

Chapter 13

Connectivity in Contiguity: Conventions and Taboos of Imitation in Colocated Networks

Johannes Glückler and Ingmar Hammer

People and organizations learn from others. Cultures, traditions, opinions, behaviors, and technologies spread through imitation. Tarde (1903) was among the first to appreciate imitation as a key learning mechanism for inventions in social life to be diffused among society (Kinnunen, 1996; Rogers, 1995). Imitation, however, is not confined to the mere replication of existing knowledge. The process of imitation always implies potential deviation into invention (Barry & Thrift, 2007; Djellal & Gallouj, 2014) because the absorption of new knowledge requires learning and, hence, conscious recombination of knowledge, an activity that may lead to new ideas and new knowledge. Imitation is thus a crucial learning mechanism and a valuable source of innovation.

If imitation is such an economic advantage, then what are the conditions that favor learning by imitation? Essentially, two powerful perspectives—social networks and geography—have been proposed and used to unpack mechanisms of learning. Social networks focus on the quality of social relations and the effect of connectivity on knowledge outcomes. Geography focuses on the spatial dimension of social relations and facilitates theory development on the role that physical contiguity has in knowledge creation and innovation. Both these bodies of literature have contributed greatly to the understanding of the interorganizational production of knowledge, but few studies have integrated these viewpoints to capture the interdependencies of networks and space (Glückler, 2013a).

In this chapter we combine the network and geographical perspectives to theorize on the interactive effect of connectivity and spatial proximity on mechanisms of learning. We specifically examine social tensions generated by imitation among firms that are simultaneously in processes of colocation and organizational integration. This tension arises from the potential conduciveness of different spatial and

J. Glückler (✉) • I. Hammer
Department of Geography, Heidelberg University,
Berliner Straße 48, 69120 Heidelberg, Germany
e-mail: glueckler@uni-heidelberg.de; hammer@uni-heidelberg.de

organizational configurations to different forms of learning. Organizational integration, for example, typically supports the institutionalization of conventions of collaboration and two-way learning, whereas spatial proximity increases the visibility and observability among actors and thus leverages the undeniable incentive of competitive, one-way learning. If colocated competitors have agreed to collaborate, the key question arises as to how firms manage the tensions of cooperation and competition that accompany collective learning.

We begin by discussing imitation and invention in terms of the opportunities and relative advantages each can offer to learning and innovation. Specifically, we adopt a perspective of social conventions to distinguish two practices of imitation: the convention of collaborative learning through friendly imitation and the taboo of unfriendly imitation in a context of rivalry. We then analyze the conditions governing different forms of spatial organization for interfirm collaboration and imitation processes before we present the research strategy of the mixed-method network case study COMRA.DE, an organized interfirm network of 25 new media technology companies in eastern Germany. We follow up with an analysis of the empirical findings on the various mechanisms of interorganizational learning and the imitation practices between convention and taboo. The chapter closes with a discussion of the consequences for network governance.

Innovation by Imitation

Inventions are often the result of planned research and development. Although the directed search process may not always lead to the expected outcomes, as is the case with serendipitous and “false negative” inventions (Chesbrough, 2003, p. 3), research and development activities frequently entail high costs, risks, and long development phases. Innovation studies suggest that high levels of research and development intensity, that is, the allocation of major resources to inventive activity, are strongly correlated with a firm’s economic performance (Ahuja, 2000; Mansfield, Rapoport, Romeo, Wagner, & Beardsley, 1977). Small and medium-sized enterprises (SMEs) often try to compensate for their diseconomies of scale by building alliances. In network organizations or, more precisely, organized interfirm networks (Glückler, Dehning, Janneck, & Armbrüster, 2012), firms are able to jointly develop resources that they would not be able to develop alone. So-called network goods are one way to achieve common goals that would be unattainable without partners. Essentially, network goods are collective outcomes from collaborative effort and have the additional advantage of being available to all members of a given social group regardless of their individual contributions to the creation of those goods (Glückler & Hammer, 2015). Because innovation refers to the process of introducing and disseminating new solutions on a market (Akrich, Callon, Latour, & Monaghan, 2002), it does not depend on invention alone. Instead, the process of imitation by observation offers an additional opportunity to learn from other organizations and to adopt and create new knowledge.

Jacobs (1969) draws on car-maker Henry Ford to illustrate that imitation or, as she calls it, “economic borrowing” (p. 64), can be a promising, often successful path to innovation. Instead of building cars himself, Ford focused on assembling pre-manufactured components. His innovation was not to create a new car but rather to offer to supply each individual component as a replacement part. In a continuing imitation process, he went on to build more and more parts himself until his company finally produced the majority of parts for his famous Model T. Japanese industry also applied imitation strategies to adopt external technologies, gradually developing its own competitive technological advantage (Bolton, 1993). The success of the Swiss watch-making industry is also the result of an intense period of imitation and reverse engineering of French and English watches in the seventeenth century (Maillat, Lecoq, Nemeti, & Pfister, 1995). Moreover, imitation is not only helpful for followers to catch up within an industry, it is an effective mechanism enabling cross-industry innovation (Enkel & Gassmann, 2010). When firms have sufficient absorptive capacity, they may detect and transfer to their own industry good practices and solutions from related and even unrelated industries. It is this unforeseeable potential for learning by imitation that makes the diversity of a city so crucial for long-term innovativeness (Jacobs, 1969).

