in the literature, this chapter approximates Porter's (1990) original idea of clusters as networks of related companies that are geographically concentrated. Clusters may often be linked to various public and private institutions. A cluster provides a constructive and efficient opportunity for discussion among related companies, their suppliers, government, and other institutions (Breschi and Malerba 2005; Nooteboom 2006). Because of externalities, public and private investments to improve cluster circumstances benefit many firms. Close linkages with buyers, suppliers, and other institutions are essential, as they facilitate learning and knowledge creation through intended and unintended knowledge spillovers (Best 1990; Cooke and Morgan 1998; Spencer et al. 2010). Because they are geographically concentrated clusters have a considerable impact on a region's economy and vice versa (Asheim et al. 2006; Boschma 2004). Being part of a cluster may provide companies with important advantages, such as:

- Access to specialized inputs and employees. Clusters can provide superior or lower cost access to specialized inputs such as components, machinery, business services, and personnel compared to vertical integration, formal alliances, or importing inputs from distant locations (Boschma 2004; Porter 1998).

- Access to information. Proximity, supply, and technological linkages and the existence of repeated personal relationships and community ties fostering trust facilitate the information flow within a cluster (Dupuy and Torre 2006; Uzzi 1997).
- Complementarities. Clusters increase productivity not only through the acquisition and assembly of input but also through facilitating complementarities between the activities of cluster participants (Hoen 2002; Maskell et al. 2006).
- Access to institutions and public goods. Firms within a cluster can access specialized infrastructure, or advice, from experts in local institutions at very low cost (Asheim et al. 2006).
- Incentives and performance measurement. Clusters improve the incentives within companies' (1) competitive pressure, when the pride and desire to perform well in a local community motivates firms to compete with each other, and (2) clusters also make it easier to measure the performance of in-house activities because there are local firms that perform similar functions (Kitson et al. 2004).

Several of these advantages, such as economies of scale, can be traced back to Marshall's work on industrial districts (Oerlemans et al. 2007), while others are more clearly connected to knowledge and innovation, such as knowledge spillovers. The value of the concept of clusters for the present discussion is that it aims to make a connection between geographical concentration and innovation. This connection follows from colocation as a convenience for knowledge creation and innovation as well as from hard (e.g., availability of venture capital) and soft (e.g., social capital) regional institutions that support, or hamper, knowledge creation and innovation (Lorentzen 2008; Oinas 2000). On the other hand, important as geographical concentration may be, knowledge creation and innovation have an important trans-regional (international) dimension as well (Malecki 2010; Scott and Storper 2003). Successful regions are increasingly nodes in global knowledge networks combining regionally embedded, indigenous knowledge with global knowledge. Given their spatial concentration, clusters may thus be at the crossroads of local and global knowledge, feeling the effect of both regional characteristics as well as global competition.

As argued, a key soft institution is social capital, which may be defined as the relations between individuals and the social and economic benefits that result from them (Westlund and Adam 2010). Social capital performs two key functions, that of a glue and that of a lubricant. As glue, social capital binds people together in relations of mutual dependency. As a lubricant, it facilitates social interaction through shared norms and values (Rutten and Gelissen 2010). In general, social capital is argued to be a good thing; however, some forms of social capital can have highly detrimental effects on individuals and on economic development. Particularly close-knit and inward-looking networks are often considered to have negative social capital. On the other hand, there seems to be a clear relation between social capital and knowledge creation and innovation (Hauser et al. 2007; Rutten et al. 2010). That is because knowledge creation and learning is a matter of interaction

