

**'Network Reflection' – a road to
regional learning, trust and innovation**

by

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In memory of my dear father, Petter

Abstract

The acknowledgement of innovation as the main driving force in economic development, and the assumptions that networks, regional co-operation and trust contribute to innovation, form the basis of this project. There is a substantial and rapidly growing literature about how regional co-operation and innovative networks work. One should expect this literature to encompass a broad discussion on how to develop appropriate forms of co-operation, but such discussions are relatively rare. The purpose of the present work is to raise and discuss precisely this issue, i.e. how to develop innovative regional networks in theory and practice.

Universities are challenged to enhance innovation environments and the thesis focuses on mechanisms enacted by a university, such as triggering networking processes within the business community. The research problem is how regional universities may promote development of regional networks, and how education of experienced managers may be utilized as a mechanism in this process. The overall research question is: How can regional forms of co-operation that enhance innovation be developed, and how can the regional university assist in this development? The three sub-questions are: 1) Does network reflection influence the development of regional co-operation and communities of practice? 2) Does network reflection influence regional collective learning and innovation? 3) How can management education contribute to the creation of interpersonal trust in networks?

The empirical context is a cluster of electronics industry in the Norwegian Vestfold region. In 2000, the cluster association decided to set up a joint

management programme – in co-operation with the regional university – to improve management practices and increase regional co-operation. To meet this challenge the university developed the educational method network reflection. Network reflection is a pedagogical method for inter-organizational, part-time management education, and an intervention with the purpose of increasing trust and inter-organizational co-operation. This longitudinal case study, with some elements of action research, follows the 27 managers from 14 firms that participated in the network reflection programme, the cluster association and the cluster from 2001 to 2007.

This thesis contains four papers, representing different theoretical perspectives. The main perspectives in the respective papers are: Paper 1) cluster, conferences, communities of practice and regional collective learning; Paper 2) innovation, connectivity and communities of practice; Paper 3) innovation, ties, motivation and regional innovation systems; Paper 4) interpersonal trust and trusted weak ties.

This work contributes to the development of theory and methods, and has practical implications. To begin with, it develops new concepts and definitions. Network reflection is a pedagogical method for inter-organizational, part-time management education, and as such it constitutes a new concept. It was developed practically during the programme and has been conceptualized theoretically in this thesis. Communities and networks of practice are extended to the regional level and termed regional communities of practice, and the thesis provides a definition of ‘regional’. Secondly, the work develops five trust-creating processes: connections, communication, direction, temporary groups and valuable gifts. Thirdly, by

combining action research, quantitative social network analysis and qualitative research methods in a longitudinal study, the work provides methodological contributions on how to study the development of regional systems of innovation. Forthly and finally, the work has practical implications for firms, clusters, universities and policy makers.

The answer to the sub-questions is that network reflection has a capacity to increase regional co-operation and influence the development of regional communities of practice. Moreover, network reflection has a capacity to increase regional collective learning and innovation. Finally, network reflection is a system of relationship-building interventions and a social mechanism that influences trust-creating processes. These processes seem to have a capacity to create enduring interpersonal trust and trusted weak ties in networks. The answer to the overall research question is that regional universities may enhance regional forms of co-operation by utilizing network reflection in organizing management education programmes for networks of regional firms.

Acknowledgements

Mountain climbing has always fascinated me. I am fascinated by the combination of hard work, risk, fun, pain, uncertainty on how the trip is going to be, the new viewpoints on the world afforded when reaching different levels, and the deeply satisfying feeling of reward you experience when you reach the top. Writing this dissertation has been like a metaphorical mountain climbing. It has been hard and sometimes painful, and the fear of not reaching the top has grasped me from time to time. But most of all it has been an inspiring, extremely instructive and enjoyable process. The reason why it has been enjoyable is twofold. First, the feeling of achievement when, after considerable effort, I reached some of the smaller mountain tops on my way. Second, all the helpful, interesting and amiable people I have met during the process. Several of these people have accompanied, supported and helped me during the climbing process, and shared their experiences and some of the pain and the fun with me.

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organized the HSS05¹ conference, written the VRI² application to the Norwegian Research Council, and are currently working on effecting the VRI project. It has been, and still is, a hard and very demanding process. We have shared hard work and our concerns, but now we also share the signs of success. Thank you both very much for the including and helpful community of practice we constitute.