The imitation process comprises three key mechanisms (Malmberg & Maskell, 2002): variation, observation, and imitation. It starts with variation stemming from parallel experimentation and the distributed search for innovations: “the tendency to variation is a chief cause of progress” (Marshall, 1890, p. 355). A firm’s ability to compete derives from the heterogeneous nature of the solutions that firms create based on different competencies, experiences, strategies, and resources. To attain this competitiveness, firms need to create new solutions and new combinations of existing solutions:

“Little progress would be made in a world of clones” (Lundvall & Maskell, 2000, p. 364).
“The blind-variation-and-selective-retention model unequivocally implies that, *ceteris paribus*, the greater the heterogeneity and volume of trials the greater the chance of a productive innovation” (Campbell, 1960, p. 395).

If there is great variety in the available practices, organizations have the opportunity to identify suitable solutions by using a process of attentive searches and observations, and in the final stage they can transfer this knowledge to their own company by imitating them.

Unlike the generation of knowledge in partnerships, imitation refers to the unilateral transfer of existing solutions from one company to another. Imitation offers savings when established practices are transferred. Imitation cuts the costs of typical trial-and-error used in the research process (Jacobs, 1969). We distinguish between two fundamental situations for imitation (Glückler, 2013a). With friendly imitation, there is a cooperative transfer of solutions, with the owners of the solutions voluntarily agreeing to transfer them or even actively transferring them outright. With unfriendly imitation, the owners of the solutions try to prevent their imitation or disapprove of any secret imitation. In this section we investigate the circumstances under which imitation processes in a network are viewed as either

legitimate and accepted (sometimes even planned) or as contested or sanctioned. Both forms of imitation, friendly and unfriendly, reflect the diametric opposition of competition and cooperation in a network.

Conventions of Friendly Imitation

In a cooperative context we assume that organizations and their members establish conventions to regulate the process of friendly imitation. Observing the good practice of others, and actively seeking and requesting aid when transferring existing solutions is accepted as legitimate or even as the actual reason for the cooperation if the current owner permits a solution to be imitated. According to (Weber, 1922/1978) conventions fall on a continuum extending from formal law to traditional customs and habits: “an order will be called convention so far as its validity is externally guaranteed by the probability that deviation from it within a given social group will result in a relatively general and practically significant reaction of disapproval” (p. 34).

A convention ranges between social custom and law: Unlike deviation from customs, deviation from convention is sanctioned; unlike law, a convention lacks an authority that enforces compliance to it. A convention thus constitutes an institutional order for exchange between parties to a transaction, creating a mutually sound basis for expectations. This order cannot penalize violations of the convention through the force of law. Instead, it uses social disrespect. Practices of friendly imitation always occur when one firm takes information or solutions from another firm with the latter’s approval. These resources may even be actively provided, often without any direct compensation. That kind of transfer to a partner corresponds to the economic principle of a gift (Ferrary, 2003), a type of generalized exchange in which a transfer is not compensated directly but rather reciprocated over the long term, possibly also by other partners (Yamagishi & Cook, 1993). Examples of friendly imitation practices—processes that could lead to imitation—include recommendations, the exchange of experience or knowledge between employees within and between companies, and specialist discussions at trade fairs.

A key factor in maintaining long-term friendly imitation is the convention of reciprocity (Gouldner, 1960). Unlike goods traded on the market, gifts provided in networks can seldom be assigned a cash value, and that value often cannot be clearly allocated after the exchange. As a rule, reciprocal treatment (Stegbauer, 2011) is of fundamental importance in the convention of friendly imitation. Imitating without authorization or without providing anything yourself violates the convention. Conventions of friendly imitation are the foundations for learning and the rapid adoption, recombination, and dissemination of ideas and solutions within networks. Ultimately, each organization benefits from the solutions from all the other partners in a network, an outcome that offers cost advantages over the long-term innovation process. Imitation without immediate interaction may even forge the creation of

collective identity, as Staber (2010) has demonstrated for colocated firms in southern Germany.

Imitation practices can always develop if firms and their employees cooperate with each other or if meetings offer opportunities for mutual observation. For example, projects are key drivers in imitation processes when companies jointly develop new knowledge and learn from each other, pooling their expertise to arrive at joint solutions. With concrete project results constantly accumulating in the company (Ibert, 2004), it should be easy for the project partners to integrate knowledge from other organizations in the firm's own knowledge base. Additional key ways in which imitation occurs are employee fluctuation and assignment of employees to multi-company project teams. When employees change their place of work, they contribute their own expertise and solutions to the new company (Malmberg & Power, 2005). As part of the European TSER project, Storper (1999) identified employee mobility as the most important mechanism for the regional exchange of knowledge between companies. In addition, the opportunities for imitating existing solutions are highly varied and are facilitated, for example,

through skilled labour mobility within local labour markets, customer-supplier technical and organizational interchange, imitation processes and reverse engineering, exhibition of successful "climatisation" and application to local needs of general purpose technologies, informal "cafeteria" effects, complementary information and specialized services provision. (Camagni, 1991, p. 130)

The Taboo of Unfriendly Imitation

The conventions of friendly imitation are based on agreement and long-term reciprocity between the partners. There are mutually shared behavioral expectations with which network members comply in order to be accepted in the network permanently. If a network member transgresses these conventions, the network members will at least disapprove of this behavior and may even sanction it by excluding the member from communication within the network (Weber, 1922/1978). However, the processes for imitating time-tested solutions are certainly not linked to cooperation: "[N]o trust is required as a prerequisite for learning. The sequence of variation, monitoring, comparison, selection and imitation can take place without any close contact or even an arm's-length interaction between the firms" (Maskell, 2001, p. 930).

