

Regional Learning in the Software Industry: A University Facilitating Regional Networks of Practice

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Abstract. The paper presents a longitudinal empirical study of a regional networking process among software companies. The process took place in the German region of Siegen-Wittgenstein and was carried out by an IS research group at the University of Siegen in an action research manner. Based on Bourdieu's theory of practice and socio-cultural theories of learning, different measures for the support of regional networks were conducted over several years. Within this networking process, the concept of social capital was applied to facilitate Regional Networks of Practice (RNoP). This paper describes the action research approach taken and presents results of ethnographic and qualitative studies which evaluated the networking approach. In particular, the following measures are described and discussed: (i) initializing informal talks and meeting to learn about the region and to build up social capital, (ii) a series of networking events involving academics, local authorities and regional software companies, (iii) the didactical concept of Courses in Practice (CiP) to bridge between university and IT industry, (iv) an EU funded networking project with software and media companies, (v) establishment of a joint research center. The achievements and obstacles of this approach are discussed with respect to the specific historical situation of the region. Furthermore, the outcomes are reflected with regard to the underlying theoretical concepts.

1 Introduction

Flourishing regional networks and clusters are interesting phenomena in the knowledge society. Their existence is an indicator that locality still seems to play an important role in a globalizing economy. So, research into the nature of regional clusters and networks deserves scientific attention. Additionally, regional clusters and networks have become an arena to implement economic policies. While globalization and multilateral agreements seemingly restrict opportunities for policy making on the level of national states, interventions to foster regional industrial sectors appear to be promising. In this paper, we have a double goal: to investigate into interventions to stimulate the process of regional learning, and by evaluating these interventions, to better understand the reproduction of socio-territorial entities, such as clusters or networks. We will conduct this investigation from the point of a research university and look into its opportunities to stimulate regional learning in specific industrial sectors.

Regional clusters attracted considerable scientific attention recently. However, the discussion has not yet led to a coherent definition of the concept and a sufficient understanding of the mechanisms of a cluster's emergence and reproduction (cf. Lundvall 1992, Guilianì 2005, Bahlmann and Huysman, in this issue). For the purpose of this paper, we draw on Porter's (2000) definition. Clusters are seen here as "geographical concentration of interconnected companies, specialized suppliers, firms in related industries, and associated institutions (...) in particular fields that compete but also cooperate" (p. 15). We define regional networks as those socio-territorial entities which consist of regional firms working in a similar industry but do not qualify as clusters due to a lower level of concentration or lacking vertical integration. The focus of this paper will be on regional networks.

From the very beginning of the discussion, scholars have been aware of the importance of knowledge "spillovers" for the flourishing of regional clusters. Marshall (1890) saw the main reason for regional clusters to emerge in the physical domain. However, he was already aware of the fact that expertise sharing within a specific industry can be enabled by physical proximity of the actors (cf. Bahlmann and Huysman, in this volume). Right now economies in the industrialized world are moving from mass production towards flexible specialization as well as from material products towards knowledge-intensive services. Under these conditions regional learning in the sense of information passing and expertise sharing becomes an increasingly more important economic factor (cf. Florida 1995). This fact is also reflected in the cluster related literature (cf. Porter 1990, Saxenian 1994). Other studies have supplemented this view by pointing to the importance of cultural factors such as shared values systems and a feeling of reciprocity among regional actors (cf. Becattini 1990, Lazerson 1990). Guilianì (2005) explains the development paths of regional clusters primarily

from a knowledge perspective. She argues that the ability of the individual firms to absorb information or expertise from external sources is central to the growth potential of regional clusters. Universities are often seen as important institutional factors in technology transfer and the development of regional clusters (cf. Saxenian 1994, Lockemann 2004). Our investigation is based on the hypothesis that research universities can also take the role of a facilitator to foster learning in regional networks. While information passing and expertise sharing nowadays plays an important role in the development of regional clusters, we assumed that it becomes an even more central focus for the development of regional networks. Such a focus is required for the development of these socio-territorial entities since firms cooperate in networks much less intense with each other than in clusters.

To ground our investigation theoretically, we draw on the theoretical concept of practice and social capital. Social capital in the sense of sustained mutual relationships is a precondition to enable expertise sharing among human actors (cf. Ackerman et al. 2003; Huysman and Wulf 2004; Huysman and Wulf 2005; Cohen and Prusak 2001). Socio-cultural theories of learning hold common practice and mutually defined identities to be central enabling conditions for expertise sharing (Wenger 1998; Brown and Duguid 1991; Lave and Wenger 1991). While these conceptions have not yet been widely applied to the analysis of socio-territorial entities, they provide us with a suitable foundation to conduct interventions and empirical analysis.

The paper is structured as follows: In the next section, we will provide an introduction to the discussion on social capital and present results from socio-cultural theories of learning, such as the concepts of network and community of practice. The third section describes the research field and methods. Section four presents the set of different activities which we conducted in fostering regional learning. Section five evaluates empirically the outcome of these activities. Finally, we discuss the findings of the study.

2 Theoretical Framework

To ground our interventions and to evaluate their outcomes, we have chosen theories of practice as a conceptual framework. Going back to the American pragmatists, theories of practice provide a framework to understand the particularities of specific social aggregates. Theories of practice conceptualize society to be divided into entities which have distinct histories shaping their members' action. The particularities among these entities can be explained by their members' rational practical reasoning only when traced back to their socio-cultural and even material and bodily constituencies.

With regard to regional learning, theories of practice allow us to understand the particularities of social entities and human actors and can help us finding appropriate means to bridge among these practices. Pierre Bourdieu (1977 and 1990) is interested in social distinctions when investigating into the reproduction of classes. His analysis of the different forms of capital and their transformation provided us with insides on how to bridge among different social aggregates.

Distinct from Bourdieu's approach, the concept of social capital has also been tackled from a communitarian perspective (cf. Huysman and Wulf 2004a). Neglecting its segregating effects, social capital is understood in this discourse as a property of social entities, which enables their well-functioning (e.g., Putnam 1993, 2000). In this sense many scholars have argued that social capital is essential to information passing and expertise-sharing activities (Nahapiet and Ghoshal, 1998; Cohen and Prusak 2001; Huysman and Wulf 2004). So, social capital seems to play a crucial role when fostering regional learning.

Finally, we will look into socio-cultural theories of learning. Networks and community of practice are conceptualized as distinct social aggregates. However, they are conceptualized along one communality, which is defined by their specific practices. This homogeneity of practices is seen as the base for their expertise generating capacity (cf. Brown and Duguid 2000b; Wenger 1998; Brown and Duguid 1991; Lave and Wenger 1991). In this sense, socio-cultural theories of learning seem to provide a well elaborated theoretical basis for analyzing regional learning.