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¹ Conference on University and Society Co-operation with more than 300 participants in June 2005

² Funding Programme for Regional R&D and Innovation

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Horten, November 2007

Anne Haugen Gausdal

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1. Introduction

An increased level of complexity and market turbulence with reduced product lifecycles, accelerating technological development and causing previously protecting economic borders to dissolve, has – together with ICT – resulted in globalization and highly increased competition (Johannessen et al., 1999a). In its extreme form, this phenomenon has been denoted as hypercompetition (D'Aveni, 1995). Furthermore, the level of education and research has augmented dramatically in the western societies during the last decades. Within this picture, knowledge has come to be considered more and more as a firm's most important strategic resource, and the ability to learn faster than the competitors is presumably the only lasting competitive advantage (Senge, 1990). This represents a paradigmatic shift, and we are currently in a passage from the industry society to the knowledge society (Johannessen et al., 1999a). The increasing globalization paradoxically seems to increase the importance of regional co-operation to firms' competitiveness (Saxenian, 1994; Maskell et al., 1998). The acknowledgement that learning, knowledge and innovation represent the main driving forces in economic development, along with the assumptions that networks, regional co-operation and trust contribute to learning and innovation, form the basis of this project.

1.1 Purpose and focus - Research problem

There is a substantial and rapidly growing literature about how regional co-operation and innovative networks work (for an overview see Freeman, 1991; Hoang and Antoncic, 2003; Asheim et al., 2006). One should expect

this literature to encompass a broad discussion on how to *develop* appropriate forms of co-operation, but such discussions are relatively rare. For instance, "we still know little, theoretically and empirically, about how clusters develop and evolve" (Nooteboom, 2006: 137). The purpose of the present work is to raise and discuss this issue, how to *develop* innovative regional networks in theory and practice. Hoang and Antoncic (2003) ask for more longitudinal, qualitative, process- and outcome oriented research on networks. Moreover Freeman (1991: 511) claims that "longitudinal case studies on the evolution of networks could be particularly valuable". Therefore a longitudinal, mostly qualitative and inductive process-oriented case study is conducted.

The research problem is deduced from the interstice of five theoretical debates: First; rather than taking place in a single spot, where a few bright actors are able to break out of the mainstream of thoughts and actions, innovation is increasingly seen as the product of coordinated efforts of many people distributed in different organizations, private as well as public. Second; the regional level of co-operation seems to be important to innovation (Cooke, 1998). Moreover regional co-operation is an important precondition for regional collective learning, and regions with high levels of collective learning are found to be highly innovative (Keeble, 2000). Third; communities and networks of practice are important sites of learning and innovation (Brown and Duguid, 2000). Hence the promotion of collective learning and innovation can be seen as the promotion of regional communities and networks of practice. Fourth; trust is considered to be essential in innovative networks involving creation and diffusion of knowledge (Newell and Swan, 2000), reducing complexity (Luhmann,

1979) and enriches the firms opportunities and access to resources. Fifth and final; Universities traditional missions of research and teaching are recently being supplemented by a ‘third mission’ of contributing to regional economic development (Etzkowitz et al., 2000; Nilsson, 2006). “Governments in virtually all parts of the world are focusing on the potential of the university as a resource to enhance innovation environments and create a regime of science-based economic development” (Etzkowitz et al., 2000: 314). Examination of how the teaching of experienced managers may constitute a triggering mechanism of networking to enhance innovation environments has, to the best of my knowledge, remained unstudied so far. The research problem is thus *how regional universities may promote development of regional networks, and how education of experienced managers may be utilized as a mechanism in this process.*

1.2 Research questions

The point of departure is to focus on the mechanisms enacted by a university, triggering networking processes within the business community. The relationship between universities and industry has traditionally been informed by the principle that research leads to innovation, and education leads to increased competence in the labour market. This focus on linear forms of relationship was (for instance) anchored in the human capital theory in the 1960s. Because the approaches de-emphasize the social, relational and situated base of information, knowledge and skills, they do not prove very useful for either understanding or promoting the interactive learning processes that are so central to economic success (Brenner, 2002). Moreover, interactive research and development (R&D) collaboration between business and universities is found to be a main condition for

innovation (Nyholm and Langkilde, 2003). Promoting interactive flow of knowledge between science and industry is therefore generally believed to foster innovation. Thus, the question yet to be answered is: How can education more directly lead to innovation? The overall research question is: *How can regional forms of co-operation that enhance innovation be developed, and how can the regional university assist in this development?* The universities' core activity is educational programs. This thesis focuses on educational programs for experienced managers from a network of regional firms, organized as systems of interventions, by implementing a new educational method denoted as network reflection. This is, however, not a traditional programme evaluation, but rather an investigation of a secondary effect. The three sub-questions are: 1) Does network reflection influence the development of regional co-operation and communities of practice? 2) Does network reflection influence regional collective learning and innovation? 3) How can management education contribute to the creation of interpersonal trust in networks?

