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Proximity is a Social Process: A Conceptual Framework

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Abstract:

Spatial proximity is assumed in the literature to be a prerequisite and trigger for cooperation and, subsequently, innovation. This paper examines conceptually the role of proximity between actors for cooperation activities. Using theories and findings from social psychology and combining them with geographical issues, it provides new insights into the emergence and development of professional collaborative relationships and the role that spatial proximity plays. Thereby the paper stays on the level of individuals (micro-level) and explains how the willingness to collaborate emerges and how local partner priorities are developed.

Keywords: Collaboration, Partner Choice, Proximity, Innovation, Geography.

JEL Classifications: L14, O32, R10

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I Introduction

The importance of innovation for growth in regions and development of wealth in countries was studied intensely by different scientific disciplines during the last five decades. In the field of Economic Geography, scientists deal with questions about innovation processes at different geographical levels. During the last 25 years the level of analysis became increasingly focused to gain deeper insights in innovation processes whereby new frameworks and theories like the concept of National (Nelson 1993; Lundvall 1998) or Regional Innovation Systems (Cooke 2001) were developed (Lorentzen 2005; Bathelt & Depner 2003).

During the last ten years an increasing number of studies dealt with the question which prerequisites are required for the development of successful collaborations at the firm and individual level in regions. The reason is that important innovations very often arise in collaborative work between different partners, because of knowledge spillovers and common learning processes (Boschma 2005; Noteboom 2008; Asheim & Gertler 2007; Grabher 1993).

An established way of analysis is to study different databases (e.g. patent and bibliometric databases, CIS data etc.) whereby the attributes of collaborating partners are observed and compared (Breschi & Lissoni 2009; Ter Wal 2009; Singh 2005; Boschma 1999). The common finding is that similar attributes among actors or a common environment more likely lead to collaborations and finally to innovations. Associated therewith, a lot of concepts were developed and adopted from other disciplines in order to have explanatory tools at hand for the complex economic and social processes that happen in spatial proximity. The most common ones are different types of proximity, e.g. social, institutional, organizational and spatial proximity (Boschma 2005), trust in organisational relationships (Kramer 1996), embeddedness (Hess 2004; Uzzi 1997) and social networks (Asheim & Gertler 2007; Borgatti & Foster 2003).

Actually, the use of databases like those mentioned above to identify actor's attributes and environmental settings was a good starting point to proof the *importance of similarities* between actors for innovation processes. Here spatial proximity is an indispensable prerequisite to identify these similarities by getting in touch with each other and building up professional collaborative relationships[1] (PCRs) that lead to common learning processes and finally innovation. Unfortunately, these studies could neither completely explain the *rise and dynamics* nor the underlying *characteristics* of collaborative relationships. One of the reasons is that very often the unit of analysis were firms, suppliers, universities (hereafter: 'actors') or even whole regions and insofar objects but not real

[1] Professional collaborative relationships (PCR), as they are used in this paper, include a task aspect and a social aspect. The first deals with common professional interests, common project goals, complementing skills etc., hence everything concerning matching and complementing knowledge and skills that enables the partners to do projects with a valuable outcome. The latter aspect refers to their personal relationship dealing with features like trust, loyalty, team feeling, sympathy, same humour etc. (Kraut et al. 1987; Frost & Taylor 1996)

persons. Additionally, databases do not include any social information like degree of trust, common values or goals, degree of friendship etc.). Hence, social information was often excluded a priori or remained strongly underexposed by using only artificial parameters created out of non-social data. In contrast, studies about collaborative relationships at work proof that the "...establishment and maintenance of a personal relationship is the glue that holds together the pieces of a collaborative research effort. Often it is at least as important as the content itself" (Kraut et al. 1987, p. 53). These findings show the importance of social features in professional relationships. To understand the collaborative behaviour of actors that is underlaid by the team performance of their employees, it is necessary to use individuals as the unit of analysis and to see them as part of a specific group having particular dynamics and goals. In that sense, the emergence and realization of collaborations includes a social process between the co-operating employees, their motivations and priorities about partners in an occupational context.

Social psychology provides various theories dealing with the development of work relationships including co-operative behaviour (Rotemberg 1994), choice of partners (Kraut et al. 1988), team performances in projects (Tuckman 1965), trust (Guirdham 2002) and friendship (Argyle & Henderson 1985). Hence, a combination of former geographical findings and social psychology theories provides a framework for further insights how spatial issues influence the individual's willingness to collaborate, into the partner priorities they have for common projects and the characteristics work teams develop. Of course, this framework implies that individuals are free to choose their partners (and to break up with them), what is mostly true for academics. In order not to exclude non-academics, the framework is enhanced by considering that in many cases individuals are restricted or heteronomous by the decisions of superiors and supervisors about partners[2]. Different studies have proven that the search process of firms for collaboration partners is strongly influenced by entrepreneurial decisions, existing firm networks, economic assumptions and the type of collaboration that a firm aims at (Blumberg 2001; Eden et al. 2008; Li 2005). To shed light on the function of spatial issues in partner search and collaborating processes is the main aim of this paper:

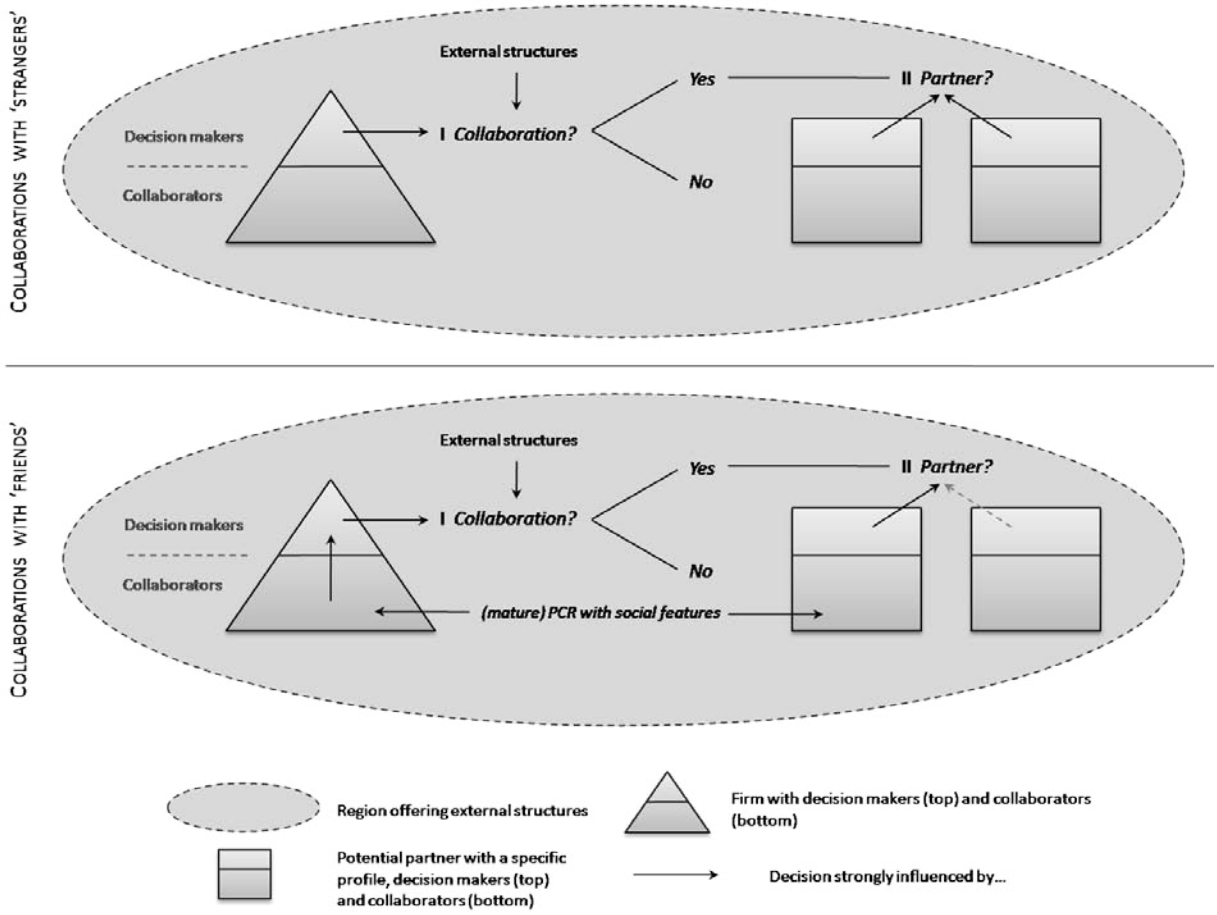
(A) *How is the individuals' willingness to co-operate for innovation with external partners triggered and influenced by spatial proximity and territory issues?*
(B) *How and why do individuals develop priorities for local partners?*
(C) *How are group characteristics and performances influenced by spatial proximity and territory issues?*

The conceptual framework developed in this paper builds upon former approaches in the field of economic geography dealing with social issues like social proximity, embeddedness and trust. First, theses concepts are briefly recapitalized. In a second step, social psychological theories are presented and combined with geographical aspects to give insights in the development of trustful, enjoyable and valuable relationships between individuals in teams and to clarify the role of spatial proximity. Here, the

[2] We will keep and consider this distinction between collaborating and decision making individuals in the whole paper, because the mechanisms for first-time and repeated partnerships are in anyway different between these two groups.

emergence of partner priorities is explained. In a third step, it is shown how individuals are motivated by their occupational environment to collaborate. Clarifying its function at the individual level and showing the linkages to superior decision makers in the firm or institute will give a deeper understanding about the collaborative behaviour of collocated actors in regions. The following figure gives an overview about the objectives and interactions occurring in the partner-search and collaborating processes in regions that are discussed in this paper.

Figure 1: Objectives and interactions in collaborating processes



II Social approaches in Regional Innovation Systems

This chapter gives an overview about the theories in economic geography explaining the importance of social processes for the innovation performance of firms and regions. Beginning in 1985 with Marc Granovetter's theory about the embeddedness of economic activities in social structures (Granovetter 1985), various approaches were developed to express the idea that it is human beings who interact in economies and therefore all professional relationships include social features (Håkansson & Johanson 1993). Unfortunately, contentual overlaps and the different use of terms sometimes lead to fuzziness and ambiguity in the research field (Hess 2004; Markusen 1999).

II. 1 EMBEDDEDNESS

The concept of embeddedness bases on the ideas of Karl Polanyi (1944). His dissatisfaction "with the absolutization of the market and its underlying rationale of self-regulation and economizing behaviour" (Hess 2004, p. 167), led to a concept that embedded economic behaviour in general in a social context and social structures. The ideas of Polanyi had been very abstract. Marc Granovetter reconceptualised Polanyi's ideas in 1985 and transferred them into a more concrete concept. He argued "that most behaviour is closely embedded in networks of interpersonal relations and that such an argument avoids the extremes of under- and oversocialized views of human action" (Granovetter 1985, p. 504). In a later paper, Granovetter (1993) specified the level of analysis in his embeddedness approach by defining two types of embeddedness: relational and structural embeddedness. The former refers to dyadic relationships between single persons (individual level) and the latter describes relationships among a number of actors (firm level) as a network (Granovetter 1992).