between human beings. And social capital allows more individuals to engage into more intense interaction. The benefit of social capital for learning is obvious, since learning is a matter of interaction between individuals. Social capital, thus, is one of the factors explaining innovation and economic performance. The structure of relations between the individuals can be used to identify two different types of social capital: bonding social capital and bridging social capital (Burt 2005; Coleman 1988; Field 2003). Bonding social capital refers to a situation where there are strong linkages between individuals. That is, (nearly) all of the individuals in a network share a direct relationship. Bonding social capital works in a way first described by Durkheim (1893/1997), who argued that: “It is impossible for man to . . . be in regular contact with one another without their acquiring some feel for the group . . . without their becoming attached to it . . .” (p. xliii). In other words, bonding social capital produces higher levels of trust and shared norms and values which, in turn, are helpful in learning and innovation. Innovation, which may be seen as the outcome of a process of learning and knowledge creation, is a risky and uncertain process, and it is competitively sensitive in that companies do not like to see the fruits of their innovation efforts leak away to competitors. Consequently, companies prefer to conduct innovation with trusted partners with whom they share strong and durable relations. A cluster with a high level of bonding social capital thus provides an environment where companies are likely to find a substantial number of trusted partners to engage with in innovation efforts; moreover, the innovation process itself—that is, the interaction—will be smoother because of the higher level of shared norms and values in the cluster. Put differently, clusters with a higher level of bonding social capital are more likely to conduct innovation, which may result in a better economic performance compared to clusters with lower levels of bonding social capital.

Higher levels of bridging social capital also have a positive effect on learning and innovation. Bridging social capital refers to a situation where a limited number of individuals in a cluster have strong relations to individuals in other clusters. In other words, these individuals act as bridges between two (or more) clusters, which are extremely relevant to transfer new knowledge and ideas into the cluster. Innovation, based on Schumpeter’s definition, is a matter of making new combinations (Morgan 1997; Rutten 2003). In today’s knowledge economy this specifically includes new combinations of knowledge, which means that a cluster must have linkages to other clusters in order to access knowledge and ideas not available inside the cluster. It is important that not too many individuals in the cluster have strong ties to other clusters as it may lead to knowledge overload. In sum, clusters that have both high levels of bonding and bridging social capital are the most conducive organizational environments for companies to engage in learning and innovation. Given this trans-regional dimension, social capital in clusters is increasingly a combination of regional social capital, for example, norms and values that are connect to their home region, and cluster social capital, that is, norms and values that have developed within the cluster.

## 2 The Spatial Dimension

As argued, talking about clusters begs the question to the importance of the spatial dimension. The answer to this question must be found along two lines. In the first place the role of the regional context must be considered, that is, the characteristics of the region in which the cluster is located. Secondly, it is important to consider the relevance of spatial proximity between network partners with regard to learning and innovation. The question regarding the relevance of the regional context is easily answered: It matters substantially (Best 1990; Morgan 2004). The regional business environment plays a crucial role in the economic performance of a regional cluster as some business environments are more conducive to firm competition and innovation than others. Four elements may be distinguished in the regional business environment (Scott and Storper 2003; Porter 1990; Teece 2000):

1. The provision of a physical and digital infrastructure and the tax and legal systems provide the bare basics for companies to operate in the twenty-first century capitalism.
2. The education levels of the regional workforce and the presence of public and private knowledge centers are of critical importance in today's knowledge economy.
3. High-quality demand of local customers (both companies and consumers) forces companies to innovate in order to meet that demand.
4. Rivalry among regional firms also encourages companies to be innovative in order to stay abreast of their competitors.

The economic geography literature offers ample evidence that clusters perform (much) better in regions with a favorable business environment than do clusters in regions with a less favorable business environment. In fact, much regional economic development policy is aimed at putting in place or improving the above characteristics (Asheim et al. 2006; Spencer et al. 2010). However, the effectiveness of such regional development policy crucially depends on the willingness of the local business community to take initiative for economic development. Effective policy has to be tailored to the needs of the local business community, which requires that it participates in policy making (Morgan 1997). Moreover, a local business environment that is sufficient but not great may actually be helpful to the development of companies. The so-called selective disadvantage may trigger companies to be innovative in order to overcome them. Similarly, a business environment that is very comfortable may actually make companies somewhat complacent (Porter 1990; Teece 2000). The key argument, thus, is that there is a relation between the level of sophistication of the local business environment, on the one hand, and the performance of regional clusters, on the other hand, but the ambition of the companies within a regional cluster to be innovative is the main driver of company performance and regional economic development (Nooteboom 2006).