1.3 Context and case description

Constituting the empirical context is a cluster of electronics industries in the Norwegian region of Vestfold, and the Electronic Coast – a cluster association committed to arena and network building with the aim of promoting growth and innovation in the region's electronics-based firms. The firms are mainly clustered in a 8-km circle around the city of Horten. A vast amount of literature acknowledges such a close spatial proximity of firms to represent an innovative power, explained as knowledge spillovers (Cooke, 2007) or mysteries in the air (Brown and Duguid, 2000). Other scholars (e.g. Maskell et al., 1998; Giuliani, 2007) argue that a relatively

dense business environment does not necessarily lend itself to co-operation and interaction. They argue that business networks (e.g. clusters) differ structurally from knowledge networks as the former are more densely connected than the latter, and business linkages are more homogeneously distributed than knowledge linkages (Giuliani, 2007). Although many firms were members of the Electronic Coast, knowledge linkages seemed to be scarce in this cluster in the beginning of the 2000s (Isaksen, 1999; Uhlin and Johansen, 2001). Therefore, at this time, Electronic Coast was more a kind of business network and still far from its objective to become a knowledge and innovation network.

Electronic Coast decided in 2000 to set up a joint management programme to improve management practices and increase regional co-operation. The result of this initiative was the establishment of the 'Management Academy' in co-operation with the Vestfold University College. The case selected for this study is the first programme at the Management Academy, which was entitled Managing Knowledge. It was a part-time programme, lasting from September 2001 to June 2002. To meet the challenge of improving management practices and increasing co-operation, the University developed the educational method of network reflection. From being theoretically inspired, the content and methods were now tailored to the participants' expectations. Detailed planning was an ongoing process involving reflection between the main lecturer (myself) and an advisor. The participants – 27 managers from 14 firms – were mostly strangers to each other. This longitudinal case study follows these managers, the cluster and the association from 2001 to 2007 in order to study the co-operation effects

of the programme and develop new methodological and theoretical contributions.

1.4 Network reflection

Network reflection is a pedagogical method for inter-organizational, part-time management education. Theoretically inspired, it was developed practically during the programme, and is conceptualized theoretically in this project. Mintzberg's (2004) experienced reflection concept in management education proved very useful in the conceptualizing work because it corresponded to a great extent with the applied method. Nevertheless, network reflection is something more than simply experienced reflection, in that it constitutes a combination of *network* activities and experienced *reflection*. Experienced reflection consists of short lectures, seminars, thesis and reflection tasks, and the role of the lecturer is mostly that of a facilitator. The principles for organizing reflections individually, in small groups and during class in the reflection tasks present great similarities with the action research concept of conferences (Gustavsen and Engelstad, 1986). The network part of network reflection is different from experienced reflection; it consists of several network interventions, e.g. inter-organizational reflection tasks and thesis groups, a lunch intervention, firm presentations, plant visits and network news. Network reflection is a large-scale intervention with increased inter-organizational trust and co-operation as intended consequences.

1.5 Structure of the dissertation

The main body of this longitudinal singlecase study consists of four papers focusing on different theoretical perspectives and complementary findings.

The dissertation is organized in the following manner: After the introductory Chapter 1, Chapter 2 presents the theoretical picture and introduces the four papers. Chapter 3 constitutes the methodological basis for this project by presenting the methods applied and the ethical issues involved. Chapter 4, 5, 6 and 7 present the four papers. Finally, Chapter 8 provides conclusions and implications.

2. Theoretical insights

By conducting a process focus at the micro level, this work aims to contribute to new knowledge in the area of regional co-operation, innovation and collective learning, development of inter-organizational communities of practice, creation of interpersonal trust in networks and the role that the regional university and management education may play in this development. These aspects of regional development and management education will be studied through four separate papers, while this chapter accounts for the theoretical insights guiding the work.