Next was to specify the 'social' features in the embeddedness approach conceptually. The aim was to express that economic action is influenced by individuals' backgrounds (I) and additionally their personal relationships with others (II) that are built up in an occupational environment (III) (Grabher 1993). Martin Hess (2004) developed a spatial-temporal concept of embeddedness including three dimensions: societal (idea of social and cultural background of individuals), network (idea of trustful relationships at the two levels of individuals and organizations) and territorial embeddedness (idea that the particular characteristics of a territory influence economic activities and social dynamics).

His concept is the one closest to the social approach developed in this paper, because it considers that two very influential factors in professional relationships are *space and time*. Additionally his concept presumes that not only the environment (structures, institutions etc.) influences individual behaviour, but individuals and their relationships shape this environment as well.

II. 2 SOCIAL AND SPATIAL PROXIMITY

Social proximity in our paper refers to the social features in PCRs of individuals, which we define as 'internal structures' of collaborative work groups. It originates from the concept of embeddedness and refers directly to the individual level. "Social proximity is defined […] in terms of socially embedded relations between agents at the micro-level. Relations between actors are socially embedded when they involve trust based on friendship, kinship and experience" (Boschma 2005, p. 66). The social proximity concept considers social factors like friendship, loyalty and trust between people and therewith it deals with restrictions in economic activities that arise from human behaviour. The concept points out that economic activities – especially collaboration projects – are difficult or even unlikely between people who are not related to each other.

The social proximity approach is strongly linked with the idea of spatial proximity. The reason is that building up social relationships, especially their indispensable social features, requires a very high communication frequency at the beginning and the chance to talk to each other unplanned and in different contexts (Kraut et al. 1988; Boschma 2005). This high frequency of face-to-face contacts can only happen in spatial proximity and is not substitutable by any media or organizational pattern. Referring to Kiesler & Cummings (2002) over the last decades of research the spatial proximity term was used in different contexts and spanned very different degrees of range. The definition above refers to a type of proximity, where people can interact face-to-face and observe each other (hereafter: *high closeness type of spatial proximity*) (Kiesler & Cummings 2002; Kraut et al. 1988). All arguments about the impact of proximity on the construction of relationships including trust etc. refer basically to that first type of proximity. Being separated from each other more than 30 meters the daily contact is much reduced, less informal information is exchanged and the likelihood of voluntary work is drastically reduced (Kiesler & Cummings 2002). Here, the construction a PCR is more difficult and the initial phase (forming and storming, see chapter III.2) is negatively impacted. This second type of spatial proximity we will face in the paper does not facilitate a direct interaction, but it is still possible for the team members to meet each other with an acceptable effort (hereafter: eased reachability type of *spatial proximity*). How much that is depends strongly on the resources of the team members. Furthermore, common external structures[3] like work and social settings are shared between the members. The advantages a regional co-location of actors refer first of all to that second type of proximity. The last type of spatial proximity is the one where neither an interaction nor easy meetings are given, because of the costs are too high. Hence proximity is not given anymore (*distance*). That circumstance is deemed to impact co-operations strongly negatively and ICT can reduce the resulting problems just to a certain level (Nardi & Whittaker 2002; Kraut et al. 1988; Kraut et al. 2002).

A geographical study by Ter Wal (2009) revealed that among different types of proximity, social proximity plays the most important role in network formation between collaborating partners.

[3] „External" expresses, that these structures are environmentally to collaborations. It is a distinction to the social structures/relationships between the collaborating individuals explained in chapter II.

Additionally, case studies about collaborations at work identified very close spatial proximity as main prerequisite for successful co-operations (Frost & Taylor 1996; Gersick et al. 2000; Bell & Zaheer 2007). With the help of literature from social psychology this paper will show, in which stages the different types of proximity (and how far that is) are needed to build up successful professional relationships.

II. 3 COGNITIVE PROXIMITY

"With the notion of cognitive proximity, it is meant that people sharing the same knowledge base and expertise may learn from each other. [...] [A]ctors need cognitive proximity in terms of a shared knowledge base in order to communicate, absorb and process new information successfully" (Boschma 2005, p. 63). The term “cognitive proximity” in this paper refers to the task features in a relationship, which means that partners share common and complementary skills and knowledge. On the one hand, cognitive proximity makes the establishment of collaboration more likely and, on the other hand, it ensures a more valuable outcome because it supports communication and absorption (Boschma 2005) and, concerning common professional goals, it triggers the ‘team feeling’ between partners (Hinings & Greenwood 1996; Dutton et al. 1996). However, while commonalities are important for working together successfully, when aiming at new knowledge and innovation as an output of collaboration, differences are important as well to generate new combinations of knowledge and avoid cognitive lock-in. In the social-psychological literature it is often argued that relationship conflict is detrimental to team performance, whereas task conflicts improve it, because of a higher discussion level. A study by De Dreu et al. (2003) revealed that conflicts in both aspects are negative for teams and only in very specific cases actually helpful (De Dreu et al. 2003). Hence, consensus is undoubtedly needed in the relationships between team members and disagreement on the task or cognitive level is on a small level useful, but should never end in conflicts.

II. 4 TRUST

Looking at all the different approaches considering social features, trust appears as the most elusive one. First of all, it is included in each of the concepts mentioned above and, in that sense, it is not an own holistic concept, but a vague idea that seems to underlie every kind of co-operation having no clear definition attached or better to say: hundreds. Every scientific discipline found its own interpretation and definition of trust (Bachmann 2006; Lewicki & Bunker 1996). Hence, trust is used in the sense of intuition, as expectation, as emotion, as conviction, as behaviour; sometimes trust is only a result of social structures or reputation, sometimes it depends highly on situations, past events and personnel constellations (Rüggenberg 2007).