Regarding the second issue, the relevance of spatial proximity with regard to learning and innovation, the answer is much more elusive. The debate on this issue falls within two equally problematic extremes. One extreme argues for the “geography of knowledge,” which argues that tacit knowledge can only be effectively communicated in face-to-face interactions and that face-to-face interactions can only be efficient on the long term when partners are colocated. This argument has been refuted because, on the one hand, temporary proximity allows for effective face-to-face communication as well as permanent proximity (Grabher 2002). On the other hand, knowledge is no longer regarded as being tacit (or codified) but as context dependent (Amin and Cohendet 2000; Morgan 2004). To the extent that partners share this (social) context, they can communicate even highly complex knowledge via digital methods, while the transfer of this knowledge to individuals outside the (social) context, indeed, does require intensive face-to-face communication. The other extreme position concerns the argument of the “death of distance,” which claims that digital means of communication are now so advanced that all knowledge can be exchanged between all people, regardless of their geographical location (Amin and Cohendet 2004). This argument, too, fails to appreciate the role of (social) context. For example, it is not difficult for a banker in Amsterdam to acquire knowledge from bankers in London because this knowledge is tacit. In fact, bankers anywhere in the world will have largely the same knowledge base. Nor is it difficult because Amsterdam and London are far apart; on the contrary. It is difficult because the banking communities in Amsterdam and London represent different social contexts with different practices, norms, and values. Being in the same place, therefore, facilitates knowledge exchange and learning because network partners share the same local (social) context and its accompanying norms and values. It allows for a richer exchange of knowledge and deeper learning (Morgan 2004).

In criticizing the two extreme positions it becomes clear that there is a role for spatial proximity between network partners with regard to knowledge creation and learning and that social context in the form of norms and values plays an important part in this role. However, it would be a mistake to see norms and values (social context) as characteristics of a region. Even though norms and values differ from one place to another they are characteristics of social and economic relations first of all. Norms and values are connected to places because the individuals in the relations are largely spatially sticky. Most human beings are connected to the places where they live, work, and have their friends and relatives, that is, to the place they call home. Consequently, social interaction (inclusive knowledge creation and learning) is also spatially sticky. However, human relations frequently cut across different spatial scales, which make it difficult to connect norms and values to places. Nonetheless, certain norms and values are more conducive to learning and innovation and others. Even though, as argued, norms and values are characteristics of relations rather than regions, given that relations are formed of spatially sticky individuals, certain norms and values may be more prominent in some regions than in others. In fact, research shows a relation between the presence of certain types of norms and values and

innovation and economic development of regions (Huntington and Harrison 2000; Inglehart and Baker 2000; Rutten and Gelissen 2010).

The effect of norms and values on regional economic development cannot be separated from more conventional variables to explain the regional economic development, such as innovation, human capital, and urbanization. Regional innovation has proved to be a solid indicator of regional economic development in a large number of studies. It underlines that today's economy is a knowledge economy and that economic development is fueled by learning and innovation (Morgan 1997). Regional human capital, often measured as the percentage of the regional workforce with higher education, is an obvious complement to the above argument as learning and innovation is predominantly carried out in occupations that require higher levels of education. In many studies, therefore, regional human capital shows a strong correlation with regional economic development. Urbanization is another factor that is directly related to regional economic development. Cities are the hubs of the economy; it is where most economic activities take place and where most of the wealth is created. Nonetheless, norms and values matter. In a recent study, Rutten and Gelissen (2010) found that regional economic development, measured as gross domestic product (GDP) per capita in purchasing parties, is largely explained by innovation, human capital, and urbanization. Norms and values only have a limited direct effect on GDP. However, they found norms and values to have a considerable effect on innovation. This is an important finding given the crucial role of innovation for economic development. It means that regions where norms and values are present that favor innovation are likely to be more economically developed than other regions.

The kind of norms and values to favor innovation as identified by Rutten and Gelissen (2010) corroborate with the findings of other research (Beugelsdijk and Van Schaik 2005). In general, norms and values that reflect a cosmopolitan attitude, self-expression, a move away from traditional and religious values, and a readiness to embrace new developments are the kind of norms and values that encourage innovation. This is because such norms and values encourage creativity, which is a key element of innovation (Florida 2002). Tolerance for nonconformist behavior and tolerance for sociocultural and ethnic diversities represent another set of norms and values that are strongly related to innovation. The kind of diversity that results from a mixed regional population in terms of social and cultural backgrounds and ethnicity and nonconformist lifestyles produces a social climate that is argued to be attractive for knowledge workers, that is, the kind of workers that produce innovations during their day jobs. But this kind of diversity also contributes to innovation directly in that it produces a richer pool of ideas and, therefore, creativity and in that it represents a more diverse market with specific needs (Florida 2002; Rutten and Gelissen 2008). Finally, participation in various social networks—such as professional, leisure, religious, political, and voluntary organizations—is related to both innovation and GDP. Although social networks do not represent norms and values as such, they are nonetheless an important soft factor in economic life. Social networks may reduce transaction costs in economic life because of the trust and reputation effects that such networks generate. Social networks may also encourage