2.1 Bourdieu's Theory of Practice

Bourdieu's work (1977 and 1990) is characterized by an attempt to bridge between subjectivism and objectivism in sociological theory. He argues that a social analysis needs to start with an understanding of the subjective reasoning of the human actors involved. Such an analysis allows understanding the complexity and situational embedment of human action in social fields. In a second step, sociologists, however, have to uncover the underlying social structures which guide human action.

Bourdieu develops the concept of practice to frame the subjective dimension of individual and social activities. In his earlier work he uses the term in three rather distinct ways: (1) "Practical reasoning" is the dominant form of human thinking and decision making. It is grounded in human actors' everyday's life experiences. Bourdieu assumes that it is distinctively different from theoretical reasoning which is found in scientific discourses or formal logics. (2) The term "practice" is what makes social setting out of a set of activities, such as playing golf. A specific practice has always a history and is related to reputation; it shapes the identity of the actors involved. (3) The term "practice" is occasionally used by Bourdieu to

just denote the performance of a specific action by a human actor (cf. Wade 2004, p. 5). While the concept of practice, diverse as it is, plays a rather prominent role in his earlier work, it fades away in his later ones. It is partly replaced by the concept of social field.

“Habitus” is a central concept to Bourdieu’s attempt to integrate subjectivist and objectivist approaches. It can be understood as a pattern of perception, thinking and action. Habitus, while being the attribute of an individual actor, is socially constructed. It has a dual nature in the sense that it is structuring actions as well as it is structured by action over a human actor’s lifetime. Habitus influences human action in a particular situation but does not determine it. So, habitus is reproduced within the different practices, or social fields, in which a human actor is involved. From an empirical research perspective, habitus needs to be observed by analyzing actors’ different practices. Similar to the concept of practice in social-cultural theories of learning (see below), habitus describes historically grown differences among social entities, such as classes, which separates human actors from each other.

Bourdieu sees human actors being struggling for resources in specific social fields. The individual actors’ forms of capital determine their opportunities to act.

“And the structure of the distribution of the different types and subtypes of capital at a given moment in time represents the immanent structure of the social world, i.e. the set of constraints, inscribed in the very reality of that world, which govern its functioning in a durable way, determining the chances of success for practices” (Bourdieu 1985, p. 241).

Bourdieu (1985) distinguishes between economic, cultural, and social forms of capital. Economic capital is immediately and directly convertible into money. It may be institutionalized in the forms of property rights. Social capital defines the advantage created by a person's location in a structure of social relationships. It explains how certain actors gain more success in a particular social field through their superior connections to other people. Cultural capital defines a person’s forms of knowledge, skill, education, and the resulting habitus, which gives her a higher status in society. It can exist in three different forms: (1) in the embodied state as part of an actor’s habitus, in the form of long-lasting dispositions of the mind and body; (2) in the objectified state, in the form of cultural goods (e.g. pictures, books, dictionaries, machines), and (3) in the institutionalized state, in the form of generally accepted educational qualifications and certificates.

In his book *Distinctions*, Bourdieu (1984) introduces the additionally concept of symbolic capital. Symbolic capital can be understood as the amount of honour and prestige possessed by a person, which allows her to influence or manipulate the value system and acting of others in a social field. Symbolic capital is a species of capital that is perceived through socially inculcated classificatory schemes. Symbolic capital is strongly related to cultural and social forms of capital. However, we will treat it in our analysis as a specific form of capital.

The different forms of capital are interrelated and can be converted into each other. As a result of a historical process, actors of different social entities are equipped with rather different amounts of these forms of capital.

2.2 The Communitarian Concept of Social Capital

The term social capital (SC) has been conceptualized heterogeneously with regard to its definition as well as to its epistemological grounding (cf. Huysman and Wulf 2004a). In line with Bourdieu's conception, a line of thoughts applies the concept of SC to reintegrate social structure and practices into economic thinking. The basic assumption is that economic interactions are embedded in social relations. Through social exchanges, people build webs of trust, obligation, reputation, expectations, and norms which influence their economic behaviour [Granovetter, 1985; Coleman 1988).

In American communitarianism SC has been defined as an attribute of a social entity, i.e. community, rather than of individual actors. Communities are seen as voluntaristic social units which promote harmonic development of organizations or society as a whole. Advocates of this point of view protest against the decline of social trust, the loss of civic engagement, and seek to foster the moral, social, and political foundations of society (Etzioni, 1995; Putnam 2000). Putnam (1993 and 2000) equals SC with the level of civil engagement and applies the concept of SC to cities, regions and whole nations. He understands SC as a set of properties, e.g. norms, level of trust, or social networks, which enables joint activities and cooperation for mutual benefit. Rising SC would be seen as a major ends in regional development.

Next to civic engagement, SC is perceived to be an important enabling factor for knowledge and expertise intense processes in and between organizations (e.g. Lesser et al. 2000). Focusing on the relational aspects, SC theories have been applied as a conceptual base to knowledge and expertise sharing strategies (Huysman and Wulf, 2004; Cohen and Prusak, 2001; Nahapiet and Ghoshal, 1998). Cohen and Prusak state in this respect:

“Social capital consists of the stock of active connections among people: the trust, mutual understanding, and shared values and behavior that bind the members of human networks and communities and make cooperative action possible. (...) Its characteristic elements and indicators include high levels of trust, robust personal networks and vibrant communities, shared understandings, and a sense of equitable participation in a joint enterprise - all things that draw individuals together into a group” (Cohen and Prusak 2001, p. 4).

It is assumed that SC is accumulating when it is used (productively), otherwise it is decreasing. In this sense SC tends to be self-reinforcing and cumulative.

People gain connections and trust by successful cooperations, and these achievements of networks and trust support good cooperation in the future.

2.3 Socio-Cultural Theories of Learning

Socio-cultural theories of learning and theorists of SC agree with regard to the importance of social networks for expertise sharing and learning. However, socio-cultural theories of learning focus on the preconditions for learning. It is assumed that mainly people who are engaged in similar practices are able to share or create knowledge concerning these practices (Lave and Wenger 1991; Brown and Duguid 1991; Wenger 1998; Brown and Duguid 2000b). So these theories offer an approach to explain under which conditions social capital can be most efficient for regional learning (cf. Duguid 2003 and 2005).

Practice is basically understood in line with the second of Bourdieu's usages of the term: a recognizable social entity shaped around a set of related activities. Lave and Wenger (1991) and Wenger (1998) define the concept of a community of practice (CoP) as a tightly knit social entity centred on a particular practice. They stress on the intertwinedness of practice, identity and sense making within a CoP.

Brown and Duguid (2000a) and Duguid (2003) distinguish networks of practice (NoP) from communities of practice (CoP). Within communities of practice, members do not only share a common practice but work together, and therefore, need to coordinate their activities with each other. The members also have, at least implicitly, responsibility for the reproduction of their community and their practice. The creation of new knowledge and expertise is happening mainly inside of CoPs.