This chapter is organized in the following manner: First a brief discussion of the importance of innovation, and a presentation of the five theoretical debates. Then some considerations on the tension between the objectifying theoretical knowledge and the subjectifying of each individual addressed in this work. Finally, a presentation of the four papers.

2.1 The importance of innovation

The connection between the importance of innovation on economic growth was first shown in figures by Robert M. Solow (1957). Later, in 1987, he received the Nobel price for his analysis of economic growth. The perspective on key actors of innovation has changed considerably during the last century (Cooke et al., 2007). First, the outstanding individual entrepreneur was seen as the main driving force for innovation and economic development (Schumpeter, 1934). Then, large corporations, such as Ford in the automotive industry, took over (Schumpeter, 1942), and in the

1990s regional embedded networks of small firms entered the stage as the main driving force for innovation. Nowadays, “the actors of the knowledge and innovation process are more diverse than in the earlier approaches” and the innovation system perspective has brought the role of the state and other public institutions, e.g. knowledge creating institutions like universities, into attention (Cooke et al., 2007: 53). Different support organizations and policy actions may promote learning and innovation at the regional level, but an important precondition is dense links between these organizations and the regional firms (Cooke et al., 2007).

Innovation is defined in several ways. Five of them are: “An idea, practice, or object that is perceived as new by an individual or other unit of adoption” (Rogers, 2003: 12); “Any idea, practice, or material artifact perceived to be new by the relevant unit of adoption” (Zaltman et al., 1973: 10); “The adoption of any device, system, process, programme, product or service new to that organization” (Huczynski and Buchanan, 2007: 610); “The development and implementation of the new ideas by people who over time engage in transactions with others in an institutional context” (Van De Ven, 1986: 591); “The commercial introduction and exploitation of an invention” (Freeman, 1979: 211). Innovation is all about invention – the creation of new knowledge and ideas – and adoption – putting the invention into practical use (Freeman, 1979; Rogers, 2003). Most definitions on innovation emphasize – like these ones – perceived newness and adoption. This perceived newness ”may be expressed in terms of knowledge, persuasion or a decision to adopt” (Rogers, 2003: 12). Moreover, the newness may materialize in new products, new services, new production methods, new markets, new raw materials or new ways of organizing (Schumpeter, 1934,

1942; Johannessen et al., 2000). Hage (1980) argues that innovation varies on a scale of newness from incremental to radical. While incremental innovation is associated with innovations within a paradigm – consisting of small novelties within an existing product or process, e.g. MMS³ on mobile phones, radical innovation is associated with revolutionary innovations (Dosi, 1982) – consisting of a totally new product or process, e.g. the telephone. Chesbrough and Teece (1996) distinguish between autonomous and systemic innovation. Autonomous innovations consist of independent changes, e.g. the development and adoption of a new turbocharger to increase the power of a car engine, without the need to change anything else in the engine or in the car. Systemic innovations, conversely, depend on a series of interdependent innovations (Chesbrough and Teece, 1996), e.g. when Polaroid developed ‘instant photography’ new technology for cameras and photo developing was necessary, in addition to developing new photo technology. Product or technological innovation and process or organizational innovation have different features, that need to be addressed. Product innovation involves inventions to the development of tangible products or services, while process innovation in contrast, involves inventions to the development of new management, work or organizational practice (Tidd et al., 1997). Although the boundaries between product and process innovation are increasingly blurring, the two kinds of innovation pose potentially different problems for management and transfer of knowledge (Newell et al., 2002). “Much knowledge produced through product innovation can arguably be captured and transferred in relatively tangible forms”, while “knowledge produced through process innovation is

³ Multimedia Messaging Service (MMS) is a standard for telephony messaging systems that allows sending messages that include multimedia objects, e.g. pictures.

largely intangible, tacit and context-dependent” (Newell et al., 2002: 147). Tacit knowledge is difficult to capture in explicit forms, and Hansen et al. (1999) found that ‘personalization’ strategies – the development of intensive personal relationships and social networks – were more effective than codification strategies when the involved knowledge was largely tacit in nature. These important differences between product and process innovation stress the need to be sensitive to the nature of the innovation when devising strategies and approaches to knowledge management in the invention phase (Newell et al., 2002). Therefore, innovation – incremental or radical, systemic or autonomic – consists of the invention and the adoption of new products or processes.