the exchange of knowledge and ideas and thus contribute to creativity and innovation (Uzzi 1997). In sum, Rutten and Gelissen (2010) conclude that cosmopolitan norms and values and tolerance for diversity are beneficial for innovation in a region and through their effect on innovation contribute to economic development. Their findings are in line with those of others (Beugelsdijk and Van Schaik 2005; Florida 2002; Inglehart and Baker 2000).

The norms and values that feature in clusters, thus, are important factors in the explanation of learning and innovation within them. However, the relation between norms and values, on the one hand, and the performance of clusters, on the other hand, is not straightforward. This is because healthy clusters are connected beyond their home region as well and because norms and values are characteristics of human relations rather than regions. Nonetheless, regional differences in norms and values do exist and they have an impact on economic development. Of course, economic development does not drive on norms and values but on learning and innovation. However, as argued, certain norms and values are more conducive to learning and innovation than others. City regions seem to have an advantage in this regard over more peripheral regions for several reasons. The population of cities tends to be more diverse and cities are often more strongly linked to the international economy. Modern, cosmopolitan lifestyles are also more likely to be found in cities than in peripheral regions. The role as hubs of the (international) economy that cities already enjoyed in the industrial economy seems to be reinforced in the current knowledge economy given the importance of norms and values for learning and innovation.

### **3 Case Studies**

In the following two sections the Java automotive cluster (Indonesia) and the Eindhoven region cluster scheme (the Netherlands) are discussed, respectively. In spite of the obvious differences between the two clusters, such as their size (large versus small) and their origin (created from the 1970s onwards versus organically grown since the early twentieth century), they make an interesting comparison. Given the different development phases these clusters are in, the comparison highlights the role of different types of linkages between the cluster companies and the role of regional social capital and cluster social capital in the clusters.

### **4 Case Study: The Java Automotive Cluster**

An interesting example to look at the role of social capital in a cluster is the West Java automotive cluster in Indonesia. From the 1990s onwards, the cluster has developed from a low-cost production facility for Japanese car makers to a technologically advanced cluster that now exports parts and sophisticated



subassemblies to other automotive clusters in South East Asia, South America, and the Middle East. The cluster has strong linkages between the Japanese-owned car plants in the region, their local subsidiaries, and local suppliers. Based largely on Japanese FDI, the cluster has developed in the 1970s as a cheap production facility for, in particular, Honda and Toyota. From the 1990s onwards, FDI from Honda and Toyota increasingly included technological and managerial knowledge in order to upgrade the Indonesian companies from low-cost producers to codevelopers. While this helped the Indonesian automotive cluster to slowly upgrade and become an exporter of automobile subassemblies, Honda and Toyota in fact created two separate clusters, one for each company, that are organized very hierarchically with the two lead companies firmly in control of their respective clusters. Linkages between Indonesian firms in both clusters are actively discouraged by Honda and Toyota, which reduces the ability of the cluster to create knowledge and develop innovations (Irawati and Charles 2010). So while the Indonesian automotive cluster may be a geographically concentrated network of related firms, it differs from its counterparts in Europe and North America in that it is not as deeply embedded in its home region. The Japanese domination has reduced the degree in which regional social capital affects social and economic relations within the cluster. The cluster receives its social capital largely from norms and values handed down from Japan. The cluster does have strong linkages to several leading public and private knowledge centers in the region, as well as intermediary organizations and government agencies. This is largely the result of a policy effort from the Indonesian government to upgrade regional characteristics so the cluster can benefit from the knowledge created in regional knowledge centers—in the hope that this leads to more innovation in the cluster that will benefit the regional economy (Irawati 2011).