In these situations specific observation methods such as reverse engineering or other noninteractive spillover effects (Glückler, 2013a) certainly enable firms to imitate and employ tried-and-trusted solutions and innovations from other firms without their agreement and knowledge (Minagawa, Trott, & Hoecht, 2007). This unapproved acquisition of knowledge is what we call unfriendly imitation. Unfriendly imitation violates the convention of eliciting the owner's agreement when adopting solutions from someone else. Although unfriendly imitation is con-

sidered illegitimate by the originator of the idea or practice, it is still legal as long as it does not violate any intellectual property rights. In these situations firms cannot influence imitation and the use of their own knowledge by other organizations. In open competition and rivalry, unfriendly imitations do not violate any convention pertaining to cooperation, loyalty, or reciprocity, and firms simply have to accept that fact as a general environmental condition.

By contrast, unfriendly imitation is socially forbidden in cooperative relationships. However, the existence of cooperative or trusting relationships between members of a network reinforces the risk of unfriendly imitation. If actors trust in the cooperation and the joint work in which they are engaging, they are inclined to disclose much more about themselves than they would to competing firms with which they have no cooperative relationship. As more information is discovered, the risk of unfriendly imitation thus becomes greater in cooperative relationships than in open competition. This argument has its roots in the observation that the greatest damage from abuse can only arise under conditions of trust (Granovetter, 1985). Within cooperative relationships the gravity of this potential harm has institutionalized unfriendly imitation as a taboo that should not be broken given the prevailing conventions.

The Geography of Interfirm Relationships

The importance of the processes described above for cooperative and rival learning varies according to the underlying conditions for cooperation. The geographic context, for instance, figures prominently in rival learning in particular, affecting the capacity to exploit opportunities for imitation. The following section distinguishes between three geographic situations—clusters, organized networks, and the special form of colocated network organizations—bearing on interfirm relations that play a key role in discussing cooperative and rival learning (Fig. 13.1).

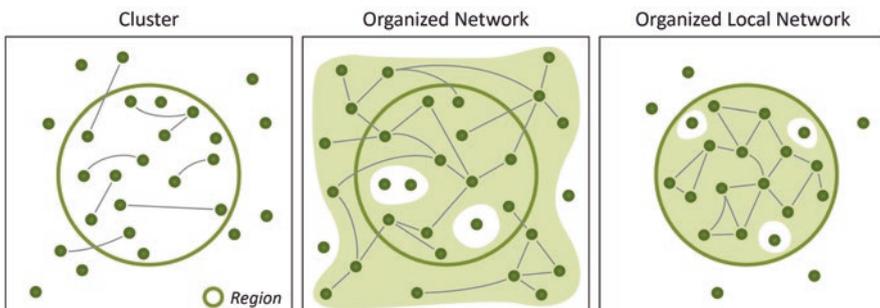


Fig. 13.1 Geographic organization of cooperation: Clusters, organized networks, and colocated network organizations (From Glückler et al. (2012, p. 168). Reprinted with permission of Springer)

Cluster

The cluster concept is associated with two elementary components in the definition: a geographical concentration of firms and a functional interrelation between them. Porter (1998) defines geographic clusters as regional concentrations of interlinked companies that perform similar activities in a common field. These two defining elements need to be assessed separately. Local concentration gives firms traditional localization advantages deriving from the joint use of infrastructure, labor markets and specialized services. The greater the number of a location's firms that require specialist employees, the cheaper and more probable it is that a corresponding segment of the labor market will form. These traditional localization advantages result, in particular, from external economies of scale. Local externalities evoke the theory of the club good (Buchanan, 1965), a reminder of why geographic concentrations are often referred to as regional club goods (Capello, 1999). The localization advantages work irrespective of any interorganizational action and require only that several firms with the same activities be colocated (Malmberg & Maskell, 2002).

The second part of the definition distinguishes between the narrow and the wide senses of the term *cluster*. The former predicates not only a geographic concentration but also functional links between the firms in a cluster. Concepts for industrial districts (Belussi & Pilotti, 2002; Sforzi, 1989) or the creative milieu (Maillat, 1998), for example, note the importance of cooperation relationships that benefit from their proximity and that are often based on trust (Bathelt, 1998). One can use transaction-cost theory (Scott, 1988) and the embeddedness approach (Uzzi, 1996) to argue that geographic proximity reduces communication costs and that face-to-face communication promotes the development of binding, trusting, and reciprocal relationships (Sabel, 1994). In this regard learning processes are due, in particular, to cooperation between local companies along the value chain. Despite the plausibility of the argument, the tendency for a firm to cooperate is often just as strongly geared to partners outside its cluster as to those within it. Empirical studies such as the software cluster in Darmstadt, southern Germany, show that lead firms and technology SMEs in the region attach substantially greater importance to strategic alliances with partners outside the region than to local opportunities for cooperation (Angelov, 2006). It is clear that functional links in a cluster are not as strong or important as supposed in traditional concepts.