Members of a Networks of Practice (NoP) share practice but do not work together, and therefore, do not need to coordinate their activities. The members of a NoP can be unknown to each other. They often only interact in an indirect manner, i.e. via newsletter or bulletin boards. Within NoPs common practice offers a reference to members for their interaction. Common practice allows them to make sense of it in a relatively effective and coherent way (cf. Duguid 2003). While new knowledge is mainly created inside CoPs, NoPs are instrumental in passing information among its member. To illustrate the concept, Duguid (2005) takes the example of Knorr-Cetina's (1999) "epistemic culture" of high-energy physicists which constitutes a global NoP which contains multiple local CoPs.

CoPs and NoPs can be seen as ends in a continuum of social entities defined by similarities in their practice, identity and sense-making. While CoPs will typically have a rather narrowly defined practice and a strong feeling of identity, the shared practice of a NoP will span a much wider variety, its identity will be less strongly felt. Therefore, the processes of sense making and learning differ in this

continuum. The mechanism of legitimate peripheral participation describes how outsiders become members of a CoP by enculturation and gradually acquiring its practice (Lave and Wenger 1991). Information passing within NoPs can be seen as a mechanism to explain learning across the boundaries of different CoPs.

For the purpose of our investigating into regional learning, we will define Regional Networks of Practice (RNoP). RNoPs are understood as NoP whose members are living and working in the same region and know each other personally. Well functioning and density of RNoPs are important aspects of a region's SC – in Putnam's sense. Saxenian (1994) showed the importance of RNoP for the development of industrial clusters when investigating into the development of the Silicon Valley and the Route 128 region.

2.4 Conclusion

Bourdieu and the learning theorists mentioned above share an interest in understanding social systems from the perspective of their socio-cultural disposition which they conceptualize as being historically emerging. Both schools believe in the constitution of human action by practical rather than by theoretical reasoning. Deconstructing the social world into distinct social entities as units of analysis is a central element in their theory building. However, the scientific goals and the resulting criteria for deconstruction vary. While Bourdieu is interested in the reproduction of social classes, the socio-cultural theorists investigate into the emergence and circulation of expertise within communities or networks of practice.

SC und socio cultural theories of learning both focus on the importance of social networks for the exchange of knowledge. However, practice theories rather focus on the human actors' capability to share knowledge. Only those actors which engage in similar or shared practices are able to share knowledge about those practices (Duguid 2005). Despite criticisms of the SC approach and the limitations of Putnam's definition of the term (Huysman and Wulf 2004a), social capital perceived as a regional resource seems to be a useful metaphor to guide an action research approach into fostering regional learning. We assume that rising SC represents a precondition for the emergence of RNoPs.

3 Field of Application and Research Methods

In the following, we will describe our action research approach. We will describe the regional setting, looking at the software and media industry as well as

the university. We also introduce the research approach and methods we conducted to foster regional learning.

3.1 The Regional Setting

The region Siegen-Wittgenstein is located in the state of North Rhine Westfalia almost at the geographical centre of the western part of Germany, about 100 km east of Cologne. Siegen, the region's centre, is a city of about 100.000 inhabitants. In one of its suburbs, the University of Siegen is located. The Siegen-Wittgenstein region has a tradition in heavy industries, specifically in steel production. In the end of the 19th and the first part of the 20th century, the region was an important location for mining in iron ore. Since the mines were closed and later on most of the steel mills disappeared, mid-size companies in the business of specialized machine and plant manufacturing as well as foundries play an important role in the regional economy. These companies are typically export-oriented towards the world market. The official figure of unemployment is at about 7%, well below the federal German average.

The University of Siegen has been founded in the beginning of the 1970s as part of the then happening expansion of the German university system. During the last 35 years, a research focus in media sciences has been established at the University of Siegen, which has gained considerable international visibility. In the late 80s an applied computer science program was established, in the late 90s a program in information systems was added.

During the last 30 years software and media companies have been started within the region. Some of the companies were created by former students of the university's media science, computer science, and information systems programs. The regional authorities maintain a database in which about 450 small to mid-size companies are registered at the moment. These companies employ about 4.500 workers. The regional authorities regard the software and media industry to be one out of nine sectors which they consider to have regional importance.

The regional authorities have set up a coordinating unit whose job is to foster the development of the software and media industries. The unit has a head and three part time employees. A particular focus of their activities is fostering the linkage between university and regional industries. Since about five years, the regional authorities were involved in allocating regional development funds of the European Union. These EU funds were intended to be allocated for regional development, especially the qualification of employees and the networking of companies. The regional authorities had set up a council to decide on project applications in which the regional employers' association and trade unions were represented, as well.

The action research program presented here was conducted by a research group at the University of Siegen's Department of Information Systems which is headed by the second author. The research group works in the field of human centred computing, specifically in the subfields such as Computer Supported Cooperative Work, Participatory Design, End User Development, and Communities and Technologies. Supported by research funds from different government sources and industries, the IS group grew during the time of investigation from two to ten staff members (faculty and research associates) and a similar number of students working as research assistants. Research is organized around specific, typically externally funded projects, and research practice develops within these projects or bundles of related projects. The second author also headed a research group at Fraunhofer FIT. The Fraunhofer Society is a well known and highly respected chain of German national research centres dedicated towards applied science and knowledge transfer into industries.

3.2 Research Methods

The research group of the University of Siegen started its regional network activities within the local software and media industries in 2002 when the head of the group got a faculty position in the Department of Information Systems. In the beginning, there were mainly three motivations to become engaged in regional activities:

- Access to regional companies was seen as an important element in information systems' education. The authors had gained earlier experiences in integrating student teams into companies' CoPs when pursuing entrepreneurship education at the Computer Science Department of RWTH Aachen and MIT Sloan School (cf. Rohde et al. 2007).
- Building cooperation between university and local industries was seen by parts of the academic colleagues, especially in the information systems department, and more so even by the president and the chancellor of the university, as an important aspect of the institution's mission. So these activities would probably strengthen the group's standing inside the university.
- A part of the German national and European Union's research funding schemes are dedicated towards joint projects between industries and academia. While these schemes typically do not require local partners, it can be considered to be an advantage to dispose of a rather large network of industrial partnerships.

We have decided to investigate into regional learning from an action research perspective. We adopted three of Lewin's (1946) principles of action research in applying to:

- Researchers are not just external observers but intervene into the field of application. In our case, we tried to increase the level of social capital in the region and link different communities of practice in the software and media industries.
- Research is a mutual process of learning among the researchers and the practitioners. It is based on an emergent process which takes shape as understanding increases. Action research emphasizes direct researcher-probant collaboration and focuses on group dynamics as the appropriate basis for practical problem-solving. Therefore, it usually combines participative and qualitative methods of analysis, planning, intervention and evaluation (Lewin 1946). In our case learning happened in a double sense: we learned together with the practitioners about the effectiveness of our interventions, the different networking activities. Additionally, our interventions intended to initiate an experience sharing and information passing process in the region.
- Researchers and practitioners joint in tackling an issue of mutual interest. When starting the process, we assumed that fostering RNoP would be a desirable goal for the regional software companies, as well.