Certainly, the importance of trust is distinctive for interpersonal activities. It raises co-operative behaviour (Aronson et al. 2009; Bouma et al. 2008; Hinings & Greenwood 1996; Rotemberg 1994), makes professional relationships and information exchange more effective (Kraut et al. 1988; Singh 2005; Sorenson et al. 2002; Torre 2008) and is the main prerequisite for satisfied relationships in any context (Winstead et al. 1995; Aronson et al. 2009; Hinings & Greenwood 1996; Gersick et al. 2000).

A very good distinction concerning the aim of this paper to get insights in collaborative work relationships in regions was made by Glückler (2005). He identified two different types of trust: competence trust and goodwill trust. The former deals with the trust in somebody's knowledge and skills and is not more than a one sided expectation in a partner's qualifications and capabilities. This type refers to the task feature in professional relationships. The latter is a very reciprocal type, because it is highly dependent on the partner's behaviour. Goodwill trust is a combination of beliefs and attitudes towards the partner's motivations, goals and commitments and only on the basis of these beliefs and attitudes own commitments are made (Glückler 2005). This type refers to the social features in professional relationships, because beliefs and attitudes are not only influenced by spoken facts, but by non-verbal communication and the identification of common values and goals, similar experiences, similar ways of thinking and many more.

Another important point concerning trust in PCRs is to understand that trust is a process requiring social interaction and hence it takes time and needs spatial proximity – the high closeness type. Unfortunately, many authors speak about trust like a stable feature that suddenly comes up from nowhere in relationships and networks. Actually, it is rather the other way round. This paper will show that the development of a professional relationship develops through different stages and each stage requires a different level of spatial proximity and different amounts of time. The main mechanism behind is the fragility of competence and goodwill trust in the different stages of a relationship (Kramer 1996).

Trust in the above sense is an attribute of existing relationships and cannot explain the formation of new contacts that are very important for the innovation performance of firms and regions, because new PCRs provide access to new knowledge and again new partners (Glückler 2005). To explain how collaborations between actors in regions emerge for the very first time, we extend our concept and include the assumption that individuals can have trust in institutions, norms, structures and roles as well. Sharing the same context makes interaction and other individual's behaviour more predictable and secure (Kiesler & Cummings 2002). We call them 'common external structures of collaborative projects'. They reduce the risk for the actors by making first collaborative projects more controllable, because they help to form realistic expectations about the partner and the project and help to predict the partner's behaviour. Assuming that actors tend to be risk-averse, external structures of a common context reduce the entrance barrier to engage in collaborative projects. Spatial aspects matter here a lot, because external structures are industry *and* region specific.

III The emergence of partner priorities

The following chapter offers a deeper understanding of the development of mature PCRs at the individual level and explains why a priority on partners emerges and with whom that type of relationship is shared. Theories and findings from economic geography and social psychology are combined to explain that spatial proximity is an indispensable factor here, which triggers the appearance of *local* and/or *familiar* partner priorities. This is true for individuals who are free to choose their partners as well as for individuals that are not free to choose. We will show that this effect is strongly linked to the raise of trust and its changes in different development stages that a small professional group[4] always passes before it can work successfully on common tasks.

III. 1 CHARACTERISTICS OF WORK RELATIONSHIPS AND SUCCESSFUL COLLABORATIONS

Before the chapter starts it is important to stress that the paper focuses exclusively on collaborations for innovations. It is not about firm collaborations in a formal way like contracts or shares. It is about individuals joining a team to generate innovations. It is about the task and the social levels that have to fit and mature in those teams, about the requirement of high frequent face-to-face interactions that are needed to evolve positive group dynamics. It is about spatial proximity being starting point, basic ground and trigger for these dynamics that are needed in knowledge intensive professional work groups.

The main difference between work relationships and relationships with family members, partners or friends is that they are predefined by occupational structures. The company of colleagues was not chosen because of sympathy, they were unavoidably met because they became a part of the same occupational structures (Argyle & Henderson 1985). In and beyond a firm/institute there are defined roles, hierarchies and tasks people have to accept and implement at work, what influences social behaviour among colleagues (Asendorpf 2000; Guirdham 2002). Additionally, industrial and territorial structures exist, e.g. an open or protectionist, a competitive or co-operative environment that defines the circumstances under which individuals meet; defined above as external structures of PCRs.

Argyle (1991) defined four different types of work relationships in order to find out which type leads to the best performance of individuals and small groups: social friends, friends at work, work colleagues and disliked colleagues. Concerning individuals the results show that people having social friends and friends at work have the best work performance. This can be explained with the emotional support and the feeling of less stress those relationships offer (Hinings & Greenwood 1996; Winstead et al. 1995; Kiesler & Cummings 2002). The most productive groups have got a high degree of cohesiveness,

[4] In this paper collaborations on innovation projects including at least two persons are defined as a small professional group.

meaning the extent to which members of a group like one another and enjoy each other's company. Highly cohesive groups show mutual help, division of labour, interpersonal attraction, and commitment to the group and internalised motivation. Furthermore, they include a lot of social behaviour like jokes, games and gossip. These characteristics are typical for relationships between social friends and friends at work, because such relationships include distinctive social features (Argyle 1991). These results show that social features in a relationship are an indispensable prerequisite for a successful professional performance and for co-operative work. The following sections will explain the emergence of collaborative relationships considering the task *and* the social features in it. The different stages of the relationship's development are combined with the function and need of spatial proximity as well as with the development of trust. Of course, the start of collaborative work between individuals is slightly different between individuals being free to choose partners and the restricted ones.