Firms in a cluster are consequently a concentration of related activities based on a social division of labor between different stages of the value chain and in competition within the same stage. Malmberg and Maskell's (2002) knowledge-based theory of clusters thus incorporates the concept of rival learning. The two researchers explicitly explore the relative advantage of having a multiform cluster rather than a single integrated firm in one place. In the case of full internalization, a single firm could exploit internal economies of scale through the reduced unit costs of large production capacity, minimize external transaction costs through an authority-based governance mode, and smoothly organize the transfer of knowledge under a regime of hierarchical control. By contrast, multiple and colocated firms engaging in

parallel and rival experimentation are more likely to generate variations of techniques and solutions that would be impossible within a single firm because of the common vision and corporate coherence it needs. This variety increases the opportunities for each firm to identify and imitate successful practices by attentively observing their competitors (Malmberg & Maskell, 2002; Malmberg & Power, 2005).

There are various mechanisms to promote observation and imitation. One is learning-by-hiring (Song, Almeida, & Wu, 2003), another is the adoption of new information and ideas from the “local buzz” within a communication ecology (Bathelt, Malmberg, & Maskell, 2004). Cluster structures favor competition and rivalry in these ways because competitors operate under the same environmental conditions, meaning that none can credibly claim any advantages—or excuse laggardness—deriving from external factors (Porter, 1998). Consequently, competition for innovation focuses purely on a firm’s ability to develop new solutions and launch them on the market. Geographic proximity grants many competitors increased visibility and thus a greater opportunity to imitate new solutions more quickly than is likely for a spatially isolated firm. There was once a time when urban variety and density were considered the drivers of imitation and the recombination of existing knowledge in other sectors or functional areas and when the city was seen as the driver of economic innovation (on both counts see Jacobs, 1969). More recently, however, proponents of cluster approaches (Malmberg & Maskell, 2002; Porter, 1998) note that rivalry, observation, and imitation under the same local underlying conditions can also be the source of innovation for local production systems outside cities and urban regions. Unlike the concept of the industrial district, which highlights interactional collaboration, the concept underlying cluster approaches bases learning on noninteractional rivalry. In addition, rival learning can explain why firms in clusters enter into so few formal cooperations (Malmberg & Maskell, 2002; Angelov, 2006).

Organized Network

Unlike regional clusters, which are often only loosely linked, the organized network focuses on actively coordinated interfirm cooperation. We define an organized network as a voluntary and purposive association of members that aligns the multilateral collaboration between a finite number of independent organizations with a collectively shared utility (Glückler, 2012). Organized networks serve to generate cooperation gains and external savings. They are an organizational instrument for constantly reinforcing the competitiveness of the individual members (Araujo & Brito, 1997). This networking makes it possible to recombine various kinds of knowledge, something that no individual member would achieve in its entirety (von Hayek, 1945; Inkpen & Tsang, 2005). The tendency to cooperate enables corporate networks to offer a backdrop for cooperative learning; they jointly generate knowledge with friendly imitation.

To use the advantages of this cooperation jointly, rules and organs through which to implement them are developed by the members as part of their network gover-

nance. Members undertake to meet the expectations in the network, which are based on formal, contractual rules and standards and on established and collectively shared conventions. Particular importance is attached to the conventions. A member cannot just opportunistically use the knowledge of other members against their will and for his or her own purposes without violating the convention and having to fear sanctions. Violating a relationship of trust in networks implies far greater consequences than simply the disapproval of the damaged partner. If joint associated third parties find out about A's opportunistic behavior with B, then B as well as all of the other partners lose their trust in A (Glückler, 2001). Even though conventions have no legal character, their violation entails the risk of being shunned by the community or even excluded from it (Weber, 1922/1978). Hence, interfirm networks offer a suitable backdrop for cooperative learning in which practices of unfriendly imitation are not only illegitimate but effectively sanctionable.

Colocated Network Organization

The third context of geographic organization is the locally organized network. It includes features of both learning processes, that is, friendly and unfriendly opportunities for imitation. Outside the strategic alliances established in the network, the physical proximity of local companies makes for unplanned personal contact (Rallet & Torre, 1999) and many other forms of mutual observation, often dubbed local buzz (Bathelt et al., 2004). The simultaneity of geographic proximity and cooperative relationships allows both friendly and unfriendly imitation, albeit in the context of a network based on conventions and rules, which sanctions unfriendly imitation more strongly than in a geographic cluster. Misbehavior can thus be identified and sanctioned with relative ease. Locally organized networks constitute a special type of organized network. They link the advantages of physical proximity with the advantages of organized cooperation in developing and disseminating innovations. The following empirical case study on a network addresses the central issue of colocated network organizations: the perception and regulation of the diametric opposition that results in locally organized networks when the opportunities for unfriendly imitation benefit from physical proximity and when opportunities for friendly imitation benefit from cooperation.

The COMRA.DE Network Case Study

COMRA.DE: Ideal Type of Local Interfirm Network

COMRA.DE is an organized network of 25 technology SMEs that offer solutions and services for e-commerce and the new media market. The network was established in response to the crisis at SELLSOFT.¹ Sellsoft had held a leading market position in

¹ SELLSOFT is a pseudonym for a large technology company on the new media market.

the German e-commerce business until the New Economy's bubble burst in 2003. The upheaval led to mass dismissals of employees, many of whom eventually found new jobs through a transfer company. The head of the human resources department at that time wanted to offer the former employees new perspectives and encourage them to form their own companies. The easy access to infrastructure (e.g., office rentals and state-of-the-art communication technology) and continual professional exchanges were particularly important in this regard. From the outset, these activities took place in a highly concentrated geographic area, a common office building that also houses SELLSOFT. In 2005 the firms then officially adopted the legal form of a cooperative, and the network was formed as an organization. By 2010, COMRA.DE had grown from the initial 26 employees to 351 employees. Over the same period, SELLSOFT shrank from more than 1200 to 275 employees, making COMRA.DE larger than its former parent.