Traditional action research distinguishes three phases of intervention: a) reflection phase, b) planning phase, and c) action and observation phase (e.g. Kemmis and McTaggart 1988). In contrast, we did not start with an overall phase model or plan for the different interventions. The interventions rather emerged due to a variety of opportunities and context factors. However, they follow the vision of increasing social capital and bridging among different regional CoPs.

We gained an initial understanding into the particularities of the regional industry by informal discussions with senior faculty at the university, the head of the regional authority's support unit, and some company owners. Supported by the regional authorities, we conducted a first networking event which again led to new insights and contacts. From this starting point, a series of events emerged which will be presented later. Courses in practice were an important aspect of the networking process in which students were supposed to learn by enculturating into regional companies' CoPs.

Within our action research team, there was a certain division of labour. While the second author, being faculty member at the University of Siegen, conducted most of the interventions, the first author, and additional colleagues, rather took the more passive position of observers. They gathered data by means of observing networking events and interviewing participants.

We conducted a series of semi-structured interviews and additional observational studies during the last four years. Since the courses in practice were an important research focus, we conducted 25 explorative semi-structured in-depth interviews with students, supervisors from academia and industries, and officers of the regional administration. 14 students, six company practitioners, three academics, and two officers were interviewed. During the interviews, which

lasted between 60 and 180 minutes, students were first asked about their personal background, their background of education and their motivation for participating in the course. After that, students were questioned on personal impressions and assessments of the course, its single components and the technological support by groupware and cooperation platforms. Students were also asked to suggest improvements. Lecturers were asked concerning their personal background and high emphasis was placed on assessments of the lecture-components held by them. The regional officers were asked about their activities to encourage the competitiveness of the regional software and media industry. We were specifically interested in their experience in establishing regional networks and their evaluation of our joint activities in fostering regional networks of practice between local industry and the university.

Furthermore, a second series of thirteen semi-structured interviews have been conducted with managers of regional media and IT companies, regarding the introduction of an expertise finding system. These interviews focused on internal and external cooperation, communication in networks with partner companies and customers, and IT infrastructure. Additionally, the interviewees were asked about their strategies to find new partners and to identify specific interests, expertises and competences of internal colleagues, external partners and potential customers.

Each person was interviewed in an individual session. All interviews have been recorded with a DAT recorder and fully transcribed. In the evaluation, the answers were transformed into a table categorizing the role of students, academic, and industrial supervisors.

Furthermore, other measures to foster regional networking have been evaluated by participant observation. The observational data was structured around the different events and documented in form of written notes and minutes. Interviews and observational data have been analyzed descriptively according to our heuristic approach (cf. Kyale 1996). The process was informed by the experiences gained when carrying out the different measures. Additionally the second author kept a calendar in which he documented his regional networking activities.

4 Fostering Regional Learning

In the following, we will present the selected instruments applied to foster social capital and bridge among CoP in the software and media industries. In the following, we will analyze the intervention processes by means of Bourdieu's forms of capital.

4.1 Learning to Know the Region: Informal Talks and Meetings

When starting the process, the faculty member did not know the key players of the region's software and media industry. During the course of the first three years, a considerable amount of time was spent in many informal meetings with a big variety of local actors. Given the general interest of the second author in establishing cooperation with the region's industries, he picked up on opportunities arranged by others. Later on the process gained its own dynamics in the sense that regional actors approached the IS group. In the following, we will present those newly established connections which led to further activities within the regional networking process.

Half a year after taking over the faculty position, the second author was introduced to the head of the region's coordinating unit for the software and media industry. A senior IS faculty member who had a long standing cooperation with the unit had told him about the existence of the unit and suggested to call the head. In the talks it became quickly clear that both sides had a strong common interest in connecting the IS group with regional industries. For this purpose, the head of the unit offered parts of his network of relationships within the region. He hinted to local company owners who could be of interest for the IS group and contacted them. He also hinted to specific companies which could be interested in cooperating with the university within the framework of Courses in Practice (see below). As a result of the talks the idea for a series of networking events emerged (see below).

In summer 2003, the second author met a consultant whose small company was specialized in setting up EU-funded projects to network small and medium sized enterprises (SMEs). Though the consultant was living in Siegen, his company had not yet been able to get a project in the Siegen region. He hoped to be more successful when involving a faculty member of the local university into his proposal. An acquaintance of both of them had introduced them to each other. As a result, it was agreed to try to write a project proposal to network and consult companies of the local software and media industry (see below).

In fall 2003, a journalist of the major local newspaper met with the second author. He was responsible for covering the page on local economics at that newspaper and got interested in the IS group as a result of their local activities. The journalist was interested in learning about the group's research activities and its engagement with local companies. The local newspaper is still a family run business whose main activities are centred in the Siegen region. Beyond journalists' interest, it is safe to assume that the publishing house has also commercial interest in the flourishing of the local software and media industries. Being by profession well informed about regions industries, the journalist shared his perspective on important regional actors with the second author. The second author offered to keep him well informed about further initiatives. The meeting contributed to a rather broad and positive coverage of the IS group's activities in

the newspaper. The two less important newspapers with a regional coverage followed later on with corresponding reportages.

At about the same time the second author was invited to become a member of a workgroup in which a department head of the biggest regional software company and a regional investor discussed future trends in the software industry. A particular focus was seen in discussing new applications with HDTV and iTV. The major software company was on the way to launch new products in the field of iTV. The work group was organized by the head of a regional transfer centre jointly financed by the university and the regional authorities. While the work group did not lead to clear outcomes and was given up a year later, the personal access to the industrial actors remained and led to the inclusion of the software firm into the regional networking activities.

4.2 Increasing Visibility and Connecting Actors: Networking Events

As a result of the talks with the region's coordinating unit, a concept for a series of networking events was worked out, called „Lyz Media Breakfast“ (according to the location the meetings took place). It tried to reach out towards heads or upper management of regional software and media companies. Following an invited talk in the early morning (starting at 8:30 a.m.), there is a joint breakfast for the participants to network with each other. So it is designed that participants can leave by 10 a.m. to follow their daily work schedules.

At the first of these events, the first author gave an introduction into the work of his group at the University of Siegen. Moreover, a member of his group at Fraunhofer FIT gave a survey on the Usability Lab's services for industry. The coordinating unit had sent invitation letters to the heads of 350 software and media companies stored in its database. The first event had some 25 participants and led to discussions and talks among the participants. The first instance of the events was considered to be successful which made the coordinating unit decide to continue organizing further events at a frequency of about 4 events per year.

The regional coordination unit had set up a similar series of events already before. But it had been abandoned some time ago. They took the interest of the IS group as a motivation to relaunch their activities. Coverage by the local newspapers helped to announce the initiative within the region.

