Collective Creativity and Brokerage Functions in Heavily Cross-Disciplined Innovation Processes

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Abstract

The centres of collective creativity tend to be at the intersections of different domains. Based on this, distances between innovating partners can be considered as sources of innovation. However, the literature usually emphasises the advantages of proximity. Proximity may, however, also have negative impacts due to the problem of lock-in – meaning a lack of openness and flexibility. This article takes the changed pattern of innovation as a point of departure: innovations are seen to emerge in nonlinear processes, often combining very diverse knowledge bases. Structural holes in networks of innovation systems are especially fruitful for innovation. In theoretical discussion, this article presents seven dimensions of distance: cognitive, communicative, organisational, functional, cultural, social, and geographical. In attempts to create innovation, different kinds of distances would need to be exploited knowingly. The study uses the experiences of the case study to answer how it is possible to span the structural holes in cross-disciplined multi-actor innovation. According to the experiences, the brokerage function is essential in exploiting the different kinds of distances. Indeed, it was necessary to define two brokerage functions: process brokerage and session brokerage.

Keywords: innovation, collective creativity, structural hole, brokerage, innovation session

Introduction

Innovations are widely seen as the driving force of economic growth and competitiveness. An organisation's success and survival depend on its capability to create new knowledge and, then, innovation. The concept of proximity is used in many different ways in literature dealing with, for example, innovation studies, organisational science, and regional science (Knoben & Oerlemans, 2006). The literature usually emphasises advantages of proximity. Proximity is seen as an important precondition for knowledge sharing, knowledge transfer, and technology acquisition (Gertler, 1995). The different dimensions of proximity reduce uncertainty, solve problems of coordination, and facilitate interactive learning and innovation. Proximity may, however, also have negative impacts due to the problem of lock-in – meaning lack of openness and flexibility (Boschma, 2005).

The literature has not paid attention to the role of distance in innovation, de-

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spite scholars researching innovation being unanimous about the huge innovation potential in combining different fields of knowledge (cf. e.g., Dosi, 1988; Johansson, 2004; Pekkarinen & Harmaakorpi, 2006). Another widely accepted fact is that innovation processes are increasingly nonlinear and interactive, including innovating partners with varying backgrounds (cf. e.g., Edqvist, 1997; Harmaakorpi, 2006; Kline & Rosenberg, 1986; Lundvall, 1992). In order to foster innovation and strengthen competitiveness, it becomes important to integrate different types of knowledge, competences, and experiences into a cooperative perspective. Networks can be considered as sources increasing an organisation's and region's innovative capabilities (Reagans & McEvily, 2003). In linking networks and innovations, the heterogeneity of resources is essential (Oerlemans, Meeus, & Boekema, 2001). Innovations thus need also elements of distance and these distances can be considered as a source of innovation.

The facts are clear, but it is far from clear how co-operative innovation processes, including innovating partners with very different backgrounds and interests, can be conducted successfully. It is very difficult when heavily cross-disciplined partners aim to take part in networked innovation processes. The difficulties increase when the innovating partners include members with scientific and practical knowledge interests (cf. e.g., Harmaakorpi & Mutanen, 2008; Uotila, Harmaakorpi, & Melkas, 2006). This article attempts to shed light on the problems and outlines methods applicable in such situations. The main research question to be answered is: what are the forms of distance in structural holes in cross-disciplined multi-actor innovation, and how can the spanning of the structural holes be facilitated by brokerage functions? The experiences gained when applying the Innovation Session Method in the Lahti Region, Finland are used to illustrate the article.

Question of Collective Creativity

Since creativity applies to all areas of life, most definitions of creativity tend to be somewhat abstract. Usually, creativity refers to something both new and, in some sense, valuable. Thus, it is seen as an important outcome of a system. According to Amabile (1997), creativity is the production of new, appropriate ideas in any activity, from science to the arts, education, business, and everyday life. The ideas must be different from earlier ones and appropriate to the problem or opportunity presented. Creativity requires knowledge and the ability to apply that knowledge in new ways and usually across a variety of disciplines. Creativity is often based on borrowing, copying and combining old ideas. Weick (1979, p. 252) describes creativity as putting new things in old combinations and old things in new combinations.

Creativity is sometimes inaccurately used as a synonym for innovation. Whereas creativity refers to pure ideas, innovation is the successful translation of ideas into tangible products or intangible services. Not all creative ideas are innovative. Creativity is one of the many critical factors behind innovation. The ability to stimulate innovation is highly dependent on the stock of creative ideas that are available for feeding innovation. Creative ideas are born out of conscious, semiconscious, and subconscious mental sorting, grouping, and matching. Interpersonal interactions at the conscious level stimulate and enhance these activities. This interplay between individuals appears to be essential for innovation (Leonard & Sensiper, 1998, p. 115.).

The source of creative achievements is no longer just individuals but increasingly also groups of people. Most creative pursuits in business and industry involve individuals working together to solve problems they cannot solve alone. Creativity does not happen inside a person's head, but in the interaction between a person's thoughts and a socio-cultural context (Csikszentmihalyi, 1996).

Collective creativity describes the phenomenon where concepts emerge in people's minds through interacting with knowledge. Thus, creative activity grows out of the relationship between an individual and his or her work, and out of the ties between individuals. The locus of creativity

in the interaction moves to the collective level when each individual's contributions not only shape the subsequent contributions of others, but, just as importantly, give new meaning to the past contributions of others (Hardagon & Bechky, 2006, p. 492.).