Most innovations fail, and firms that do not innovate die (Chesbrough, 2003). In a situation with hypercompetition (D’Aveni, 1995), the firms’ ability to innovate is crucial and ”innovation is frequently a primary purpose for knowledge management” (Newell et al., 2002: 142). Innovation on new products or services is not enough, firms also have to be innovative in the relationship to their customers, other organizations and the way the business is organized. Moreover, the increasing competition and the recognition of knowledge as the most important strategic resource require new ways of management and organizing, namely organizational or process innovation. Sweeny (1996) argues that although technological innovation tended to be the driving force of technological and social change in the past, there are indications that social forces will determine technological and organizational change in the next long wave. Hence, the need for innovation focus due to both technological and organizational concerns. Because innovations are so important and because they often fail, focusing on

innovation is essential in the business community. A crucial point is therefore how innovation is achieved.

2.2 Co-operation – an assumption for learning, knowledge creation and innovation

Because learning and knowledge creation represent processes leading to innovation, this section starts out with some considerations on learning and knowledge⁴. The interest in knowledge creation and organizational learning has grown dramatically in recent years (for an overview, see Crossan et al., 1999). By introducing the concept of tacit knowledge and arguing that “we know more than we can tell”, Polanyi (1966: 4) divided knowledge into two categories, explicit and tacit. Explicit knowledge can be put on paper, formulated in sentences and captured in drawings, while tacit knowledge is tied to the senses, skills in bodily movement, individual perception, physical experiences and intuition (Krogh et al., 2000: 6). Nonaka (1994) claims that transferring and utilizing tacit knowledge among people is essential to the process of knowledge creation. Since "individual face-to-face interaction is the only way to capture the full range of physical sensation and emotional reactions that are necessary for transferring tacit knowledge", social interaction are of great importance to knowledge creation (Krogh et al., 2000: 181).

⁴ Organizational learning and knowledge creation represent somewhat different debates, but because the distinction between these directions is not the main focus in this work, the distinctions are not discussed here. Cooke (2007) claims, however, that the regional innovation systems approach is not particularly predicated on learning, but rather on *knowledge* and innovation. Economic geographers (e.g. Lundvall, Keeble, Wilkinson and Maskell), on the other hand, are more preoccupied with the association between organizational and technological *learning* with spatial density of firms (Morgan, 1997).

This new understanding of knowledge creation and learning resulted, in the late 1970s and 1980s, in a radical shift in the literature on how innovation is produced. From a mode characterized by linearity and self-sufficiency, the innovation mode is now characterized by co-operation and interaction (Gibbons, 1994). The linear innovation model, which has formed the basis of the foundation for innovation policy in the last decades (Nelson and Winter, 1982; Freeman, 1995), is based on the idea that technological research and diffusion of technology are the most important elements in the development of innovations leading to commercialisation (Smith, 1994). The main hypothesis of the linear model is that major capitalisation on R&D is closely related to the degree of innovation (Olsen and Johannessen, 2003). The interactive innovation model (Freeman, 1995) has, however, a more diversified view of what generates innovations. In this model innovation is a function of investments in private and public R&D, and knowledge spillovers from various links between R&D and practice (Lundvall, 1988; Freeman, 1995). This interactive innovation model has led to a shift in focus, and to the acknowledgement of innovation as a social, technical and collaborative process involving many actors. One important quality of the interactive innovation model, is the emphasis on co-operation as opposed to the emphasis on competition (Lundvall and Johnson, 1994). Another important quality is that the actors can be found both inside and outside the firm (Johannessen et al., 1999c). Many scholars, for instance Antonelli (1996) and Powell (1996), support the basic idea of regarding the interactive innovation model as the link between various types of knowledge, internal and external to the firm. Antonelli (1996: 285) claims that "the capability to innovate successfully appears to be strongly conditioned by learning opportunities and by the accumulation of specific knowledge that is both

internal and external to the firm”. Moreover, Powell et al (1996) argue that the locus of innovation is rarely found within individual firms, but rather within networks of learning; inter-organizational relationships constituting a community. Hence, the new mode of innovation requires interaction between internal and external knowledge and actors.