The cluster thus has strong internal linkages (i.e., bonding social capital) but in an incomplete way given the existence of two subclusters for Honda and Toyota. The cluster also has strong external linkages (i.e., bridging social capital) but only with Japan. These external linkages have exposed the cluster to the inflow of new knowledge and have enabled the cluster to develop and implement innovations resulting in its upgrading from low-cost production facility to international exporter (Irawati 2011; Irawati and Charles 2010). But obviously the cluster is also limited. It is overly hierarchical with the Japanese car makers in a dominant position. As argued, there are actually two clusters, one Toyota cluster and one Honda cluster and the leading companies of these clusters discourage relations across their networks. Horizontal linkages within the Toyota and Honda networks are also few and far between. Consequently, bonding social capital in West Java automotive cluster is insufficiently developed which prevents the cluster from developing and exploiting its potential for innovation. The hierarchical relations proved very useful in the upgrading of the cluster as it took place since the 1990s because it allowed for a quick dissemination and absorption of much more advanced Japanese knowledge, skills, and technologies. But it now prevents the cluster from internal learning and knowledge creation that are necessary for innovation and further economic development (Irawati 2011; Irawati and Charles 2010).

The case study of the Java automotive clusters shows first of all that not all social capital is beneficial for cluster development and the contribution of the cluster to regional development. Moreover, the case study suggests that different forms of social capital may be beneficial in different phases of a cluster's lifetime. The cluster's social capital has been very helpful so far in upgrading it from a low-cost producer to a knowledge-based international exporter. But its social capital has prevented the cluster from developing innovations of its own. To accomplish that, the cluster needs to develop stronger linkages between its firms and allow economic transactions to benefit from the regional social capital.

## 5 Case Study: The Eindhoven Region Cluster Scheme

The name cluster scheme is somewhat misleading as the "clusters" that were formed under this scheme were composed of only two to five companies, most of them small- and medium-sized enterprises (SMEs), although many clusters included a large company or a knowledge center. Moreover, the clusters that were formed under this scheme existed for only 2 years on average: the time it took to develop a new product. This was the aim of the cluster scheme: to form temporary networks between regional SMEs for product development. The hope was that, once SMEs had learned how to collaborate on product development, they would continue to do so after the completion of their projects, either with the same or with new partners, and thus contribute to regional development. In other words, the cluster scheme did not so much build a new cluster as it attempted to strengthen the relations between the SMEs in the already existing metal and electronics industry cluster. The cluster scheme was operational from 1994 through 2006 during which time just over 100 clusters were created (Rutten and Oerlemans 2009).

In terms of its general outcomes, the cluster scheme was very effective. Of all the companies involved, 90 % reported that the innovation they set out to develop was actually realized. This means that the immediate objective of the cluster scheme was overwhelmingly realized. An outcome that is somewhat puzzling at first sight is the fact that only 61 % of the companies reported that their competences had improved as a result of their participation in the clusters scheme, and only 40 % argued that their collaboration skills had improved. The explanation for these relatively low scores is that the cluster scheme predominantly attracted SMEs that were already innovative and were already engaged in networking. In other words, their competence and skills were already developed. It is interesting that of the 40 % of the companies that argued that their collaboration skills had improved to a (very) high degree, 63 % argued that in particular their collaboration management skills had improved. This finding illustrates that networking is difficult, it is a skill that needs to be developed and that even relatively experienced networkers have room to improve their collaboration skills, particularly with regard to how to manage a collaboration project.

Developing the technology does not necessarily mean that this technology also materialized into a product that was subsequently introduced on the market. Of the companies involved, 76 % reported that they introduced a product on the market as a result of their participation in the cluster scheme, while 24 % reported not to have introduced a product on the market. This is a very encouraging result from a policy-effectiveness perspective. However, the economic effect of the new products developed under the cluster scheme is not very strong. Few companies earned a substantial (more than 10 %) turnover with this product. On the other hand, 73 % of the companies that had a product on the market claimed that the product did contribute to their competitive advantage. This is a further indication that the companies that participated in the cluster scheme were already innovative, that they may have had more than one innovative product on the market that contributed to their turnover, and that the new product developed under the cluster scheme was part of broader innovation strategy to strengthen their competitive advantage.