COMRA.DE was created without public subsidies, purely on the private initiative of the shareholders. As a type of network organization, the cooperative offers the advantages of binding its members more strongly than an association, but it is not as hierarchically structured as a GmbH (German public limited company). The network is formally governed by the executive and supervisory boards. A member company takes on the role of network spokesperson, and membership is due to the purchase of units in the cooperative. Each member has one vote, which means they have equal voting rights. This formal governance structure guarantees the members sufficient flexibility and independence. In addition to the cooperative rental of the office property, the individual companies reap collective benefits from bundling specialist expertise to solve complex tasks and from pooling capacity to process larger orders. As a result, the cooperative can work on the market as an end-to-end provider with the greatest possible bandwidth and, for example, pursue joint marketing activities and receive improved purchasing conditions.

Within the cooperative the member firms specialize in different areas of competence, such as developing software for online shops, mail-order solutions, mobile applications, online marketing, and Web design. These competencies are offered to SMEs and large enterprises alike. In addition, the network operates as an e-business service provider for other cooperatives. In 2007, COMRA.DE recorded revenues of €17.5 million, up 80% from the previous year. This figure was the largest percentage increase in revenues the network had yet achieved. In the following year, revenues totaled €18.1 million; in 2009, €19.2 million (Beck, 2011).

Method

COMRA.DE agreed to participate in a network case study from May 2010 to September 2011. In preliminary discussions the spokesperson reported a series of problems and challenges for work in the network, which finally led him to agree to a scientific investigation of organized networks as part of the research consortium krea.nets (Glückler et al., 2012). The method for the study was based on the

procedure for situational organizational network analysis, SONA (Glückler & Hammer, 2012), which integrates qualitative and quantitative research methods in six consecutive phases. The case study was based on expert interviews² with four company owners and the network spokesperson, who with his own company is also a member of the network. A customized network questionnaire was prepared from the interviews and offered to all of the network members for a standardized network survey. Of the 25 members invited, 20 participated in the study, a return rate of 80%. The data collected in the survey was then evaluated with methods of social network analysis (Borgatti et al., 2002). The results of the network analysis and the interviews with the individual network members were presented and discussed at one of the monthly shareholder meetings to ensure communicative validation of our findings. The empirical research and data collection is based on joint contributions by Beck (2011) and Hammer, Beck, and Glückler (2012).

Results

Breaking Taboos

Friendly imitation is based at least on goodwill, and often also on active support in transferring existing solutions to another network member. If companies violate this convention through secret, unagreed-on imitation, then conflicts in the network are inevitable. But what does breaking taboos look like when it comes to unfriendly imitation? The case of COMRA.DE illustrates the breaking of a taboo. The members of the COMRA.DE network share information on the current trends in the e-commerce sector. In late 2010 social network technology was a major issue, so members discussed how COMRA.DE could further hone its profile in this area and generate additional benefits for the network. The discussions led to the idea of developing software that would link online shops with the most frequently used social networks in the Internet, without this connection having to be initiated. Three of the member firms decided to collaborate on a project and jointly implement this idea with a finished product. A fourth member firm observed their activities and broke the taboo. At a trade fair it published a press release stating that it, together with a major competitor outside the COMRA.DE network, would be the first provider to launch a standard shop for social networks on the market. However, this member had never worked together with the original developers or supported the joint development:

The fourth member did that alone, was not involved in the design and development, and didn't say a word to anyone—"pssst"—and did this secretly with SELLSOFT, and then published the press release on this subject without saying anything to us beforehand. (Member of the original development group, November 2010)

²All of the interviews were recorded, transcribed, and coded with MAXQDA.

It was not the first time that this member had used rival learning against other members of the network. The chief executive had already attracted attention on several occasions in the network with his noncompliant activities. The members had repeatedly informed the entrepreneur that his behavior violated the conventions of cooperation they had agreed on at one of the cooperative's monthly meetings. In personal discussions, other members attributed the "persistence" of this unfriendly imitation to a lack of sanctions on such behavior and the ineffectiveness of the disapproval of actually engaging in opportunism. Nevertheless, no attempts were made to exclude this member from COMRA.DE:

This is the legendary black sheep who will always be a black sheep. The fact that this company has a very similar level of knowledge makes this process [of imitation] much easier. I am concerned, once again, about this action. At some point or other he will have to learn—and yet apparently we haven't made a major impression—because he has never been thrown out. OK, he's a tenant here, he has a whole floor. If we throw him out, then we have a problem. He won't cease to exist in a city like this, either. He'll still be there. Until now, we thought that we would [keep] that crazy guy under control, give him a bit of guidance and influence him. (Network spokesperson, November 2010)³