Beyond the “Lyz Media Breakfast” series of networking events specifically designed for the software and media industries, the second author was invited to give talks about the group's work at a variety of different events in the region. The audience reached from the local trade union association towards the industrial board. These talks helped rising the visibility of his group's work. After the talks there were opportunities to start talking to the different regional actors.

4.3 Bridging between University and Industry: Courses in Practice

Based on earlier experience in entrepreneurial education, we have developed Courses in Practice (CiP) to be a didactical concept which bridges among CoPs of regional software companies and the IS group. Originally, the concept was developed to offer learning opportunities to students by integrating student teams into the CoPs of local IT companies (cf. Rohde et al. 2007).

The CiP approach works as follows: IT companies define projects close to their core business. The student teams work on these projects inside the companies. When working in industries, the students are additionally coached by members of the IS group. Each group is supported by an academic supervisor. CiPs have duration of typically one term (4 months). During this time about five meetings among the students and their academic supervisors take place.

In the end of the term, the students and their company advisors present the results of their projects publicly. The students give a 20 min talk about their results which the company advisors comment on it for about 10 min. Finally, the results are discussed publicly. The event is announced in the region. The participation of the faculty's dean and the engagement of the regional administration guaranteed a certain level of public interest. So, typically some 30 employees of other companies, faculty members, journalists, and students join the presentations which end with a small reception. These events became occasions for further networking among the regional actors as well for acquiring new companies and students.

A groupware tool called Basic Support for Cooperative Work (BSCW) was deployed to all CiP project groups to support their internal cooperation as well as the interaction with the academic supervisors. BSCW was developed by the Fraunhofer FIT (cf. Bentley et al. 1997). The system supported cooperation within and between working groups. Lecture and project materials have been published in the system. In order to find these materials, the system offers various options for retrieval. Furthermore, awareness mechanisms and functionality for annotations and discussions are offered to users.

The first CiP were held in summer term 2003 at the University of Siegen. After presenting the concept to him, the head of the regional coordination unit pointed us towards two small software companies whose CEOs he knew well and thought could be interested. Following his introduction, we had a meeting with each of the CEOs and convinced them to buy into the project. Since 2003, four instances of the CiP have been conducted. Eight student team, two every year, consisting of overall 19 students got enculturated into the CoPs of four different software

companies. Two of the four companies participated more than once in the course: one of them four times, the other company two times.

When investigating empirically into the learning processes happening within CiPs (Rohde et al. 2007, Fischer et al. in preparation), we found that the students teams do not just enculturate into the companies' CoPs. Due to the student learning history at the university and the coaching provided by the IS group while running the projects, the students often turn into boundary spanner between the university's and the company's CoPs. This is specifically the case the company define projects related to innovative products or processes, in which they do not have an established practice inside their company.

According to the interviews and the observation, the usage of technological cooperation support with BSCW seemed to be ambiguous: While some of the CiP groups used the system regularly and found the support very helpful for their cooperation, other groups did not use the system very much. The findings showed that the usage of cooperation platforms like BSCW depends on several factors, as the number of members of a CiP group, their spatial collocation/distribution, the frequency of their physical meetings, and the usage of other systems (like CVS) in the participating companies. The application of technological cooperation support was more important, as less frequent physical meetings of distributed groups have been conducted. Furthermore, some of the involved IT companies denied to use the BSCW system at all, due to the priority for their own technological infrastructure.

4.4 Bridging among Regional Industries: Funded Networking Project

The European Structural Fund (ESF) provides funds for the industrial development of specific regions under different program lines. In North Rhine Westphalia, the state government had decentralized the decision-making for allocating considerable parts of these funds into the regions. Siegen-Wittgenstein had creating an advisory board which decided on the different project applications. The advisory board represented enterprise owners, trade unionists, local politicians, and members of the region's administration. A section of the region's business development department was instrumental in preparing the decision making of the advisory board. Since the board did not meet often, the department had a strong influence on the decision process. It provided most of the relevant information towards the members of the board.

Together with the consultant, in September 2003 the second authors set up a meeting with eight CEOs of regional software and media companies. Both sides had attracted have of the participating companies. In the meeting we tried to agree with the companies on joint vision and a work plan for the project which fitted the

criteria of the ESF program. In the meeting and the following negotiations, it turned out to be impossible to agree on a work plan. This was due to different interests among the companies, historically grounded animosities and rivalries among certain CEOs, and the requirements that the companies should pay for about one quarter of the projects total costs. In the end of November, we finally succeed to hand in a proposal with a smaller consortium. It was directed towards consulting the participating companies individually and set up consortia meetings to foster expertise sharing among them. The proposal was rejected by the regional authorities. Though the second author intervened strongly towards the head of the coordinating unit, he did not get a clear feedback on the backgrounds of the decision nor could he revoke it.

Surprisingly, in late November 2004 the regional authorities approached the business consultant and the second author to submit a similar proposal than the one rejected about a year ago. Unfortunately the funding conditions had deteriorated. So the companies were expected to cover about half of the costs for the services the project provided. Therefore, we had to find new partners from the local software and media industries and rearrange the project proposal. The project was surprisingly approved with just four partners – just one remaining from the original proposal. The activities of the network-building process cover joint meetings among the CEOs, meetings with the IT departments of strategic clients in the region (e.g., a brewery, a producer of switchboards), and joint public relations. So these joint activities focus around marketing and management practice within software and media companies.

Furthermore, the IS group is in the process of establishing a joint research center in the field of interactive television (iTV). The center will focus on research and development of innovative technological features and suitable formats of iTV. This activity is jointly pursued by a regional software company, the administrative body of the region, and the university. The software company is member of the ESF project and has already participated four times in CiP. This initiative therefore is grounded in a longer history of cooperation among the different actors.

Finally, the IS research group has developed research proposals together with different member companies of the regional network. Many research programs of the German government and the European Union require participation from industry. Some of them even require explicit SME participation. So, it makes sense for the IS group to include regional companies into their research proposals in case there are matching interests and converging practices. So far two joint research proposals have been written of which one got funding. The participating companies were both involved in CiP before writing the joint proposal and are both members of the ESF project. So the research proposals are grounded on an already rather well established cooperation between university and industry. On

the other hand, the opportunity to receive public funding via the university's activities stabilized the regional networks.

4.5 Supporting Cooperation: Expertise Finding in Regional Networks

For the media and IT industry in the region of Siegen-Wittgenstein, a company database exists with about 600 different firms. This regional company database only contains the main address data and some keywords regarding the companies' core business. The database is rarely used as regional "yellow pages" but quite often less informative than the companies' websites. Therefore, it is planned to introduce a system for expertise finding additionally to this database. The ExpertiFinding Network has been developed at the IS group of Siegen University to foster cooperation between employees in large, distributed organizations.