Creativeness in social settings can be divided into company and networking level pursuits. According to social learning theory, hidden agendas, biases, and inadequate understanding detract from the rationality of organisational level efforts at innovative renewal. Learning at the organisational level is a collaborate endeavour in which members generate new ideas by sharing their knowledge and interacting with each other. The more radical and risky ideas are, the more organisational resistance and hindrance to open interaction increases (Bandura, 1997). At the networking level, the challenge is to get heterogeneous hastily formed groups to work together, share ideas openly, and create radical ideas. In research unit and company collaboration, partners may overrate each other's capabilities, which can easily cause friction and misunderstanding between partners. Multi-party co-operation demands flexibility and success depends strongly on the functioning of each of the internal networks (Håkansson & Snehota, 1995).

Problems of Collective Creativity in Structural Holes

The centres of creativity tend to be found at the intersections of different domains, where beliefs, lifestyles, and knowledge mingle and allow individuals to see a new combination of ideas with greater ease (Csikszentmihalyi, 1996, p. 9). Thus, people tend to be attracted to groups made up of members similar in some way to themselves, and relatively few people are capable of bonding different groups together. If group selection favours those who are similar, it reduces the diversity of the members. Homogenous groups often reach solutions more quickly and with less friction along the way. Homogenous groups do little to enhance expertise and creative thinking. Everyone comes in with a similar mind-set and leaves with the same (Amabile, 1998.) Behaviour and opinions are usually more homogenous within than between groups, so people connected across groups are more familiar with alternative ways of thinking and behaving (Burt, 2004).

The term *structural hole* refers to the social gap between two groups. Structural holes often are the weak connections between clusters of densely connected individuals (cf. Granovetter, 1973; 2005). Networks with an abundance of structural holes create opportunities for the new combination and recombination of ideas. For example, cross-discipline groups of individuals can offer applications expertise from a variety of areas. This enhances learning opportunities and fresh thinking and promotes integration across traditional borders. According to Burt (2004), structural holes lead to good ideas. People surrounding structural holes have different interests and perspectives and use different concepts and language. Success in innovation is seen as depending upon the flexibility of the organisation and the ability to interact with outside organisations and third parties (Gellynck, Vermeire, & Viaene, 2007.)

The main problem in utilising the innovation potential in structural holes stems from the diversity or "distance" between the innovating partners. This distance can take different forms: cognitive, communicative, organisational, social, cultural, functional, or geographical distance (cf. Harmaakorpi, Tura, & Artima, 2006). The main problems faced when spanning the structural holes can be tackled through this taxonomy.

Cognitively close individuals are able to assume certain common knowledge that does not need to be defined. Cognitive distance refers to differences in knowledge bases. Two actors can be cognitively distant for two main reasons: i) they know different topics; ii) they have different levels of knowledge on the same topic (Albino, Carbonara, & Petruzzelli, 2007). Boundary-spanning reflects the understanding that members with different backgrounds operate from different perspectives underpinned by distinct cognitive structures (Fong, 2003). Effective interaction relies on, and may be thwarted by, the ability to interact across the cognitive boundaries that underlie dif-

ferences (Carlile, 2002). Cognitive diversity will increase the likelihood of creative new knowledge emerging in groups. Through the interaction of diverse knowledge groups, there is the potential to overcome the factors constraining the development of new knowledge (Mitchell & Nicholas, 2006, p. 69). Too little cognitive distance means a lack of sources of novelty, while too much cognitive distance implies problems of communication (Nooteboom, Vanhaverbeke, Duysters, Gilsing, & van den Oord, 2006).

The ability to communicate and exchange ideas is an important part of the creative process. Within groups, the term interaction is used to describe the use of language and other symbols to develop an enriched and shared understanding. Communication can easily be misunderstood or misinterpreted. People often discuss problems in a language they mistakenly assume everybody in the group understands. The participants' success in reaching a common creative vision, exchanging creative ideas, and evaluating them depends on the ability of the group to devise a shared language, which is an essential asset in developing a common understanding. To the extent that people share a common language, this facilitates their ability to gain access to people and their information. In order to combine the information gained through social interaction, the different parties must have some overlap in knowledge (Nahapiet & Ghostal, 1998, p. 254) or there must be someone who translates this knowledge so that it is relevant to the others.

The development of emergent knowledge is vital for creativity and innovation, but sharing, exchanging, integrating, and creating knowledge can be difficult. Organisational distance refers to the difficulty in coordinating transactions and exchanging information within and between organisations. Knowledge transfer across organisational boundaries can be characterised by false starts, different interpretations of the same idea, and disruptions (Zellmer-Bruhn, 2003). But too much organisational proximity is accompanied by a lack of flexibility. There is a risk of being locked-in in specific exchange relations, and this may limit access to various sources of information. The search for novelty often requires going outside the established channels (Boschma, 2005).

Functional diversity refers to actors' different areas of expertise. Members of different functional communities do not necessarily understand each another because they do not interpret knowledge in the same contexts. Functionally close actors act in areas of expertise close to each other - for example, in the same industry (Harmaakorpi et al., 2006). Similarities in knowledge and experiences facilitate the acquisition and development of new knowledge.

The importance of functional proximity is based on the concept of absorptive capacity. This means the organisation's ability to recognize the value of new, external knowledge and to assimilate and apply it (Cohen & Levinthal, 1990). If actors are functionally far from each other, there is more to learn and there are more possibilities for innovations, but the distance also means that it is more difficult to learn. The concept of functional proximity seems similar to cognitive proximity. But cognitive proximity is a much broader concept that refers to the extent to which actors can communicate efficiently, whereas functional proximity refers to the extent to which actors can actually learn from each other, what they exchange, and the potential value of these exchanges (cf. Knoben & Oerlemans, 2006).