Many comparatively new companies, like Microsoft and Cisco, that conduct little or no basic research themselves, are now competing with elder companies, like IBM and GE, which conduct vast and long-term research programmes themselves. The newcomers are very innovative but “have innovated with the research discoveries of others” (Chesbrough, 2003: xix). “The way we innovate new ideas and bring them to the market is undergoing a fundamental change” which is acknowledged as a paradigmatic shift from ‘closed innovation’ to ‘open innovation’ (Chesbrough, 2003: xx). The internal focused logic of closed innovation, which worked well throughout the most of the twentieth century, is currently eroded by a combination of five factors: 1) growing mobility of highly experienced and skilled people; 2) increased college and post-college training that spill out knowledge from big companies’ ‘knowledge silos’ to other companies and firms; 3) growing presence of private venture capital, which is combined with the investors’ competence in commercializing external research and converting start-ups into growing firms; 4) increasingly fast marketing of new products and services; 5) increasingly knowledgeable customers and suppliers that challenge firms ability to profit from knowledge silos. In situations where these eroding factors have occurred, closed innovation does not work. Firms instead need to carry out open innovation that utilizes both external and internal ideas to create value. Open

innovation “assumes that firms can and should use external ideas as well as internal ideas, and internal and external paths to market, as the firms look to advance their technology” (Chesbrough, 2003: xxiv). Successful startups therefore seldom invest in fundamental new discoveries, but rather, like Cisco, they look outside for ideas to commercialize. In systemic innovations, however, independent firms will not usually be able to coordinate themselves to knit those innovations together (Chesbrough and Teece, 1996). Hence the open innovation perspective suggests some very different organizing principles for research and for innovation, of especial interest to autonomous innovations.

The acknowledgement of interaction with external actors as an important condition for innovation has resulted in enormous interest in networks in both theory and practice, and terms like innovation networks (Freeman, 1991) and network of learning (Powell et al., 1996) are launched. Networks are very loosely coupled systems of people and groups working together (Pedler et al., 1997). Learning is acquiesced as the most important process within innovation systems. "Learning is an interactive process and knowledge is a collective asset shared in networks and organisations" (Lundvall, 1996: 1). Frednes (2001) asserts that networks can create dynamic relations, great flexibility and make access to knowledge easier, and thereby be a space for knowledge, collaboration and learning. Networks may take the form of strategic alliances, joint ventures or long-term buyer-supplier partnerships. The number of networks is growing dramatically, and many firms enter into network alliances with specific learning objectives (Inkpen, 1996).

Developing of man-shaped networks depend on people shaping motion into the system (Frednes, 2001). The increased focus on organizational learning and knowledge has contributed to a deeper understanding of factors and processes conducive to innovation, but little attention has been given to social mechanisms triggering innovation (Johannessen and Olsen, 2003). This work will, however, emphasize such social mechanisms and examine if network reflection shapes motion and triggers learning and innovation in the Electronic Coast system.

Relationships are important for acquiring information (Burt, 1992), solving complex problems and learning how to do one's work (Lave and Wenger, 1991). Rather than searching in documents and databases, people prefer to turn to other people for information. Allen (1977) found, for instance, that engineers and scientists were five times more likely to turn to a person for information than to an impersonal source. Relationships are therefore important channels for knowledge transfer (Levin and Cross, 2004).

The social network theory is occupied with ties and structural holes. Granovetter (1973:1365) refers to a tie as a "local bridge of degree n " if n represents the shortest path between two points (other than itself) and $n > 2$. "The strength of a tie is a (probably linear) combination of the amount of time, the emotional intensity, the intimacy (mutual confining), and the reciprocal services which characterize the tie" (Granovetter, 1973:1361). A given tie is strong, weak or absent (Granovetter, 1973). The mark of strong ties is connections with high intensity of emotional closeness and frequent communication (Granovetter, 1973; Burt, 1992). Granovetter (1973) defines the content of weak ties as distant and infrequent relationships that are

efficient for accessing novel information. Structural holes are defined as the absence of ties between actors (Burt, 1992). There is an ongoing debate (e.g. Jack, 2005) about the influence of ties on innovation. How close and frequent the contact ought to be is under debate. Hansen (1999) suggests close relationships – strong ties – to be powerful to knowledge sharing. Strong ties, however, are resource-demanding to sustain and may result in a lock-in effect which prevents absorption of new information (Grabher, 1993).