The system helps to become aware of persons' expertise by making individual knowledge and interests visible. It offers an expertise search engine which generates individual expertise profiles by using self-assessments and automatically created keyword profiles. Since the self-generated profiles present "yellow page"-like data (contact information, organizational status information, formal qualification, main interests asf.), the automatically-created keyword profile is generated by an analysis of documents and folders which are assigned for this analysis by the individual users. Intelligent search mechanisms allow for the generation of an sorted keyword list which is ordered by the frequency of the individuals' keyword usage in their documents. That keyword listing can be edited by the individual user and then be published in the system. Therefore, no documents have to be made accessible to others but only structured data concerning the individual work practice. Furthermore, no information is distributed which is not authorized by the individual user before.

To foster cooperation within the regional media and IT industry in Siegen-Wittgenstein it is planned to introduce this ExpertFinding Network not providing data about individual expertise but about the expertise and competencies of companies. Each regional IT company should be able to create an own "yellow page"-profile and to assign official documents (which might be published already elsewhere or which are not published before) for an automatic keyword analysis. After editing the resulting company's keyword list, the company publishes the data in the system. Users of the ExpertFinding system can search for certain keywords and compare their own profiles (the yellow page-profile as well as the keyword-profile) with that of other companies. Intelligent matching algorithms allow for the finding of companies which are similar to the own company's profile.

According to thirteen interviews with regional IT managers that were conducted during spring and summer 2006, an improvement of the regional marketing of products and services is expected by some interviewees. They consider such an ExpertFinding system an addition to companies' websites, leaflets and call center activities. Some managers stress the importance of the regional market for their business. They attract their regional customers by a good reputation and references communicated mainly in personal networks. Especially very young companies (start-ups) seem to expect improvement by the application of the ExpertFinder. They hope for a quicker and better integration into the regional market.

Other managers stated that their marketing is not focusing on the regional but on national or international markets. These persons expect the main effect of such a system concerning the support for regional cooperation with other IT companies. Furthermore, they see some advantages of regional cooperations in the reduction of costs (e.g., travelling expenses) and more effective cooperative relations.

However, some interviewees are very sceptic with regard to the application of the ExpertFinder network. They state that their knowledge of the regional companies and their competencies is quite good and therefore, they do not need support for the regional expertise awareness. Others are very critical with concern to the regional competition. They are worried about giving away information to competitors.

Despite the presented critical statements, the introduction of the system is planned for the beginning of 2007. According to the action research approach, this introduction process will be evaluated and adaptation of the existing ExpertFinding framework to regional companies' needs and requirements are projected.

5 Obstacles to Regional Learning

While the description of the regional networking process has focused so far on the overall achievements, we also encountered considerable problems and set backs.

In the beginning, it was difficult to identify companies whose practices were related closely enough to the ones of the IS group. Since user orientation does not have a strong tradition in computer science curricula at German universities, the importance of this set of practices was not fully understood by some of the regional software companies. So some of them felt little motivation to engage with the IS group. Others did not have fitting expectations of how to match practices. For instance, in the first instance of the CiP one of the companies

defined the project tasks in a way that pure implementation work had to be conducted by the student team. The company wanted to realize an awareness feature within an on-line community system. Though the IS group's research agenda dealt with the design of a communityware, the company just asked the student team to implement a prespecified feature without conducting a requirements analysis or evaluating design alternatives. They seemed to be more interested in cheap student software developers than in (mutual) learning at all. Thus, it took time to identify fitting practices within the local software companies and adapt mutual expectations.

When trying to establish the funded networking projects, we found that the development practices among different regional companies varied considerable. This was due to the fact that many of these companies worked in rather distinct market segments and based their development on different tools and platforms. To secure shared practices among the CEOs involved, we focussed the joint networking activities around *management* practices in the software industry, which seemed to be more comparable between the different firms.

Even if fitting practices can be identified, the different actors need to accumulate sufficient trust to open up for boundary spanning processes. In the case of CiPs, in two instances companies defined projects which were only peripherally important to their core business. Their engagement in taking care of the students and offering opportunities for enculturation was rather limited in these instances, as well. On the side of the students, such an attitude limited their readiness to engage fully in the project. Moreover, in one of these cases doubts came up whether one of the companies would act fairly towards their students. During a first meetings with the university supervisors, one of the participating students mentioned that the company still owed him money from an earlier student job. Therefore, he clarified in the meeting that he would not participate in the team which was supposed to work in this company. While he participated in the team work with another company, his remarks left traces in the other student team's readiness to enculturate into the company's CoP.

Trust also had to be built during the first meetings of the networking project. In a first meeting, the participating CEOs were rather reserved with regard to talk about their problems and issues to be addresses in the project. This attitude changed in the course of the next meetings, however, to different extents among the actors.

During the networking project, we also found that certain companies, while participating in the networking process, did not want to be seen as regional players. Two of the larger SMEs delivered software and services to client all over Germany. They did not want to be perceived as *regional* players. Therefore, we avoided setting up a website for the regional networking process. Thus, it is important to respect the specific identity and self concept (Tajfel 1982, Tajfel and Turner 1986) of the different actors within regional networking processes.

The networking efforts took place in a social world which was shaped by historical processes predating our activities. At different occasions, it turned out that historically caused animosities prevented us from bringing actors together. For instance, when organizing the first ESF consortium among regional software and media companies, two competing web agencies would not enter the consortium jointly. When investigating into this issue, we learned that the CEOs once worked in the same company and separated in a move which was mutually perceived to be hostile. We perceived similar phenomena when setting up the workgroup on HDTV and iTV: The head of the regional economic board was formally member of the group. However, he never showed up due to the fact that he and the local entrepreneur were competing for influence in the region's parliament where they represented different political parties.

The networking activities in the software and media industries were also competing with activities in other industrial sectors. When the first application of the ESF project failed, it became clear that the regional administration had decided in favour of actors from different industrial sectors. Since he was not made aware by the regional authorities with regard to such a potential competition, the second author was strongly disappointed with regard to the application's outcome. Since he felt betrayed to some extent, it paralyzed the networking activities for several months.

Engaging deeply with companies can lead to the fact that academics become part of the companies' strategies, which can challenge the university's specific role in the networking process. In one of the CiPs, the student team worked with a major producer of cooling equipment. Before the project started, the university did not have direct contact to the cooling equipment producer. The relationship was established by the head of one of the smaller companies which took part in the regional networking project. This company was providing scan services to the cooling equipment producer. The head of the scan service provider had talked to the CEO of the cooling equipment producer and drawn his attention to the CiP approach. He intended this move as a service towards an old client combined with the opportunity to launch the introduction of a document management system (DMS) at the client's side. He was trying to expand his company's portfolio of services towards the domain of DMS. Before, he had already taken some steps to sell these services towards the cooling equipment provider. So far he had not been successful. He hoped that an analysis of the problem-prone and paper-based payment process would finally lead to the introduction of a DMS. So, he hoped to profit from the project by opening a new field of services for his company. The CEO of the cooling equipment producer had rather different plans. He wanted to analyze whether the paper-based processes could be designed in a simpler manner so that scan services would be less required and could be provided internally. Thus, he started the project by not allowing the CEO of the scan service provider to take part in the project meetings. During one of the project's workshops, one of

the middle manager even asked the student team to evaluate the market for scanners and develop a proposal for an internal delivery of the scan services. The second author who took part in the workshop made clear in the meeting that the student team would not take over this task of planning the substitution of the external scan service provider. He stated that such a demand did not fit with the history of the project establishment. The stance was finally accepted by the management of the cooling equipment producer. Still, it looked like the results of the project would seriously damage the scan service provider's long term interests. Its CEO was often asking the second author about the state of the project. Dealing with these questions created a certain loyalty problem for him.