While organisational and functional distances refer to the relationships between institutions, social distance is about the relationships between people. Lack of trust can prevent people from asking questions or volunteering information. The potential for increased competition is another reason people avoid sharing what they know. Social cohesion around a relationship can ease knowledge transfer by decreasing the competitive and motivational impediments. When individuals believe in freedom of expression and value the understanding of diverse viewpoints, they engage in behaviour that is more effective for creating knowledge (Mitchell & Nicholas, 2006, p. 71).

On the other hand, too little social distance in an economic relationship may weaken the innovative capacity of organisations due to an overload of trust. A closed network system may incur opportunity costs because outsiders with new ideas and knowledge are denied entry. Long-term relations or relations with too much commitment may lock members of social networks into established ways of doing things at the expense of their own innovative and learning capacity (Boschma, 2005).

How organisations view knowledge sharing and creation seems to be dependent on their organisational culture. Every organisation and even their subunits have a culture of their own, which influences how their members think, feel, and act. Cultural distance refers to differences in these cultural habits, rules, and values. Understanding is also always cultural. The creation of knowledge is therefore a complex process involving the understandings of different organisational cultures and subcultures (Beckhy, 2003). Cultural assumptions, beliefs, and values can be deep-rooted within the members of the organisation and cannot be easily changed. Cooperation will develop more easily between members of the same organisation or the same innovations network (Rallet & Torre, 2005). The challenge for collective creativity is to get members of different organisational cultures to interact with each other.

The geographical distance, which means the physical distance between actors, can be a barrier to creativity and innovation. Although proximity facilitates interaction and cooperation, it does not automatically produce innovations. The geographical distance does not necessarily mean that people in the groups are unaware of one another, but because they are not in contact, they do not know what the others are doing. Geographically proximate actors may be cognitively too distant to cooperate. There must be someone who brings them together and motivates them to work together. One of the challenges in collective creativity is simply to motivate people to be creative. Even where opportunities for the exchange of knowledge exist and people anticipate that value may be created through interaction, those involved must feel that their engagement in the knowledge exchange and combination will be worth their while (Nahapiet & Ghostal, 1998, p. 249). Most people need encouragement before they realise the benefits of discussing ideas outside their regular work group.

Brokerage Functions

In sum, the difference between the innovating partners is often so large that a special interpretation function is needed. Burt calls this special function information brokerage in the structural hole. The information brokerage could occur by (i) making people on both sides of a structural hole aware of the interests and difficulties of the other group, (ii) transferring best practices, (iii) drawing analogies between groups ostensibly irrelevant to one another, and (iv) making syntheses of knowledge interests (Burt, 2004).

Actors who have suitable connections can act as brokers between the clusters or groups. Burt suggests that brokers focus on establishing ties to other disparate or disconnected groups, exploiting the structural hole, so they can then bring together members of the two groups who would otherwise be more difficult to connect (Burt, 2004). A structural hole indicates that people on either side of the structural hole have access to different flows of knowledge (Hardagon & Sutton, 1997). It is proposed that structural holes have both positive and negative influences on creativity and innovation.

Brokers support innovation by connecting, recombining, and transferring to new contexts otherwise disconnected pools of ideas (Verona, Prandelli, & Sawhney, 2006). Multiplex relationships, especially with individuals holding broker positions within these networks, are perceived to be important to innovative behaviour (Shaw, 1998). Whilst spontaneous co-operation between organisations can occur, it appears that some kind of brokerage intervention can help co-operation,

for example, by advising on the advantages of co-operation, giving information, identifying opportunities, catalysing discussions between different actors, or bringing companies together.

Two very useful concepts when considering brokerage functions in regional innovation systems are bonding and bridging social capital (cf. Tura & Harmaakorpi, 2005). Bridging social capital creates bonds of connectedness formed across diverse horizontal groups, whereas bonding capital only connects members of homogeneous groups (Granovetter, 1985; Putnam, 1995). This division of social capital into bridging and bonding types becomes crucial in assessing regional innovativeness, since both are essential to build an atmosphere of trust and proximity in each innovation network and keep them open to allow the necessary flows of information to take place. Bridging social capital, with the element of distance, is seen to be positive because it brings the individual innovation networks into trusting interaction enabling, for example, an increase in the absorptive capacity benefits of the structural holes of these networks. Burt's (2004) definition of the "social capital of brokerage" is very similar to that of bridging social capital.

The Case Study

Innovation Session Method

The Lahti Region aims at being a leading area in practise-based innovation activities in Finland. In the Region, the framework of network-facilitating innovation policy has been developed to promote practice-based innovation activities (cf. Harmaakorpi & Tura, 2006). The innovation session method is an essential part of the policy aiming to create an environment where structural holes are spanned and new innovation networks formed (cf. e.g., Aula & Harmaakorpi, 2008; Harmaakorpi & Tura, 2006.) During 2004-2008 there have been almost 80 innovation session processes. The results of the innovation session processes have included new business ideas, service concepts, enhanced products, product development projects, operations models, clarifications, and strategies (Pässilä, Frantsi, & Tura, 2008). Each innovation session process is always planned individually considering the organisation's background and needs. The normal procedure of triggering new innovation processes is as follows: the innovation experts in the intermediate organisations approach local companies and analyse their possible future trajectories and the knowledge needed to reach those trajectories. This analysis often reveals some structural holes to be spanned. The innovation session method is an integrated process with planning, acting, and implementing.