III. 2 THE DEVELOPMENT OF PROFESSIONAL COLLABORATIVE RELATIONSHIPS

Usually, work relationships start on a very formal level just to do the tasks, fulfil the assigned role and get paid for it. But this is different when individuals have to co-operate in common tasks, because here they get in touch and get to know each other personally. Hence, social features are added over time to the relationship, complementing the formal task features.

If the decision is made to collaborate in an innovation project (for the motivation to do so see chapter IV), the development of a small professional group passes through four stages whereby the group structure (group as a social entity) and the task activity (group as a task entity) develop in parallel ways (Guirdham 2002; Argyle 2007). Figure 2 shows the development over time.

FIG. 2: FOUR STAGES OF GROUP DEVELOPMENT

STAGES OF GROUP DEVELOPMENT	GROUP STRUCTURE (GROUP AS A SOCIAL ENTITY)	TASK-ACTIVITY (GROUP AS A TASK ENTITY)
1. Forming 	Testing and dependence – discovering what interpersonal behaviours are acceptable, what patterns of communication to use? Collaboration or competition?	Members find out what the task is, what the rules are, and what methods are appropriate, in what time scale? With what resources?
2. Storming  	Intra-group conflicts because of the missing of agreed norms to regulate disagreements → emotional response to task demands and/or other group members	Emotional resistance to demands of task, negotiating about objectives, strategies and individual's roles
3. Norming 	Development of group cohesion, overcoming of conflicts and acceptance of the group and idiosyncrasies of others, mutual support and developing of group	Open exchange of views and feelings, openness to other group members
4. Performing 	Members are assigned particular functions and roles are functional, interpersonal problems are solved and interpersonal structure is the tool of task activity,	Emergence of solutions to problems, energy is focused on effective work

based on: Tuckman 1965, Guirdham 2002 and Argyle 2007

The table shows that the development of a group having a common task but consisting of members with different skills, knowledge, experiences, character traits etc. is an up and down process and unpredictable. If collaborations fail, usually this happens at the end of the storming stage, which means that no agreements on objectives and strategy could be found because of member's emotional response (disagreement with leader or other members, polarised opinions etc.). Here it is important to stress that there is a shift from stage one to stage four between individual needs, group and task needs. In the forming and storming stages the most important considerations for the group members are their own needs. They want to be sure that the collaboration will have valuable outcomes for themselves, that they can contribute in the way they want to and further more. The storming stage is the time to negotiate about it. In that stage, the group needs or the task are hardly important. People would accept that the whole collaboration fails because of personal dissatisfactions. Only after everybody enforced his own ideas or at least made acceptable compromises, a group feeling and unique features can develop. This is the focus at stage three, when mutual support arises, norms, goals and methods are defined. Only at stage four the common task and how to perform it in the best way is the most important issue and individual needs become subordinated (Tuckman 1965; Guirdham 2002).

Tuckman's model implies that at the beginning of collaborative relationships the build up process of social features is more important than task features and that there can only be a shift over time, if the conviction among all members arose that task as well as social features match each other. This conviction refers to Glückler's idea of competence (task feature) and goodwill trust (social feature) mentioned above (Glückler 2005). Because the latter is a reciprocal type, a lot of social interaction is required, which only can emerge in the high closeness type of spatial proximity (see below).

Basically, competence and goodwill trust – or likewise task and social features of a professional relationship – are issues that do not appear from nowhere as well as partners in collaboration relationships are not an unknown entity before they meet and suddenly they come together and share characteristics. Every individual has got a professional and a social profile that was developed the entire time before meeting new potential partners. Getting in touch with each other and building up a professional relationship by passing Tuckman's four stages includes the identification of each other's profiles. Only a few groups will pass the four stages successfully, because its member's profiles match, on the one hand, in a complementing and valuable way and, on the other hand, in an enjoyable and emotionally supportive way (what is expressed in the different types of proximity approach). Additionally to the matching profiles, the right framework conditions are required, such as having the chance to meet (accidentally or by being put into contact with each other by a common acquaintance) or having enough time and spatial proximity to interact intensively (first of all face-to-face) to build up the different features of a relationship.

Tuckman's model fits very well for individuals who are free to choose their partners and who are free to break up with them, if they are dissatisfied in any way. For individuals that are not free to choose, the process is slightly different. Very often the collaborating partners are pre-defined, because the decision-making individuals in the firm/institute did choose the partner because of his profile and offer in the project. Very often the collaborating individuals of both partners feel a higher pressure to be successful and it is very likely that they work with a pre-defined goal and are limited in time. These pre-conditions seem to be primarily influential on the task level, but indirectly they touch the social level as well. Tyler & Blader (2000) distinguish between co-operative behaviour that is discretionary and one that is mandatory. The latter one refers to the type of collaborations were individuals were not free to choose their partners and design the collaboration process, but were bounded by contracts, given norms and goals. In contrast to discretionary collaborations, here individuals are often only instrumentally motivated, which is in a long term perspective less optimal for the working group's outcome (Tyler & Blader 2000).

III. 3 THE IMPORTANCE OF SPATIAL PROXIMITY

Spatial proximity in economic geography deems to be an indispensable prerequisite for collaborations, but it is still unclear which aspects of the interactions between individuals and firms are exactly affected

by spatial proximity. To overcome these shortcomings, other types of proximity were developed, to catch and express the effects of spatial proximity, or the term itself was combined with a time component (temporal spatial proximity; Torre 2008) to consider the mobility of workers and firms and to explain collaborations over distance.