The analysis of the interviews suggests two findings. First, although the deviant firm imitated a potential economic product from its network colleagues, a formal exclusion was not possible. According to the network policy that had been formalized and circulated among all members, competition between network members must not be hampered under any circumstances. Technically, the instance of unfriendly imitation was not a violation of codified rules, for the perpetrating firm produced its solution with own resources and partners for their own, separate customer. Second, the consequences of excluding the deviant firm from membership would have been more serious for the rest of the network than for the black sheep. Thus, the other members decided to maintain membership but to withdraw from the conventions of cooperation, that is, of exchange knowledge and friendly imitation. If they stopped knowledge exchange with the black sheep, they would still benefit from observing its activities as long as that member continued to have its offices in the same building as they did. The members thereby sanctioned the taboo-breaker not by formal exclusion but by articulated disapproval and soft exclusion from internal forms of cooperation: They no longer invited that member to joint activities and excluded it from open knowledge exchange and collaborative projects. Moreover, that member was suspended from the "cafeteria atmosphere" at lunch time and from unofficial management meetings. As one member firm reported, "[The black sheep] will be isolated, and nobody will talk to them any more" (Interview, November

³The term "black sheep" was used in this specific case of unfriendly imitation. Actually, both the rule-breaking member and the network have been very successful in business. Whereas the network relies on friendly imitation, the deviant member firm relies on a supply network consisting of business firms outside COMRA.DE. At the time of our investigation in 2010 and 2011, this firm reported 23 employees but had expanded to more than 100 people by the time of this chapter's publication in 2016. For lack of space in the joint office building, the member chose to resign from the network to pursue its own business and growth strategies, upon which it had embarked in the previous years.

2010). It is apparent from discussions with members of the network that violating the taboo of unfriendly imitation results in perceptible sanctions against illegitimate behavior, in particular through exclusion from the local communication ecology in the network. But what are the consequences for the excluded firm? Does the black sheep really experience disadvantages from soft exclusion?

Forms of Cooperation and the Consequences of Breaking the Taboo

In the first meeting and in personal interviews, network members highlighted the gains from collective learning among members. Employees often asked for assistance, and they exchanged program parts, codes, and other technical or organizational solutions with employees from other member firms just across the corridor. The physical proximity in the same building, together with the related activities of the firms in the same field of technology, was found to be a powerful source of collaborative learning. The information revealed in the interviews was used to develop a specific network questionnaire, which was then used for a network survey to capture all bilateral relationships across four distinct forms of cooperation among all members of COMRA.DE (see Fig. 13.2).

The first form of cooperation in this multilevel network was the imitation-of-solutions network. Firms in the network survey were asked to provide information on the use and transfer of solutions from other members.

Over the past four years, have you introduced in your company new features or concepts that were developed by other members of COMRA.DE? Please consider novelties such as products, plug-ins, applications, code parts, marketing concepts, and organizational concepts. If this was the case, which companies developed these new features?

The responses were used to construct a network in which each link denoted an instance of one member imitating another member's solution. This type of imitation was of no legal relevance with regard to copyright violations. The companies freely disclosed their knowledge, and the imitation constituted reuse of artifacts in software or the company's organization, which are very difficult to protect under law.

The second form of cooperation was the knowledge-exchange network. In the interviews, members argued that network activities increased their opportunities for imitation and information transfer. The companies reported that knowledge was regularly exchanged both between employees and at a management level. Employees and managers either held informal discussions in the corridors or specifically looked for each other to obtain help and advice to solve concrete problems. On the basis of these interview descriptions, the members in the network survey were asked to indicate all partners who had helped them solve work-related problems, a proven survey item that conveyed valid representations of the knowledge network in previous studies (Glückler, 2008, 2013b, 2014; Glückler & Panitz, 2014).

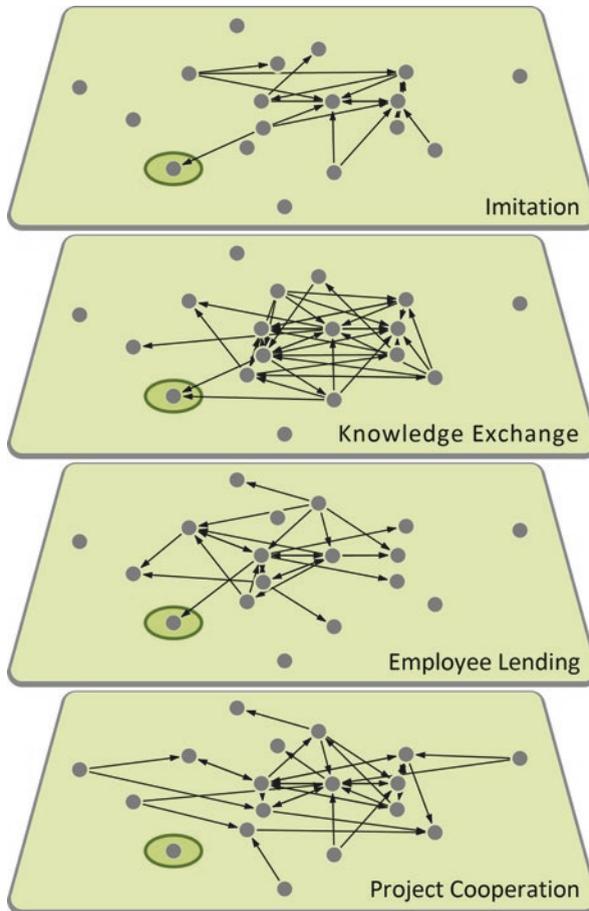


Fig. 13.2 Four forms of cooperation in the COMRA.DE corporate network. From Glückler et al. (2012, p. 177). The shaded circle highlights the position of the “black sheep” in the different forms of cooperation. Reprinted with permission of Springer

A third form of cooperation practiced within the network was employee-lending, that is, the temporary sharing of employees between the partner firms. Employees were used in the partner companies as consultants. When required, they also helped with the design of concepts for Internet purchasing systems. The amount of time spent as a temporary worker varied greatly. Some consultants were lent only for a specific project; others had been cooperating with the partner companies for several years. Lending employees was a widespread practice in the COMRA.DE network. The firms were then asked to state those members to which they had already deployed employees over the last years.