The culmination of the innovation session process is a one-day long innovation session. The participants of the innovation session include experts from the companies, top-level experts often from the world of science, and members of the intermediate organisations. The purpose is to combine regional and inter-regional expertise to enhance the company's innovation activities. Experts give the possibility of examining the issues from an alternative viewpoint. The combined input from the companies and the experts, together with the facilitating team of a creativity operator and group brokers, is used to generate ideas for innovation for the company to consider. An innovation session begins with introductory speeches given by the experts chosen to fit the theme of the day. After the introductory speeches, the creativity operator promotes interaction between the participants in order to discover the innovation potential lurking in the structural holes. The aim is to find 2-4 potential ideas to pave the way for new networked multi-actor innovation processes utilising collective and creative knowledge production.

In the Lahti Region, the innovation session method development has taken three major steps in the development of methods, group settings, and the role of brokerage. The first phase experiments were designed as a combination of individual and group creativeness utilising progressive ideation methods. Progressive methods, by repeating the same steps many times, generate ideas in

discrete progressive steps. In the sessions, groups were randomly formed and based on each individual's interest in the issues. During the second phase, groups were formed according to the heterogeneous combinations of networking partners, but brokerage was not systematically used. The main techniques were progressive and partly hybrid, aiming at combining the expertise and ideation in small group settings. Hybrid methods like synectics combine different techniques to address varying needs at different phases of ideation (Shah & Vergas-Hernandes, 2003). During the third phase, the innovation session development group began employing brokerage in a more systematic way. The brokers were placed in advance into specific task groups and acted as facilitators in group settings. During this final development phase, brokers took a more active bridging role in company briefing meetings and pre- and post session processes. The broker's role also changed to become more proactive and even provocative in the one-day sessions.

Thus, the innovation session method has experimented with various social approaches and creative working methods to combine the existing knowledge of scientists and the practical approaches of company experts. Additionally, the brokerage has enabled the use of a wide variety of techniques simultaneously in a one-day session compared to sessions involving a company and one facilitator. Understanding the importance of the brokerage function has been the key to successful innovation sessions. During the first two phases the method was very vulnerable: success seemed to depend more on chance than on some predictable results, and the structural hole was often not properly spanned during the session. Since launching the brokerage function in the sessions during the third phase, and especially since widening the brokerage to a comprehensive way of action in the whole process, the success of the sessions has increased remarkably. Therefore, it was necessary to define two brokerage functions: process brokerage and session brokerage. These observations were based more on perceptions and feelings of members of intermediate organisations. So, there was a need to study brokerage functions in more detail.

Methodology

Case studies are used to organise a wide range of information about a case and then analyse the contents by seeking out patterns and themes in the data (Tellis, 1997). In general, a case study strategy is preferred when the researcher seeks answers to how and why questions, when the researcher has little control over the events being studied, when the object of study is a contemporary phenomenon in a real life context, when boundaries between the phenomenon and the context are not clear, or when it is desirable to use multiple sources of evidence (Yin, 2003). The research questions of this study are:

> what are the forms of distance in structural holes in cross-disciplined multi-actor innovation, and
>
> how can the spanning of the structural holes be facilitated by brokerage functions?

The case study research involves an in-depth, longitudinal examination of a single instance or event: a case. The case company of this present article is the medium sized manufacturer Stala, which manufactures stainless steel sink units and sink bowls for domestic kitchens, as well as waste sorting systems. Stala has been active in regional innovation development, has utilised innovation development services actively on several occasions, and has been involved in every recent step in regional innovation policy development during the last ten years. Stala has been involved with the innovation session method in all three development phases. The first aimed at finding product innovation in nano-technology, recycling, and ageing. The second session focused on nano-technology, and the third on e-business. This study summarizes the findings of the third innovation session process.

Qualitative researchers tend to collect data in the field at the site where the participants experience the issue or problem under study. This up-close information gathered by actually talking to

people directly and seeing them behave and act within their context is a major characteristic of qualitative research (Creswell, 2007). The data collection in case study research is typically extensive, drawing on multiple sources of information, such as observations, interviews, documents, and audiovisual material (Creswell, 2007; Eriksson & Kovalainen, 2008). For example, Yin (2003) recommends collecting six types of information: documents, archival records, interviews, direct observations, participant-observations, and physical artefacts.

This study uses qualitative methods to gather data from multiple sources during the innovation session process. The data include documentation, a questionnaire, and observation. The documents of the pre-session and the session are analysed. These include the PowerPoint presentation of the creativity operator in the pre-session, the structure of the session, and the PowerPoint presentations of the experts in the session. The general conversation and group works of the innovation session were documented and analysed. The documentation was prepared by a member of the intermediate organisation. She was not involved in the actual innovation session process in other ways. The first stage of the analysis concentrated on the identification of the different kinds of distances during the innovation session process.

During the second stage of the analysis, the researchers tried to deepen the analysis by identifying the ways the brokers acted in order to bridge these distances. Observational evidence is often useful in providing additional information about the topic being studied (Yin, 2003). To increase the reliability of observational evidence, the innovation session was observed by two observers. Both observers wrote a report about their observations of the innovation session. One observer observed the session at a general level. The purpose was to observe what happened during the innovation session and how participants behaved during the session. She sat in a corner of the room so that she could easily see what was happening in the session. During the ideation phase, she was walking around the groups but did not interrupt the group work. According to her own opinion, her presence did not disturb participants. Perhaps in the beginning of the session some participants were curious about her role. The other observer was actively engaged in group work while at the same time observing and evaluating group processes and procedures. Participant-observation is a special mode of observation in which the observer is not merely passive. Participant-observation provides certain unusual opportunities for collecting case study data, but it also involves problems (Yin, 2003). During the innovation session, this meant having two roles at the same time and it is possible that the participant-observer may not have sufficient time to take notes and participate in group work.