A final outcome to be mentioned here is the effect of the cluster scheme on networking within the Eindhoven region business community. Of the companies involved in the cluster scheme, 42 % reported that they continued their collaboration with at least one of their cluster partners, while 39 % of the companies involved reported doing so with two or more of their cluster partners. Only 19 % of the companies involved no longer collaborate with any of their cluster partners.

The success of the Eindhoven cluster scheme thus was built on strong existing regional and cluster social capital in the form of linkages and shared norms and values. The Eindhoven region cluster scheme is a clear example of indigenous regional development based on knowledge creation and innovation in a cluster. On the other hand, non-innovative SMEs were not reached with this scheme. The scheme reinforced what was already there.

## 6 Discussion and Conclusion

Comparing the Java automotive cluster and the Eindhoven region cluster scheme shows how clusters in different phases of development contribute to regional development. While the Eindhoven case is a clear example of indigenous regional development based on knowledge that is embedded within the cluster, development in the case of the Java automotive cluster depends predominantly on Japanese FDI in the form of technological and managerial knowledge. In the Eindhoven region cluster scheme regional social capital as well as cluster social capital affected relations between the cluster companies as the cluster scheme built on existing economic and social relations. The Java automotive cluster scheme on the other hand depends heavily on cluster social capital and benefits from regional social capital (the overlapping of social and economic relations) only to a limited degree. This raises the question whether indigenous development is currently even possible in the case of the Java automotive cluster. Its insulated and hierarchical subclusters around Toyota and Honda substantially hamper the intended and unintended knowledge spillovers that characterize successful (innovative) clusters in Europe

and North America, as in the case of the Eindhoven region cluster scheme. The social capital in the Java automotive cluster helped bring it to its present state of development but seems to frustrate its further development. This example also shows the limits of cluster building in that it may only be effective in the initial development phase of a cluster. This suggestion is underlined by the failure of the Eindhoven region cluster scheme to involve non-innovative SMEs. In this more advanced clusters, government policy did not succeed in forging new linkages between innovative and non-innovative SMEs. Although the reasons for this failure were not explored in the case study, it seems likely that, albeit in a more subtle way, subclusters (of innovative and non-innovative firms) also exist in the Eindhoven region between which knowledge spillovers do not readily occur.

This chapter looked at knowledge creation and innovation in clusters. Our conclusions can be summarized as follows. In the first place, bonding social capital is very important for learning and innovation in clusters. It reflects many and strong linkages between firms in the cluster, which contributes to the emergence of shared norms and values that facilitate the flow of knowledge between the firms. Clusters with high levels of bonding social capital are also difficult to penetrate for non-cluster firms, which means that the knowledge of the cluster is less likely to leak away to competitors. Secondly, bridging social capital is also essential for clusters. It is vital for clusters to have linkages to firms outside their home region in order to secure access to new ideas, knowledge, and information and to expose the firms in the cluster to international competition. Both aspects are argued to contribute to learning and innovation. Put differently, there is nothing “regional” about successful clusters. Instead, they are firmly embedded in national and international networks. Thirdly, however, the regional context is still a crucial factor behind learning and innovation in regional clusters and their contribution to regional economic development. The availability of physical and digital infrastructure, knowledge centers, a highly educated workforce, demanding customers, and an enabling tax and legal system are as important in the current knowledge economy as they have ever been. Additionally, regional norms and values play an important role since some norms and values are more conducive to learning and innovation than others. Cosmopolitan norms and values, that is, openness and tolerance for socio-cultural and ethnic diversity and openness to new developments, technologies, and opportunities, facilitate the flow of ideas and foster creativity and experimentation which, in turn, fuels learning and innovation. City regions are more likely to host cosmopolitan norms and values than rural regions. Although ultimately people, not regions, hold cosmopolitan values, and since people holding cosmopolitan values are not exclusively located in cosmopolitan regions, it is certainly possible for rural regions to be a fertile environment for learning and innovation. Arguably, however, the challenges for rural regions are larger compared to city regions.

A more nuanced account of the effect of regional characteristics, such as bonding and bridging social capital, on cluster development is needed to understand the contribution of clusters to regional development. This chapter suggests that different forms of social capital may be beneficial in different phases in a cluster's lifetime, depending on the dominant form of knowledge spillovers (top down via FDI or horizontal).

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