Freeman (1979: 211) summarized the interactive innovation model as follows:

Innovation is a ‘coupling’ process, which first takes place in the minds of imaginative people somewhere at the ever changing interface between science, technology and market. The coupling is more than an intuitive flash: it is a continuous creative dialogue over a long period of research, experimental design, and development.

Although Freeman’s (1979) coupling process supports the above focus on interaction and relationships, he also claims that the innovation process starts in the minds of individuals. This latter focus is in accordance with several other theorists (e.g. Koestler, 1964; Polanyi, 1966) who claim that creation of new ideas happen in the individual mind. Crossan et al. (1999) propose that organizational learning is multilevel: Individual, group and organization, and that these three levels are linked by social and psychological processes: intuiting, interpreting, integrating and institutionalizing – the 4 I’s. Furthermore, they emphasize that intuiting and

–partly- also interpreting represent processes at the individual level. Moreover the action research concept of conferences (Gustavsen and Engelstad, 1986) provides a combination of individual and collective reflection to increase the learning outcome. The overwhelming focus on cooperation and interaction in most innovation theories may therefore be somewhat biased by underestimating the value of individual thinking and reflection. This work aims at discussing the value of *a combination of cooperation and individual reflection* to innovation processes.

This section shows that “unleashing the innovation potential in social systems requires an increased emphasis on connectivity and social relations among a number of actors, and on organisational learning” (Johannessen and Olsen, 2003). The open innovation perspective, utilizing internal and external actors and knowledge, is important, and innovation focus on both technological and organizational concerns is required. Finally, although cooperation and interaction are necessary conditions for initiating innovation processes, they are not sufficient. Individual processes as intuition and reflection have to be included. Therefore, to emphasize the building of social relationships, objectifying perspectives are not sufficient, the actors need to be subjectified and played into actions to develop the systems.

Networks can also have a negative effect on innovation and "although learning through alliances can and does occur successfully, it is a difficult, frustrating and often misunderstood process" (Inkpen, 1996: 124). Networks are time-consuming and can be more or less symbolic without particular activity and contents. The outcome of inter-organizational co-operation often has uncertain return (Lawson and Lorenz, 1999): the potential for

returns is very good, but it is difficult to predict what the return will be. Normally, it takes some time before the return can be harvested and it is therefore difficult to predict when the presumptive or unknown return will be received. A network with all its opportunities may also weaken our engagement and motivation for making any contribution ourselves (Frednes, 2001). There is a risk that ideas and information that can be disadvantageous for the network members may be resisted or even stopped, and that lock-in effect (Grabher, 1993) may take place. There is also a danger that network activities may weaken the firm's engagement and constitute a pretext for doing nothing and therefore inhibit the innovative power in crisis, well-known as creative destruction (Schumpeter, 1942). Networks therefore represent both great opportunities and pitfalls concerning learning, knowledge and innovation.

The important problem of co-operation to support knowledge creation and knowledge sharing to enhance innovation is addressed in much of the literature (Levin and Cross, 2004). The regional co-operation literature focuses on spatial proximity and the quality of co-operation, e.g. in knowledge networks. The organizational learning and knowledge literature (Polanyi, 1966; Nonaka, 1994) focuses on knowledge properties of co-operation. Social network theory is most occupied with structural properties of networks, such as structural holes (Burt, 1992) and ties (Granovetter, 1973; Uzzi, 1996, 1997; Hansen, 1999), while the relationship literature is most focused on trust (Mayer et al., 1995). This work aims at addressing all these literatures, but to a different degree in the four papers.

2.3 Regional co-operation

Despite the acknowledgment of the increased importance of regional economies, there is still no general understanding of how to define a region (Harvie, 1994; Cooke and Memedovic, 2003) and the concept of *region* is often taken for granted. Hence, before the discussion of regional co-operation, the concept of region needs to be discussed and defined. A region can be defined by four criteria: a) It must not have a determinate size; b) It is homogenous in terms of specific criteria; c) It can be distinguished from bordering areas by a particular kind of association of related features; d) It possesses some kind of internal cohesion (Cooke and Memedovic, 2003: 3).