The experiences of the brokers of the intermediate organisations were collected by using a questionnaire with open questions. The questionnaire was sent by email to six brokers after the innovation session and they had a couple of days to answer it. All those brokers participated in the innovation session. Brokers who were involved in the innovation session process but did not participate the innovation session were excluded. The brokers had previous experience about innovation session processes. Presumably, brokers compared the Stala innovation session process with other innovation session experiences when answering the questionnaire. The answers were collected in one document and analysed. The questions were:

1. Common observations of the session?
2. How did the composition of the session function? How did the participants take part in the session? Was the atmosphere in the session innovative?
3. What kind of results did the innovation session have? Are there possibilities for further processes?
4. What were the reasons the innovation session was successful or unsuccessful?
5. How would the respondent develop the innovation session process further?

Qualitative researchers try to develop a complex picture of the problem or issue under study. This involves reporting on multiple perspectives, identifying the many factors involved in the situation, and generally sketching out the larger picture that emerges. Researchers are bound not by tight cause-and effect relationships among the factors, but rather by identifying the complex interactions of factors in any situation (Creswell, 2007). All three authors took part in the process in different roles and had many informal conversations with members of the client organisation and the intermediate organisation during the process. These conversations have also had an impact on the evaluation of the process.

The Innovation Session Process in a Case Company

In terms of brokerage and spanning the structural holes, the Stala case represents the development in its development phases. The third innovation session process with Stala is depicted in Figure 1. The size of the ovals in the figure indicates the importance of the occasion to the success of the innovation session process. For example, the size of the oval of the pre-session is based on its importance being a "testing laboratory" for ideas about the theme and working methods of the session generated during meetings. In addition the number of the participants is larger in the pre-session than in the meetings involving also those who have not participated in the planning of the session before.

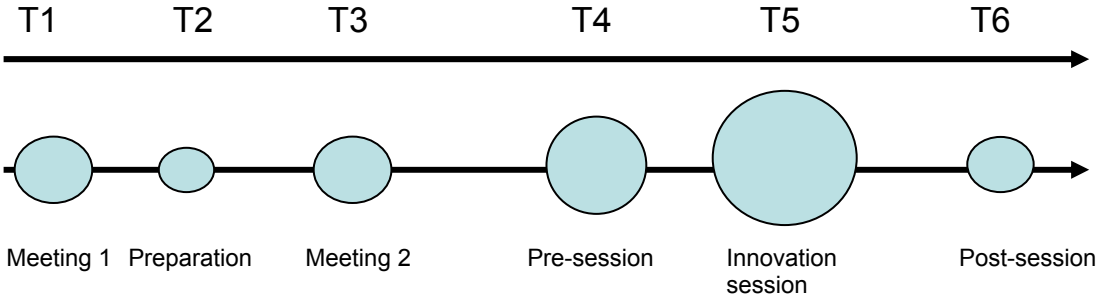

Figure 1: The third innovation session process with Stala

The proposal to arrange the third innovation session emerged in a discussion between the intermediate organisation Lahti Science and Business Park and Stala. The first meeting (T1) was held between the process broker from Lahti Science and Business Park and the company's R&D manager. In the meeting, the structural hole was revealed between the company and the e-business and it was selected as the innovation session target area. E-business was seen as a possibility to increase business and promote internationalization. Shortening product life cycles combined with changing customer needs were seen as new challenges for the current business. Nowadays, customers want faster and easier service. They also need information about the product after they have bought the product. The e-business topic was also selected because the case company did not know about e-business possibilities. To shorten the cognitive distance between the experts and the management, the preparatory phase of the third session was prolonged. In addition, the longer preparatory phase made it possible to commit the management better to the process.

After the theme was selected, the process broker Lahti Science and Business Park arranged a preparation meeting (T2) with experts and scientists to discuss the relevant technology to find the

needed expertise in e-business solutions. Two process brokers and a technology expert held the second meeting (T3) at Stala with the R&D manager to set the session goals and determine the necessary expertise and framework for the session. The process broker and Stala's R&D manager organised a pre-session (T4) with representatives of the company management, university researchers, and Science Park brokers. During the pre-session, the goals of the innovation session were clarified, experts and participants were selected, and the working questions for the groups were prepared. It was decided that every group had a different topic, and that there would be a session broker in every group. The brokers were not experts in e-business. The themes of the group were the added value of e-business, new business possibilities in customer e-business, and the earning logic of e-business. Practical things such as who is responsible for invitations and where the session will be held were also decided.

Before the beginning of the session (T5), the creativity operator and the session brokers had a short meeting about the content of the session. One of the brokers rearranged the tables and chairs to better fit the group discussions. The participants arrived to the session a little late. Every participant signed non-disclosure agreements. According to the brokers some of the people did not really know why they had come and were sceptical. One broker described the atmosphere being too formal. At this moment some of the brokers were worried about the success of the session and were relieved that the group work started up without friction. As one broker wrote in his answer, *"The session succeeded even though I had doubts in the beginning of the session."* According to the observer the atmosphere improved when the introducers of the session arrived and it was possible to start the session. The session was opened by the creativity operator and the representative of the case company. To reduce the social distance, everybody introduced him or herself to the group and told about their latest experience in e-business.

The first introductory speech concerned the current state of e-business, its possibilities and effects on business. The introducer was from The Finnish Electronic Commerce Association, the purpose of which is to follow, promote, coordinate, and support the development of electronic commerce. The topic of the second speech was how to use the internet in sales, and it concentrated more on the consumer's standpoint. This speaker was from the Finnish Information Society Development Centre. The Centre promotes the efforts of its public and private sector members to create viable tools and expertise for use in the information society. Both of the introducers came from outside the Lahti Region. During the introductory speeches the participants listened carefully and took notes. After the first speech, the session brokers had to open the discussion in the groups but after the second speech the participants started to discuss spontaneously.