Finally, the fourth form of cooperation was the project-cooperation network. Network members were asked to state those partner firms with whom they had

Table 13.1 Four forms of cooperation in COMRA.DE

Variables	Number of network components	Network density ^a	Number of relationships	Relationships per member (mean)
Imitation	9	0.04	17	0.85
Knowledge exchange	7	0.10	38	1.90
Employee-lending	8	0.07	25	1.25
Project collaboration	4	0.09	35	1.75

^aNetwork density is calculated by dividing the number of observed relations by the number of possible relationships. Adapted from Glückler et al. (2012, p. 177). Reprinted with permission of Springer

repeatedly collaborated in concrete projects in the past.⁴ In professional software engineering, particularly in the IT industry, it is standard practice to modularize common project outcomes and reuse them in other projects. In the software industry joint projects can become a key process for knowledge imitation because developed project solutions such as programs, code, or parts of programs and code—so-called code snippets—can easily be reused in other projects.

The imitation network was the most highly fragmented of all the activities. Slightly more than half of the members had already used concepts, plug-ins, or code sections from other network members for their own operating purposes. This imitation allowed the companies to save development time and to make solutions to problems available in the company. Not only was friendly imitation as a network activity at a moderate level in the network, it was also the activity with the fewest relationships, the lowest density, and a comparatively low number of average relationships per network member (Table 13.1). The size and similarity of the member companies were statistically unrelated to engagement in imitation among network participants. In particular, the exchange of knowledge and the cooperation on joint projects were the strongest network activities in COMRA.DE. They included the largest number of members, the greatest density, and the largest number of relationships.

What was the position of the deviant firm that had repeatedly broken the conventions of the network? If the firm had really been sanctioned with disapproval and exclusion from the communication and cooperation relationships, that status would be reflected by a relatively peripheral or even isolated position in the network. Indeed, according to its own response and the responses of the other members to the items in the survey, the deviant firm was largely isolated from any activity. It did not lend any employees to other members, receive any solutions from other companies,

⁴To rule out other explanatory factors, we included many additional variables, such as the entrepreneurs' joint history, capital participations between member companies, and company prestige. Later analysis showed all these variables to be insignificant, however, so we do not address them in depth in this chapter.

participate in any exchange of knowledge, or cooperate in projects. The company was isolated especially from project work and was avoided by all three of the other companies. However, the other members of COMRA.DE reported that the company was a source of knowledge and imitable concepts and was a target for their own employee-lending. Yet on the whole, the noncompliant firm occupied only a peripheral position in the network (Fig. 13.2).

What was the benefit of a peripheral location in an organized network? The answer is quite simple: The physical proximity resulting from collective location in one building meant that imitation could never be stopped even if communication and collective projects and other work was very slow between the rule-breaker and all others. Therefore, the black sheep's continued membership let the other members benefit from the increased visibility and monitoring of new technical and industry-specific developments.

If there are regular exchanges between 26 or 27 companies, then you are much more on the ball than if you were to be in the inner city with a team of 15 employees or in a commercial zone. You would never get the same value there. And I certainly don't mean that negatively, but the value of fast exchanges, including at an employee level, that's something we have only here in the network. (Interview with a member of the COMRA.DE corporate network, July 2010)

Despite the deviant firm's opportunism, the other members exploited the advantages of physical proximity and organizational membership. The fact that the taboo-breaker still belonged to the network meant that they believed it legitimate for them, too, to observe the company and to imitate its successful practices and solutions without approval. On the whole, the network analysis confirms the sanctions of disapproval detailed in the interviews, which were expressed by soft exclusion from the various forms of internal cooperation rather than by exclusion from membership altogether. The firm was thus forced into structural periphery of its relational activities. Despite the short-term advantage of unfriendly imitation, the violation of network conventions must ultimately be viewed as negative on the whole. Breaches of taboos place the culture of cooperation at risk, undermining the cooperative core of a corporate network. In the following section we analyze the mechanisms of friendly imitation, that is, the economic opportunities arising from the combination of connectivity and contiguity.