In such a complicated and delicate situation even small events can lead to a break-down in social relationships. In one of the networking events, an IT consultant was introduced to the second author. They had a general small talk in which the IT consultant asked about the regional companies the second author was engaged with. The second author mentioned, among others, the project with the cooling equipment producer. The IT consultant used this information to access the head of cooling company's IT department. Referring to his talk with the second author, he promoted his services. While he was not successful with that, the head of the IT department told this story to the CEO of the scan service provider. Since the CEO could hardly judge how the second author had acted indeed, the story created a certain reservation with regard to the second author's general intentions.

The tension-loaded situation resolved in the end of the CiP when the cooling equipment producer decided to ask the scan service provider to introduce a DMS in one of his other factories. Therefore, at the public presentation of the project results both sides expressed satisfaction with the project's results at last. At that point it was possible to tackle the conflicting situation openly.

The experiences and observations mentioned above show that action research interventions in regional industrial settings have to take into consideration historically evolved structures and relations between different actors. Most of these partly conflicting relations and competitive structures are not known to researchers as new actors in the field nor discussed openly. Speaking in terms of SC, trust-building in regional networks does not start at point zero but can rely on "bridging" social capital. However, one has to anticipate the negative effects of "bonding" SC as well (Portes 1998; Putnam 2000; Cohen and Prusak 2001)

6 Discussion

The aim of the different interventions mentioned above was to increase the level of social capital between university and regional industries as well as to

establish RNoPs amongst regional software and media companies. Given the historically evolved different forms of capital already owned by the companies and actors, it was necessary to invest a significant amount of symbolic, cultural, and economic capital as well as communicative resources to trigger and foster the establishment of trustful relationships and the building of networks among the different regional actors.

The distribution of the forms of capital among the actors in a social field must be seen as the result of socio-historical processes (Bourdieu 1985). The activities of the Siegen IS group, described in section 4, can be seen as work directed towards the accumulation of capital in the regional setting. Analyzing the action research approach from a Bourdieuan perspective, the IS group was equipped with a rather high level of symbolic and cultural capital while it lacked social capital in the region. In the beginning of the process, none of the members of the research group had lived in the region before or knew any of the important regional actors. Thus, the IS group's activities, especially the ones of the second author, were directed towards rising its social capital in the region. Therefore, other forms of capital needed to be invested to gain and increase social capital.

There were mainly two strategies which were employed. First, the second author aligned with actors who owned already a considerable level of social capital in the regional software and media industry. The cooperation with the head of the regional coordination unit is the best example of this approach. Secondly, the second author applied symbolic and cultural capital to increase the amount of social capital. In the eyes of regional actors his symbolic capital mainly consisted of (a) being a professor of the university and (b) being additionally aligned to a widely known research organization, the Fraunhofer Society. Symbolic capital played an important role in attracting regional actors to engage with his group. Cultural capital, in the sense of the IS group's expertise, played an important role in maintaining once established relationships with regional actors.

Economic capital plays an important role in shaping the reward system for academics. The reward system within the University of Siegen, within the Fraunhofer Society, and within the national and European context of research funding, as it was perceived by the second author, encouraged him to invest efforts in augmenting his social capital within the regional software and media industry. On the other hand, the newly gained social capital could be transferred in other forms of capital as well: While symbolic, cultural and economic capital can be used for investment to increase social capital, the newly accumulated social capital improved the reputation (symbolic capital) of the university IS group. Since the standing of research groups at residential university is dependent on successful networking with regional actors, trustful relationships and good cooperation with regional industries helps to improve this standing. With regard to a potential transformation of social capital into economic capital, a better

regional standing of the university research group was perceived to increase the chances of the IS group to apply for public funding.

Beyond improving his personal social capital, certain activities aimed additionally at increasing the social capital within the regional software and media industry in a Putnamian sense. These activities were partly motivated by his perception of the reward system within his scientific field but also by his personal stance on the role of universities in society (see Fischer et al., in preparation). To this end, the author had a shared interest with the region's coordination unit. Their joint activities can be seen as an effort to mobilize their complementary forms of capital in encouraging regional learning.

However, this approach to expertise sharing was restricted by the regional structure of practices and partly conflicting interests of major actors. As it was mentioned above, it turned out to be a challenge to identify company practices which were closely enough related to the ones of the IS group. Some of the involved companies worked in domains which did not focus on human computer interface design and therefore were not interested intrinsically in issues of human centred computing. To find common practices, communication and processes of mutual learning between the university and IT companies were necessary. When building RNoP, instead of the companies' core business practices, secondary business practices (such as marketing and managerial activities) were more likely to offer common ground.

In the near future, the expertise sharing within regional networks shall be supported by technical means as well. The introduction of an ExpertFinding Network which allows for the generation and matching of companies' competence profiles was assessed to be helpful for the awareness of regional expertise. Probably such a system can foster the identification of similar practices and the building of new cooperative structures.

Our work has brought up some wider applicable implications for the action research approach into regional networking:

- From an action-research perspective interested in regional learning, it is important to deconstruct social systems to understand boundaries which could act as potential barriers to expertise sharing and the establishment of RNoPs.
- We assume that practice, in the sense of socio-culturally embedded bundles of related activities, is an appropriate concept to base analysis and interventions upon. So, CoPs and RNoP seem to be appropriate as basic units of analysis.

Starting from these conceptualizations, we assume that interventions should aim at linking existing CoPs by establishing or fostering RNoPs. To encourage regional learning within certain NoPs, these interventions need to increase the level of social capital, in a communitarian sense of that term. The interventions

should be aimed at the establishment of social relationships among actors of particular regional CoPs and NoPs.

We believe that the concept of Regional Networks of Practice (RNoPs) bridges a gap between the concepts of CoP which refers to a shared practice and mutual trust and NoP which relies on a broader practice domain but does not require personal relationships. RNoPs can be seen as an intermediate concept, not necessarily requiring shared practice but a broader domain of interrelated practices. In contrast to NoPs, RNoPs are grounded in personal relationships and mutual acquaintance in regional settings.

When conceptualizing interventions, one needs a profound understanding of the forces which drive the reproduction of a social field. Bourdieu's forms of capital, originally developed for the analysis of social classes, provide us with a helpful framework to intervene into the reproduction of socio-territorial units.