After a short discussion in the groups there was an interactive panel discussion. The purpose of the panel discussion was to activate the general discussion and also introduce the other experts and their fields of know-how in e-business. They were mainly researchers from local university units whose research interests lie in information society, web-based communication, and organisational and interpersonal communication. The questions to the panellists were first prepared in the groups, which reduced the social distance between the participants. The panel discussion focused mostly on how it is possible to strengthen the brand of the company by e-business. To explain their views, the panellists compared how the buying of training shoes from eBay does not affect the brand of the training shoes. So, by doing this they reduced the functional distance between the case company and other manufacturing companies using e-business with different products. The case company had not realized to examine the e-business experiences of other companies because of the functional distance.

There were three groups in the session, each comprising company members, experts, and a session broker who facilitated the group work. One broker described his group, *"The group was very skilful and self-guided. As a facilitator, my role was to collect the generated ideas and ensure that the group was following the given instructions."* This comment demonstrates the need for a bro-

ker even in groups which are capable at group work. The idea generation started with individual brainwriting. Each group member wrote down ideas silently on paper. After a while, the person passed the paper to his or her neighbor who used the ideas already written as triggers for, or stepping stones to, some new ones. In the observed group, the members of the group found it hard to generate ideas alone. Nor were they interested in working pairs. The session broker asked how they would like work and they were unanimous that the best possible working style for them was to discuss about the topic together. The collective idea generation concentrated first on large quantities of ideas and building on each others' ideas. The group built their ideas on those ideas generated in individual brainwriting, and they also helped the ideation with working questions prepared in the pre-session. The session broker was also permitted to suggest ideas. She tried to encourage members to generate wild and exaggerated ideas by suggesting these kinds of ideas herself. The input on the wildest ideas came from the session broker or the travelling expert. Ideas were written on Post-Its by group members or the session broker. After the quantity phase of ideation, the ideas were grouped and analysed.

The social distance diminished during the group work. This was seen in that, for example, the discussion changed from a polite and peaceful discussion to a more friendly and loud one. Members became more trusting of each other and presented more radical and also provocative ideas. In addition, members did not always wait for their turn to speak. Because the groups comprised of members with different backgrounds, there were cognitive and communicative distances. For example, most of the Stala members had a technological background whereas the experts were researchers or experts in communication or e-business. Despite these differences, the members used the same kind of language in the observed group. Only some concepts were opened and clarified. Especially the broker was active in asking the meaning of concepts. One of the experts asked many questions from the representatives of the case company which helped the understanding in the group. He gave examples and made comparisons. He also specified the conversation, and in fact the group spent all of their time discussing the topic of their group work. To interact across cognitive distances, various drawings and illustrations were used. One of the group members had a laptop and he clarified his point of view by showing an example from the internet. Because the session was arranged at Stala premises, the representative of Stala introduced kitchen accessories to the group.

Each group presented their group work, and there was a chance for comments by experts and other participants. Every group paid attention to the possibility to increase the value of the product with different kinds of services which are possible to add to the product through e-business. In addition, different kinds of responsibility and partnership issues and the brand were considered in the groups. Every group emphasised the need to consider the end-users' role in developing the products and ways to distinguish the company from others.

Table 1 summarises the phases of the innovation session and the observers' interpretation of the brokerage function. In practice, drawing the lines between the different dimensions may be very difficult, but the table illustrates the main distances to be reduced during the different phases. For example, building an open atmosphere is essential in all these phases because it makes it easier to decrease the cognitive distance during the ideation phase. In a trustful atmosphere, volunteering information and asking is easier. When examining Table 1, the different types of stimulation of the participants is vital. This stimulation may be opinions or the ideas of experts or it can be creative working methods. Some people are simply more creative than others (Woodman, Sawyer, & Griffin, 1993) but creativity can be stimulated and enhanced, for example, by various creativity methods. According to one broker, *"The visits of the travelling expert stimulated the group work by introducing new viewpoints."*

Table 1: Reducing distances by session brokerage in each phase of the Stala innovation session.

The phase of the session	What happened?	Distance to be reduced	Observers' interpretation of brokerage function
Warming up	▪ The creativity operator explained the meaning of the session. ▪ The representative of the case company introduced the company and its challenges. ▪ Participants introduced each other to their groups and the facilitator introduced the members of the group to all.	Social distance	Building an open atmosphere by connecting participants to each other and to the challenges of the company.
Introduction speeches	▪ 2 experts held introductory speeches.	Cognitive and functional distances	Transferring information from other areas.
Panel discussion	▪ The experts and some of the representatives of the company formed the panel. ▪ The participants could put up questions to the panellists.	Social, cognitive, and functional distances	Establishing ties between the company and the experts.
Idea generation	▪ Individual brainwriting and collective brainstorming ▪ Creativity operator gave the main instructions and session brokers facilitated the group work.	Cognitive, communicative and social distances	Encouraging the participants to think outside the box with the help of creativity methods and for example provocative questions.
Analysing and grouping the ideas	▪ Collective group work with the help of the session broker. ▪ The travelling expert and creativity operator visited the groups. ▪ Presenting the group work.	Cognitive, communicative and social distances	Combining the generated ideas and solutions.
The results and further plans of the case company	▪ The representatives of the case company introduced their ideas about the session and its results. They also told what is going to happen next. ▪ The creativity operator closed the day and gave thanks to the participants for their effort.	Social distance	Motivating the company and the participants to develop the generated ideas further.