Practices of Friendly Imitation

Conventions of friendly imitation are based on either approval or even active support of one firm's reproduction of another firm's solution. Discussions with network members left no doubt that the different forms of exchange and cooperation were geared to providing other parties with solutions in eventual or immediate exchange for help and advice. The imitation network in Fig. 13.2 documents the results that relationships have for friendly imitation, but it provides no information on the enabling conditions. Network-related statistical methods can be used to investigate

Table 13.2 MRQAP: Effects of forms of cooperation on the dyadic imitation of solutions

Variable	Model 1	Model 2	Model 3	Model 4
Knowledge exchange	0.394** (0.042) ^a			0.370** (0.036)
Employee-lending			0.045 (0.047)	-0.170* (0.042)
Project collaboration		0.327** (0.038)		0.292** (0.039)
<i>adj. R</i> ²	0.153	0.105	-0.001	0.228
<i>p</i>	0.000	0.000	0.319	0.000

^aStandard deviations are in parentheses. * $p < 0.05$. ** $p < 0.001$. $N = 20$ members, 380 observations, 5000 permutations. Dependent variable: imitation network. Adapted from Glückler et al. (2012, p. 179). Reprinted with permission of Springer

whether the various forms of cooperation support imitation, with the imitation network being the dependent variable. The results of a series of multiple network regression models (MRQAP, see Krackhardt, 1988) have shown that bilateral project cooperation and exchange of knowledge significantly increase the propensity of two partners to learn from each other through successful imitation. Model 1 illustrates the significant positive association between knowledge exchange and successful imitation (Table 13.2), a finding also reflected by an interview in which a network member told of the effect that collaboration had had on imitation.

There is an online shop called Magento..., and all of these member firms that I just mentioned use Magento. There's a lot of transfer here because the employees ask people, "Tell me, have you already written a plug-in for Magento? It can do such and such." And they say, "Yes, we've done that." (Interview, July 2010)

As with knowledge exchange, cooperation in projects also promoted imitation between companies (model 2). In projects, knowledge from different companies was merged and further developed to create new solutions. Companies reported that the newly developed solutions were stored not in a joint program library, as is often the case in the software industry or development syndicates, but rather in the companies participating in the projects. This practice may be due to two facts: (a) the use of standardized shop systems in the e-commerce industry, and (b) the use of many different software systems. In the COMRA.DE network, for example, more than six different shop systems were in use, with business firms mastering more than ten different development environments if one includes programming language as well. Therefore, the joint projects allowed the simplified development of specialist applications such as the use of new security systems on different standardized systems that were equally used by a large number of companies. The new media industry was characterized by standardization, modularization, and the accumulation of knowledge. However, this knowledge was stored in and used by the individual companies, not jointly (Grabher, 2004). Clearly, projects promoted the transfer of codified knowledge for the companies involved.

The fact that firms were engaged in employee-lending seems unrelated to the probability of their learning from each other (model 3, Table 13.2). The multivariate

model 4 encompasses all three levels of cooperation and confirms the combined effects of knowledge exchange and project cooperation on imitation relationships. In summary, we see that various levels of cooperation and prevailing conventions of friendly imitation supported the transfer of solutions between members. This cooperative learning promoted the innovative abilities of the individual members and was fostered in particular by the mutual exchange of knowledge between the companies and their joint project work.

Conclusion

Although spatial contiguity and network connectivity have for the most part been investigated separately for their role in knowledge creation, we have combined the two perspectives to explore the opportunities and tensions that emerge from situations in which organized connectivity and spatial colocation come together. We have argued that connectivity among firms facilitates purposive collaboration and forms of friendly imitation, whereas spatial proximity also enhances the mutual visibility among even disconnected firms and thus increases the incentives for unfriendly forms of rival learning and unilateral imitation. The case of COMRA.DE has illustrated how an organized business network's members who are collocated in an office building have experienced both friendly and unfriendly imitation. Our analysis has shown the imitation of successful solutions from other members. Variation leads to a superior position, and imitation gives the company a head start when looking for new solutions. Even if the network promotes these collective gains from learning, not all of the companies are equally committed to cooperation. In particular, members learn from the partners with whom they have worked on earlier projects and with whom they have repeatedly exchanged knowledge that can be used in the company to solve work-related problems.

What are the consequences for the management of organized networks? Variation and imitation in organized networks are an opportunity to reduce the individual's costs of continuous learning. This process can be actively supported if the firms manage to share their knowledge and to work together on projects. As Dyer and Hatch (2006) ascertained for the automotive industry, a mutual opening of the firm is to the advantage of all of the partners. However, a convention of friendly imitation is also an opportunity to develop excellent practices for developing common learning processes and, at a later stage, to establish network goods (Glückler & Hammer, 2015). Network goods in COMRA.DE could be joint program databases or organizational concepts for cooperation based on the division of labor. We argue that awareness of the convention of friendly imitation is a fundamental requirement for successful cooperative learning.

However, variation and imitation in physical proximity also allow spillover effects from friendly imitation. One of these results was reconstructed in detail in the interviews with members. Unfriendly imitation is regarded as a breach of existing conventions, and its effects quickly circulate among members (Coleman, 1988). In the

case of COMRA.DE, the sanctions have been expressed in collective disapproval (Weber, 1922/1978) of the member who has broken a taboo. Although the network management board or its shareholders at first refrained from tangible sanctions such as formal cancellation of membership, the members practiced various forms of soft exclusion leading to the deviant member's isolation from most forms of cooperation. That member ended up on the perimeter of the network for cooperative learning and finally resigned from the network. The new prevailing semiconvention in the relationship with this member was legitimacy for both parties to pursue rival learning practices. This case illustrates that interfirm collaboration involves a tension between cooperation and competition, especially in situations of spatial colocation where the actions of others are relatively observable and rather easy to imitate even against their consent. The legitimacy of imitation is therefore highly institutionalized in terms of conventions and taboos.

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