Basically, spatial proximity is defined as the physical distance in units of length, or to get a more realistic picture of distance between people, it is measured in time units of how long it takes to reach somebody for a face-to-face contact (Frenken et al. 2009). Actually, spatial proximity itself has no direct influence on co-operative behaviour, the raise of trust, successful outputs, new ideas etc. It is the starting point and basic ground for all the processes between collaborating people as described in the following.

In the *forming phase* of a PCR spatial proximity is important in two points. First, it enables the initial meeting of persons. This can happen in contexts like becoming a member of the same firm/institute, on conferences, fairs and charity events. Either people meet in these contexts accidentally, or they planned to meet there, or they are introduced to each other by a third common contact. Initial meetings trigger the identifying process of each other's professional and social profiles and define the starting point of a collaborative relationship. Even if people had information about the other one before (third persons talked about them, reading the other one's paper, etc.), only face-to-face contact can transfer non-verbal information, which is required to get a complete picture of the other one's profiles (Rüggenberg 2007). Spatial proximity is essential in that stage, but does not have to be permanently. A few hours or a day can be enough to decide to at least try to start a co-operation with somebody. Usually, that decision is based more on the information about the task dimension and professional profile than on the personal profile.

But sometimes people share a common personal relationship first and then later on, they add the task level and start to collaborate. Spatial proximity makes it more likely that people have the chance to meet each other unintended. Kraut et al. (1988) studied its impact on the probability of collaborations in academia. They proved that spatial proximity increases the probability, because people, having their offices on the same floor or in the same building, have got a higher frequency in interaction (unintended meetings, having lunch together etc.). Studies in social psychology found that people are more likely to like each other the more often they meet (Aronson et al. 2009). It is very likely that people search for partners with whom the stressful and time consuming stages of forming and storming are already passed. Furthermore, shared external structures seem to make partners more predictable. This explains the high number of repeated collaborations in business and academia (Gulati 1995). The type of spatial proximity needed in the initial phase contains is the high closeness type, meaning a maximum range of being in the same building that unintended interaction can take place frequently.

In the *storming stage* spatial proximity is as important as in the forming stage, if the partners start with no experience about each other. The reason is that people do not know each other very well, because neither the social information – which leads to a very low degree of trust and the increased danger of misunderstandings and disappointments – nor the professional information about the partner – what

may lead to misjudgements about the partner's professional skills or goals – are complete. Therefore, the opportunity of frequent interaction and the exchange of non-verbal communication must be given. This is only possible in the high closeness type of spatial proximity. Case studies about PCRs gave strong advice that the storming stage usually takes place in the same context as the forming stage. Hence, we assume that the loss of spatial proximity before confidence about the partner's appropriateness has developed leads to the relationship's dissolving. Usually, individuals who are not free to choose their partners are more unlikely to break up, because they do not have the power to do so. In arranged projects very often roles, goals and norms are given in the project's contract. Nevertheless, a failure on the social level about the ways to communicate, how to treat each other or personal sympathy influences the final output negatively.

In the *norming stage* the high closeness type of spatial proximity is desirable but not necessary. Still, frequent interaction is needed to define norms and strengthen the group feeling, but the social features of a relationship are developed well enough to communicate without face-to-face contacts all the time. Nevertheless, the high closeness type of spatial proximity would raise the quality of communication, because it means that partners could meet in different contexts (for lunch, after-work-party, teaching etc.) to share information about each other and their project ideas more often and more detailed. Intended regular meetings have the disadvantage that people shorten and filter the information they share because of limitations in time. Having the chance of unintended meetings means to inform each other about smaller steps and results, this strengthens the team feeling and helps to intervene in early phases of problems (Kraut et al. 1988). However, in this phase a lot of face-to-face communication can be replaced by other forms of communication, such as phone and internet. If no high closeness is given between partners, at least an eased reachability should be given, to develop norms, rules, strategies and goals in face-to-face meetings.

These mechanisms are applicable to the *performing stage*, too. The performing stage is supposed to be the longest stage of collaboration and thus the cost factor of meetings becomes important. The longer it takes to meet the partner(s) the more organizational effort and resources are required to work on a joint project. This very often lengthens projects and even if collaboration does not fail automatically because of missing high closeness spatial proximity, these collaborations are more difficult and resource consuming than collaborations done in that type of spatial proximity. But at least regular meetings between the team members should be possible, because innovation need interaction. Hence, the eased reachability type of spatial proximity should be given to perform. This is actually the type of spatial proximity most of the economic geographers have in mind when mentioning spatial proximity of actors. A preference to search for partners who are that close that even the performance stage can be done without organizational difficulties seems to be very likely, at least for some kinds of projects. This is the reason why there is a shift over time from former to new colleagues for collaborations after moving to a new firm/institute, which does not mean that all contacts to former colleagues get lost (Agrawal et al. 2006).

III.4 TRUST IN PROFESSIONAL COLLABORATIVE RELATIONSHIPS

The following section will show that building up trust in PCRs is quite complex but absolutely important for the success of collaborative projects aiming at an innovative output. Furthermore, we discuss to what extend the trust in external structures (see above) triggers the emergence of collaborative projects and helps to realize them. Here, spatial issues again have an important function.

Lewicki & Bunker (1996) identified three different levels of trust in professional relationships that build up on each other, without the necessity that all partnerships pass all levels. Mostly, professional relationships stay on level two, a lot get stuck in level one and only a few reach level three.