However, the exposure to ideas from other group members and the use of creative methods may be at least as important in creative idea generation (Couger, Higgings, & McIntyre, 1993). Thus, the significant benefit of sharing ideas with others is that it should increase the chance that one will come across ideas one would not have thought of in a solitary idea-generating session. These

ideas may in turn stimulate additional novel ideas (Paulus, 2000). One of the session brokers described the innovativeness of his group by saying "*…that questions of radical innovation were not raised. It was more like putting different kinds of concepts, assumptions and questions into the same framework."* He quoted one of the group members who said that all these things were somehow familiar to him, but they had now put these familiar things into new framework and the picture looks new.

According to the brokers the session was successful for several reasons. Most of the brokers indicated that the innovation session succeeded because the case company had a clear and focused target for the innovation session. The focused target was result of the long preparatory phase, which helped the representatives of the case company to have pre-understanding about the issue. They were also committed to the process and they actively took part in the general discussions and group work during the innovation session. As one of the brokers put it, "*The representatives were committed to the process which helps the deepening of the issue during the innovation session."* Brokers also referred to previous innovation sessions and according to them the "*familiarity with the innovation session also promoted its effective use."* The social distance between the representatives of the case company and most of the brokers was reduced already during the previous innovation session processes. In addition, the right people were invited to the session. One of the brokers observed that, *"There were no participants who had been obligated to participate in the session."* Creativity needs freedom. If participants are forced to participate, they will probably lack motivation and creativity. Several brokers emphasised that the experts were interested in the topic and understood their role in the session. This can be seen as a result of successful brokerage before the session. It is the brokers' duty to explain the meaning of the session and the challenge of the client organisation and to make sure that they have understood their role. The compositions of the groups were also well-designed and functional. One broker wrote that, *"The group composition was fantastic: two experts and two from the company"* and another that *"groups were productive."* A summary of the answers to the questionnaire is given in the Appendix (Table 3).

After the innovation session (T6), the process broker, who also participated in the innovation session as a session broker, the e-business expert, and the R&D manager met again and agreed to start an e-business project in the Stala kitchen unit. As a result of the innovation session, the case company started the e-business about a year after the session. The session gave the terms as to what kind of business the company wants to be in and what kind of partners it wants to have in e-business. According to the company, the session opened doors to research and technology about which it had no previous knowledge.

The special focus on reducing the "distances" between innovating partners in each phase of the Stala innovation process is depicted in Table 2. The table demonstrates that brokerage is a process. During that process, different kinds of distances are accentuated differently and should be reduced at the right time. In the beginning of the innovation session process, it is essential to reduce the organisational, cultural, and functional distances by process brokerage. This means introducing other ways of thinking and doing. It should be noticed that brokerage may not only span the distances between innovation partners, but also lessen the in-house hindrance and resistance to innovation. Reducing these distances makes it easier to reveal the hidden innovation potential during the process. The table also illustrates the importance of reducing the social distance, which should be taken into consideration during the process. Innovation is always a social process. It is also noticed that the need to reduce the geographical distance was not necessary until the innovation session because of modern technology.

Table 2: Reduced distances by process brokerage in each phase of the Stala innovation session process.							
	Cognitive	**Communicative**	**Organisational**	**Social**	**Cultural**	**Functional**	**Geographical**
T1			x	x	x	x	
T2	x	x	x				
T3				x		x	
T4			x	x	x	x	
T5	x	x		x		x	x
T6			x	x			x

Discussion

According to the experiences in the Lahti Region, the potential innovating partners in the innovation environment might be unable to even begin the development due to the overly large distances between the partners. This kind of situation was present in our case study, too. The company was interested in starting e-business but they had no expertise in it. E-business was in any case considered a possibility to increase business. The cognitive distance between the case company and e-business expertise was too long. An innovation process can end before it has started, even if the innovation potential in the structural hole is obvious. The brokerage function in such a situation needs to tackle all the potential forms of distance to be successful.

The evidence has clearly shown that individual ad hoc innovation sessions are inadequate when trying to span the structural holes. Spanning a structural hole is clearly a process rather than an individual action, even if the one-day innovation session is its cornerstone. It is highly improbable that the innovating partners "find" each other in one day without careful preparation and a well-prepared script. In the case study, one of the reasons the innovation session was considered successful was the long preparatory phase before the session. During that time, the focused target of the innovation session process was constructed together with representatives of the company and brokers of the intermediate organisations. The intensive preparatory phase gave possibilities to find the right kind of experts and prepare them. It also gave possibilities for the case company to commit to the process and get a pre-understanding about the issue. Because the innovation session is a process, different kinds of brokerage roles are needed. This also indicates that for reducing different types of distances, different kinds of skills are needed. A successful innovation session needs both process brokerage and session brokerage.

A one-day innovation session normally requires several months of work to be successful. The process brokerage includes the management of the whole process. Reducing the organisational and cultural distances is important before the session. In a strong corporate culture there is the danger that people may adopt fixed mind-sets to solve problems. Once the company is locked into a culture that has proven itself to be successful in the past, it will be difficult to convince its members to adopt alternative ways of doing things in the organisation (Tan, 1998, p. 24). The process broker has to have the courage to introduce alternative ways to construct the theme of the innovation session. For example, if organisations are allowed to choose experts for the innovation session themselves, they will usually choose experts they already know well or who belong to the same functional community. The case company did not have strong or weak ties with possible e-business experts. Therefore, the innovation session process probably hastened the start of the company's e-business significantly.

According to Burt (2004), structural holes lead to good ideas, but there is no evidence that those ideas lead to implementation efforts or success. The people surrounding structural holes have different interests and perspectives. Such unconnected people are more difficult to mobilise or coordinate around new ideas. A process broker can also help coordinate the after session processes.