To gain an appropriate understanding of regional structures of reproduction these socio-territorial units, Bourdieu's concept of SC can be helpful to analyze a broad variety of social processes:

- It helps to analyze why certain regional actors are not accepted by particular CoPs. The concept of habitus (Bourdieu 1985) provides us with an analytical lense to understand the role of bonding SC (Putnam 2000) which leads to the closure of certain communities against certain actors.
- These processes of social closure can lead to an extreme emphasis on the regional identity, which makes it quite unlikely that an "outsider" who is a new player in the region is accepted by the existing regional communities at all (c.f. Portes 1998, Cohen and Prusak 2001).
- The accumulation of social capital of a new actor in regional social structures can be analyzed by the investigation in the investment of other forms of capital (like symbolic, cultural, and economic capital) for trust-building. Although the study presented focuses on social capital mainly, the ownership of other forms of capital seemed to be an important facilitator for the accumulation of social capital in the regional networks and communities.
- In the presented case of the fostering of RNoPs initiated by an academic actor, it was important to refer to SC as an individual resource (like it is conceptualized by Bourdieu) rather than an collective good, as it is looked upon e.g., by Putnam or American communitarists. The more individual-centered perspective of Bourdieu seems to be more appropriate for the initial phase of social capital building and the personal engagement of certain actors (e.g., the academic researcher or a particular local authority). The more inter individual, collective perspective of the communitarians might be more promising for the analysis of a collective practice of an already existing community. In this sense, both theoretical approaches might be seen as complementary to each other, Bourdieu looking from the individualistic/micro-perspectivist "worm's eye view" and the

communitarians looking from the collectivistic/macro-perspectivist “bird’s eye view” at the phenomenon of SC.

However, investigating in processes of learning requires other theoretical approaches since Bourdieu’s theory of practice is not mainly focusing on *learning issues*. Although both theories refer to human actions and the concept of practice, socio-cultural theories of learning (esp. Lave and Wenger’s concept of CoPs) seem to be more appropriate to understand the conditions which foster or hinder processes of social learning.

The CoP approach refers directly to common practices and shared histories of learning to differ between different communities, while Bourdieu focuses on habitus and class differences instead to explain social stratification. Therefore, for the understanding of *collective processes* of expertise sharing and the building of RNoPs, the approach of Lave and Wenger (1991) seems more appropriate.

Since Bourdieu’s concept of (class) habitus is focused on social classes mainly, processes of regional learning should be rather focused on social practice instead. While the *successful* mutual and collaborative learning of regional industries can be explained better with socio-cultural theories on learning and the CoP approach (Lave and Wenger 1991, Wenger 1998), the *failure* and the obstacles of regional learning projects might be better understood relying on the Bourdieuan concept of SC. SC proved to be helpful with the analysis of social closure and processes of social accentuation between communities. Furthermore, the investigation in transformation processes of different forms of capital seems to explain the accumulation of social capital as a central precondition for the establishment of regional NoPs. The two sets of theories (Bourdieu’s concept of CS and the socio-cultural inspired CoP approach) were helpful with gaining insights into (i) the successful/non-successful personal impact on building up social capital in regional networks and (ii) the collaborative learning *of and in* regional NoPs.

7 Conclusion

Based on the theoretical approaches of SC and socio-cultural theories on learning, the IS group of the university of Siegen attempted to facilitate regional learning in IT industries by interventions such as informal meetings and talks, a series of networking events (Lyz Media Breakfast), the didactic approach of courses in practice (CiP), conducting an ESF-funded networking project involving several IT companies, and founding of a joint research center for iTV (Media Design and Experience Lab). Following an action research approach, empirical evaluation of these measures by series of qualitative interviews, minutes analysis and participant observation showed achievements and shortcomings of the attempt:

The close cooperation with local authorities and the collaboration with the highly respectable research center Fraunhofer Society helped to accumulate social capital within the region and to trigger networking of different IT companies successfully. The CiP approach led to trustful relationships and cooperation of the university IS group, IS students, and several software companies. In an ESF-funded project, four software and media companies did not cooperate with each other with regard to their core businesses but with regard to their marketing and management practices. In the Media Design and Experience lab, two companies envision to cooperate with the university to research and develop innovative solutions in the domain of interactive TV.

On the other hand, the program for facilitation of RNoP faced some obstacles: Certain regional actors were rejected by others when building up network structures. Due to historically evolved, personal animosities and structures of competition, some networking attempts failed. Furthermore, egoistic strategic actions and intransparent communication behaviour of single actors led to conflicts and set backs in the trust-building process. Due to the recency of the academic actors in the regional setting, it required a reasonable amount of initial investment just to understand the social dynamics and to be accepted by regional IT companies. Differences in practices between IT companies and the IS group hindered learning through enculturation during the CiP program. Limited resources (in terms of economic capital) led to competition among different industrial sectors with regard to publicly funded networking projects.

Summing up our experiences and the empirical findings, the theoretical approaches of SC and the socio-cultural theories of learning offer potential for the analysis and the understanding of social networking processes. With regard to the facilitation of RNoPs among university and software industries, Bourdieu's conception of SC helps us understand problems and limitations: However, Bourdieu's focus on the *individual* accumulation of SC (and other forms of capital) does not seem to be the best analytical perspective to explain *social/collective* action and practice in communities. According to the "worm's eye view-"/"bird's eye view" perspectives mentioned above (micro-/macro-perspective), both theoretical approaches might be complementary with regard to the *individual* chances and limits for the engagement in social networking processes on the one hand and the *collaborative* learning processes in RNoPs on the other.

The program for the facilitation of regional learning in NoPs of IT companies was motivated by the assumption that expertise sharing between regional software and media companies might lead to advantages in competition with other regions' companies, especially with regard to national and global markets (Porter 2000). Residential universities are regional actors that could play an important role in the process of regional learning and the building of RNoPs. The experiences of the presented case in the German region of Siegen-Wittgenstein show that regional

networking can be an appropriate means to foster regional learning even in regions which are not characterized by local clusters as defined by Porter (2000). Although the Siegen-Wittgenstein region did not offer such an interconnected local IT cluster, the interventions by the university's IS group and the regional authorities led to cooperations in which mutual learning between different software companies took place. The technological support of these cooperation structures by the introduction of an ExpertFinding Network is planned and will be evaluated in further research.

The presented case of establishing RNoPs among IT industries describes an university-driven attempt to foster regional exchange of expertise. Due to their particular forms of capital universities can play an important role in this process. However, processes of networking and enculturation require substantial efforts from regional companies as well as from university actors. Mutual trust between regional companies and academia needs to be built over time through cooperation in various regional activities (cf. Fischer et al., in preparation). From an academic point of view, engaging in the networking of regional industries can help researchers to gain insights into facilitating and hindering conditions for regional learning and forster the development of conceptualizations and theory.

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