The first level of trust represents the starting point of a relationship and is named *calculus-based trust*. This type is first of all a conviction that partners will do what they say and very often this happens because the consequence of violating the other one's trust in that early stage is quite clear: the relationship will break. Lewicki & Bunker (1996) assume, if people expect more outcome from a relationship than they have to invest, they will try to keep the relationship and will do what they say. In professional relationships these calculations refer more to the competence trust or task features of relationships.

The second level is called *knowledge-based trust* and is grounded in the other one's predictability. This type requires a history of interaction in which partners could collect information about each other concerning needs, preferences and behaviour. The rule behind is simple: the more interaction, the better one knows the other and the more the partner is predictable, which raises trust (Lewicki & Bunker 1996). This type refers more to the social features than task features and requires a lot of interacting, especially face-to-face. It rises in the storming and norming stage and could be fully developed for the first time at the end of the norming stage. But actually, to collect information about each other does never really stop.

The third level of trust in professional relationships is not always achieved, but seems to be very helpful for collaborations because it refers directly to co-operative behaviour, team feelings, common goals and identities. This type of trust is named *identification-based trust* and bases on the identification with the other one's desires and intentions. It is a mutual understanding and leads to the point that each can effectively act for the other (Lewicki & Bunker 1996).

This type of trust is extremely motivating and powerful in collaborations. Case studies about collaborative relationships revealed that sharing a common goal, especially when it is different to broader parts in the community, gives an extreme team feeling and a strong motivation to work together and create something new (Hinings & Greenwood 1996; Dutton et al. 1996; Gersick et al. 2000). Especially the latter one is very important to be innovative.

The development of different levels of trust in a professional relationship goes hand in hand with passing the four levels of a small group development. Here, spatial proximity in different nuances concerning its range is starter and supporter, too. "Trust has been connected to conceptions of morality (Baier, 1986), satisfaction with 'another's fairness' (Ring & Van de Ven, 1994), or as a derivation of institutional (Shapiro, 1987) and cultural (Lane & Bachmann, 1996) influences. All of these conceptions capture important elements of trust" (Bachmann 2006, p. 125). Bachmann's ideas about trust include the trust of individuals in things and structures when he includes institutional and cultural aspects people are able to trust in. The trust of individuals in things and structures is comparable to the trust of individuals in the external structures defined above. Its rise is comparable to the mechanisms behind the rise of knowledge-based trust in personal relationships. Individuals are embedded in a particular territory and in industrial specific structures, sometimes for a long time. By this, they collect a lot of information about their regional and industrial environment, get familiar with it, and adopt roles, attitudes and ways of thinking, what makes this environment predictable and trustworthy. They develop a specific kind of proximity to their occupational environment that Boschma (2005) named 'institutional' and 'cultural' proximity. This type of proximity can theoretically go over very long distances because it has its limits at cultural borders. Actually, it is very often limited to regional borders because of the limited interaction radius people have. Referring to the distinction between a task and a social profile of individuals, institutional proximity belongs to the task and cultural proximity to the social profile. Closing the circle by assuming that individuals have a priority for things and structures they trust in (like they have for individuals they trust in), a priority for collaborative projects in their industrial environment and region appears. This idea is supported by the 'behavioural approach' Brökel & Binder (2006) developed, where they explain that individuals have a strong propensity to search for partners locally. The reason is that most of the information and experiences are local ones and during a partner search process they come up into mind first (heuristic) and if this solution satisfies, the partner is chosen (Broekel & Binder 2006).

To sum up, in the economic geography literature the term spatial proximity actually covers very different degrees of distance. To build up trust, to develop the social features in PCRs and to learn and inspire each other, spatial proximity is very limited in its range (high closeness type of proximity). To trigger the processes that are required for successful innovations in the sense of creating new knowledge, individuals have to be in the same room, on the same floor or in the same building. If the distance is larger, these effects are not verifiable anymore (Aronson et al. 2009; Kraut et al. 1988; Kiesler & Cummings 2002). But if innovation projects are performed by individuals who already know each other, spatial proximity is not more than a helpful tool to avoid communication mistakes and to limit costs, but it still should be of a distance that enables individuals to meet each other frequently. In that case, collaborations can be performed over huge distances, if the team member's resources are big enough. Lastly, in a later phase of the co-operation the high spatial closeness can be partly substituted structures of a common institutional or cultural environment or by clear agreements in contracts, what expresses the idea of institutional, cultural and organizational proximity (Boschma 2005). But it is

important to stress the ‘partly’, because studies from socio-psychology about motivations in groups proofed that only enjoyable and discretionary teams are more likely to be successful, what requires high closeness for a while in a certain point in time. This is even more true, the more complex the output is supposed to be, e.g. innovations (Tyler & Blader 2000; Argyle & Henderson 1985).

IV The willingness to search for partners

The former sections dealt with the emergence of partner priorities because of spatial issues, which we explained with the help of social psychological theories. This chapter focuses on the step before individuals start collaborative projects and deals with the question of how individuals get motivated to engage in collaborative projects with externals and why spatial issues can trigger this.

In chapter II we explained with the approaches of Granovetter (1985) and Hess (2004) that firms and thus individuals are embedded in an occupational environment which is specific in an industrial and territorial way. That the industrial environment supports economic behaviour and collaborations is mentioned by many scientists. "In a world of uncertainty, [...] rules, norms and institutions play a functional role providing a basis for decision-making, expectation and belief. Without these 'rigidities', without social routine and habit to reproduce them and without institutionally conditioned conceptual frameworks [...] it would be impossible for the agent to make sensible decisions and to act” (Hodgson 1988 by Grabher 1993, p. 4). Treading networks as a governance structure, Håkansson & Johnson (1993) argue that activities between individuals are influenced by norms and are directed by external forces setting the conditions of interacting (Håkansson & Johanson 1993). The approach by Bathelt et. al (2002), for instance, shows that this industrial environment is strongly linked to collocation and thus to spatial proximity. They deal with the idea of ‘local buzz’ that “…refers to the information and communication ecology created by face-to-face contacts, co-presence and co-location of people and firms within the same industry and place or region […], which stimulate the establishment of conventions and other institutional arrangements”" (Bathelt et al. 2002, 38). Local buzz can only work as a trigger for collaborative projects, if industry or region specific structures individuals can trust in are developed (see III.4).