Session brokerage refers to the facilitation of the innovation session. A session broker's goal is to develop an understanding of the session and shorten the cognitive, communicative, and social distances between participants, in particular. Communication can be impaired for cross-disciplined innovation groups by the differences in the group members' professional vocabulary and the concepts they use.

The goal of identifying opportunities and generating ideas is to become completely open to all possible alternatives. This goal is virtually impossible to meet because people put up barriers when socialising. The innovation session always begins with an introduction of the participants and a warm-up exercise to lighten the atmosphere. Experience has shown that it is good that participants have same status. When the managing director is in the same group with shop floor employees, especially in a hierarchical organisation, it may cause unnecessary tension and hinder group work. In the case study, the compositions of the innovation session groups were prepared beforehand and the group members had the same status, which helped the group work for its part. Every group had company members and experts.

What kind of expertise is needed in the brokerage functions? In the case study the brokers were not experts in e-business. Their expertise was related to managing the different phases of innovation session processes. Experience has shown that it is similar to that of lawyers (Heiskanen, 1992). Lawyers are hardly ever experts in the cases they tackle. However, they normally have the experience of many cases and the ability to gather the evidence to solve the case problems. Brokers need a variety of skills, knowledge, and experiences to help a group do its work and free itself from the barriers of creativity. Only a few individuals are born brokers, normally they have to be trained. There is a need for further studies and discussion concerning a broker's abilities and training. The methodological distinction between process and session brokerage also needs further discussion.

Questions seem to be an effective way of bringing the partners on opposite sides of a structural hole closer, and the Lahti Region is applying the interrogative model of inquiry for this purpose (cf. Harmaakorpi & Mutanen, 2008). The model has its origins in theoretical philosophy. Collective creativity also involves considering not only the original question, but also whether there is a better question to be asked.

Conclusion

This article underlines the importance of the innovation potential hiding in the structural holes of regional innovation systems. It stresses the importance of distance as a source of innovations. New measures are needed to be able to exploit this potential by collective innovation. These measures are closely related to aiding collective creativity in a very cross-disciplined multi-actor environment. According to the case study of this article a special brokerage function is needed.

This brokerage function aims primarily at increasing the absorptive capacity and bridging social capital (related to the social capital of brokerage) in the potential innovation networks. According to the experiences of the case study the brokerage function includes the following features:

- It aims at bridging different distances between the innovating partners.
- It is a process rather than individual actions.
- The brokers are often experts in no particular discipline.

- It enhances widely used idea generation methods by careful broker's interventions in the ideation process
- Brokerage may not only span the distances between innovation partners, but also lessen the in-house hindrance and resistance to radical innovation.
- Brokerage also enables the flexible use and variation of versatile creative methods.
- It is asking questions rather than giving answers.

The findings of this study support the assumption that distances could be used as a source of innovation. It gives practical implications on how it is possible to exploit different kinds of distances knowingly. It also gives more information about the role of the brokers in innovation process. A criticism of the case study methodology is that its dependence on a single case renders it incapable of providing a generalized conclusion. Limitations of this study are also related to the generalisation of the case study. Our case study concentrated on the fuzzy front end of the innovation process in a medium sized private sector company. Distances can be used as a source of innovation in other kinds of organisations, too. We can also assume that the bigger the distance is, the more essential it is to use the brokerage function. But based on this study, we cannot say how different kinds of distances are accentuated for example in public sector organisations and whether we need a different kind of brokerage there.

We can also raise the question about how the brokerage functions differ during the innovation process. Distances may indeed be differently accentuated during the various stages of innovation processes, and this may change the character of brokerage. Future research should also study whether brokerage belongs mainly to the fuzzy front end stage of an innovation process, or whether it is needed also in later stages. Particular challenges posed by different types of innovation processes, such as process, service, and product innovation processes, should also be looked into in detail in order to obtain results clarifying brokerage functions. User-driven innovation also places many new demands for brokerage and should be included in future research directions.

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Appendix

Table 3: Summary of the answers to the questionnaire for the brokers.

Question	**Summary of the answers**
General observations	The innovation session was considered successful. Most of the brokers described it as good or successful. One described it as routine, but good. The beginning of the session was seen as a critical point because there were some participants who did not know what was happening and the atmosphere was suspicious. The minutes dragged by. Despite of the difficulties in the beginning of the session, the group work started without any great friction.
The composition of the participants, atmosphere, and innovativeness	All participated in the innovation session. Participants concentrated on the theme of the innovation session and were willing to follow given instructions. Experts were diverse, but they expertise was overlapping. They were capable of presenting what they know. One expert received criticism because his presentation was too long and had too much statistical information. The groups were seen as balanced. There were differences in the groups' working styles. One group was considered as quiet and the members turned the problem over in their minds. Another group was loud and the members were "fooling around" a lot during the ideation phase.
Results of the session	According to the brokers, there were possibilities for further innovation or development processes. The company will not change its basic business, but they will prepare an e-business strategy and start projects around e-business. There were also some incremental development ideas which should be studied. One broker saw that there could be possibilities for new innovation session processes in the future with the company.

Success or lack of success of the session	Capable groups, interested experts, a clear and focused target, and the commitment of the company were mentioned as main reasons why the session was considered successful. According to one broker, the session would have been more successful if it had been arranged outside the company. The timetable was also too tight at the end of the session and there was too little time to figure out what was going to happen next.
Further development	Almost all the brokers saw that the panel discussion was functional and should be developed further. According to one broker the panel needed some sharpness and suggested that some of the themes or questions should be given to the panellists beforehand. In addition, the beginning of the session was considered as one of the development targets. For example, there should be more time for the participants to get to know each other and also for a creative warming up exercise in the beginning of the session. Some brokers missed more stimulation like pictures in the ideation phase and more moving around and less sitting around the table.

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