To understand how the external structures trigger the collaborative behaviour of individuals, it is helpful to use a psychological theory developed by Ajzen (1985) to explain how a person’s intention becomes an action: the theory of planned behaviour. In this paper it can be used to explain how personal characteristics (attitude), the occupational environment (subjective norms) and individual’s beliefs about the controllability of common projects (controllability) trigger collaborative behaviour. This theory is in line with the arguments by Tyler and Blader (2000), who point out that individuals

engage in collaborations because of an inner motivation based on their attitudes and values (discretionary co-operation) or because of given norms and rules frightening them to get punished (or not awarded) when they do not collaborate (mandated co-operations) (Tyler & Blader 2000).

Referring to Ajzen (1985), the *first dimension* that can trigger a concrete action is a positive attitude towards that behaviour. In our context this first dimension contains two aspects: The evaluation of the benefit that can be reached by a well-performing collaboration and the trust in the positive value of collaborations. The former depends on the specific economic situation. We focus here on the latter aspect. For instance, if people are convinced that a collaborative project is enjoyable and effective they have a positive attitude, which strengthens the propensity to collaborate. How individuals evaluate collaborations depends on former experiences and their inner attitudes and values (Tyler & Blader 2000; Aronson et al. 2009).

The *second dimension* is the occupational environment, namely a firm's and industry's structures, hierarchies and norms that can support or prevent collaborations (Guirdham 2002). The more collaborative projects take place in the environment, the more partner options the environment offers and the more open an environment is for collaborations with external partners, the more 'pressure' is on the individual to collaborate. Tartari et al. (2010) proved that a very collaborative environment triggers sceptical individuals to collaborate and raises in general the positive attitude towards collaborative projects.

The *third dimension* is the controllability of a collaborative project, which represents unknown external factors bringing uncertainties for the individual and its firm and thus risk into a project (Ajzen 1985; Guirdham 2002). Here a broader definition of environment becomes important, because "[t]he firm is embedded in the business system, which is again embedded in the institutional environment" (Lorentzen 2005, p. 5). The idea of controllability most likely belongs to external structures and thus to the territory and industry specific environment. The external structures mentioned above motivate individuals to look for external partners to engage in first-time partnerships, because these structures decrease uncertainty, make potential partner's behaviour predictable, and help to find a matching partner because of higher local buzz. They minimize the risk to collaborate with externals, because they minimize uncertainties and make projects more controllable even if no PCRs with externals exist so far (what is always the case in first-time partnerships). This makes it more likely that collaborative projects emerge, but this effect is restricted to the range of these external structures and local buzz and therefore to a particular territory.

Transferring this concept to the different types of spatial proximity concerning the distance they cover, the following picture occurs: Personal attitudes and subjective norms can only be influenced in direct interaction with other individuals in a common occupational environment. That is why the high closeness type of spatial proximity is needed. That means, even if a lot of co-operations happen in a

region or in an industry, but the own firm/institute does not support co-operations, it is very unlikely that the employees of this firm will have a high incentive to collaborate. But if a firm or an institute supports co-operations a lot and positive experiences concerning collaborations exists, it is likely that these employees will show a propensity to engage in collaborations, even if co-operations are unusual in the industry or region. Only the aspect of controllability can be positively influenced by the eased reachability type of spatial proximity mentioned so often in the literature of economic geography. The reason is that industry or territory specific structures that help to control and predict collaborative projects can cover wider distances than just the own room, floor or building. The limitation here is highly dependent on the individuals own interaction radius and therefore the space he has insights in.

V Conclusions

Spatial proximity was always deemed as a trigger for collaborative projects between actors in regions, which is very important for being innovative. Our paper combines existing theories of economic geography with concepts and findings from social psychology to get deeper insights in the motivations to engage in collaborative projects and the priorities for partners that occur. Understanding these processes, we could identify the particular function of spatial proximity and got the following insights: In spatial proximity, referring to the collocation of actors, industry and territory specific structures can emerge offering norms, rules and attitudes that help individuals to predict the other one's behaviour and motivations. That minimizes the risk in collaborative projects with externals and motivates to engage in those projects. Additionally, spatial proximity in the sense of high closeness between individuals is required for the development of mature professional collaborative relationships, which means that people know, predict and trust each other. This type of relationship is needed in collaborations for innovations, because they last long and require a lot of personal interaction to gain new knowledge. Additionally, high closeness with other individuals can change personal attitudes and raise subjective norms concerning collaborative projects.

To sum up, individuals develop a priority for partners with whom they share a PCR. If they do not have any partner experiences, they have a priority for partners embedded in the same industry-specific or territory-specific structures that can substitute PCRs at the beginning regarding risk minimizing. Hence, a regional search focus exists when individuals look for partners, what deems to be one of the most important mechanisms in the rise of any type of industrial agglomeration. Finally, individuals can be motivated to engage in collaborations, because of the occupational environment surrounding them.

Gaining insights in these mechanisms could help to design more effective political measures in regions to shape the industrial environment and in that sense the occupational context of individuals in a way that enables and triggers collaborations for innovations in particular places.

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