Regional – the adjective for region – means something larger than local. A region is a particular fairly large area of land, usually without exact limits, that sometimes crosses national borders. Regions can, however, have different kinds of specific criteria and related features that possess internal cohesion, of an administrative, functional or cultural nature. *Administrative regions* are governmental or political controlling mechanisms like counties, groupings of counties, European Union (EU) regions or intra-firm units. They are sometimes cross-national, e.g. units of global companies or the EU regions NUTS2 and NUTS3. Regions are also regarded "as political governance systems below the national but above the local level of public administration" (Cooke and Memedovic, 2003: 4). *Functional regions* represent appropriateness according to co-operation or coordination, depending on e.g. communication infrastructure, distance, product-market, labour-market, cluster, interests or non-regenerating natural resources. The concept of industrial cluster is sometimes used to define a region from an economic perspective (Porter, 1998a), hence a cluster represents a

functional region. Regions may, however, contain more than one economic cluster (Cooke and Memedovic, 2003). The appropriate range for regional co-operation is found to be one hour's driving time (Powell et al., 2002; Cooke, 2007). *Cultural regions* represent people with common culture and language, e.g. Lapland and Kurdistan. The regional culture is found to affect firm behaviour fairly directly (Nooteboom, 2006). One city therefore generally belongs to several kinds of regions. Although different kinds of regions sometimes overlap, they generally have different limits.

It is sometimes said that the noun 'region' is derived from the latin verb 'regno' which means to be king, or to have the power to rule. According to this interpretation, a region is supposed to be an area of land that is under a unitary government of some sort. South East Asia, for instance, according to this definition, cannot be a region since several governments are active in this area. However, this interpretation is not quite right. The actual noun is not 'regno' but 'regio' which means district, neighbourhood, or even border, direction, and quarter.

“The boundaries of regions are not fixed once for all; regions can change, new regions can emerge and old ones can perish. Therefore to analyse a region, criteria must be found that define a functioning unit within a specific time” (Cooke and Memedovic, 2003: 3). In this work regional is mostly used in the meaning of a functional region of labour-market and the cluster of electronics firms. The other kinds of regions are also somewhat involved. The regional university sector in Norway is mainly organized with one university in every county. Hence, because it is located in Vestfold county, this institution is called Vestfold University College. Furthermore, the

county administration of Vestfold is member of Electronic Coast and participated actively in at least one identified networks of practice. Thus, administrative regions are involved. The participants at the management education programme in the present work were all ethnic Norwegians, speaking Norwegian, working in the same industry and living inside Vestfold, therefore they belonged to a common cultural region. A region is therefore defined as *a particular fairly large area of land, usually without exact limits, that can change over time, and possesses related administrative, functional or cultural cohesion.*

Several scholars agree that regional co-operation and proximity is important for innovation (e.g. Saxenian, 1994; Cooke, 1998; Maskell et al., 1998; Porter, 1998a; Keeble, 2000). The reason is that "collaboration diminishes considerably as a function of distance" (Miettinen, 2002: 103), our concern for others tends to increase with geographical closeness (Elster, 2007), common regional culture makes communication more easy (Nooteboom, 2006) and geographical closeness enables people to meet face-to-face and share tacit knowledge. Moreover, the proximity of, and repeated exchanges among, firms and institutions, fosters better coordination and trust (Porter, 1998a). Finally, "the enduring competitive advantages in a global economy lie increasingly in local things – knowledge, relationships, motivation – that distant rivals cannot match" (Porter, 1998a: 78). The innovative power of spatial proximity is, however, under debate. Some scholars (e.g. Maskell et al., 1998; Giuliani, 2007) argue that a relatively close business environment does not necessarily lend itself to co-operation and interaction. They agree on the potential of such co-operation to stimulate innovation, but emphasize

the feature of the co-operation, and argue that knowledge networks are needed to release the innovative power of regional co-operation.

Several concepts are developed to capture the assumption of regional co-operations' importance on innovation, for instance cluster (Porter, 1990; Saxenian, 1994; Porter, 1998a), regional innovation systems⁵ (Lundvall and Johnson, 1992; Cooke, 1998; OECD, 1998) and regional collective learning (Lorenz, 1996 referred in Keeble, 2000). Porter (1990) launched the idea of industrial *clusters* as motors of economic development. A cluster is "critical masses – in one place – of unusual competitive successes in particular fields" (Porter, 1998a: 78). Cluster is defined as "geographical concentrations of interconnected companies, specialized suppliers, service providers, firms in related industries, associated institutions (for example universities, standards agencies, and trade associations) in particular fields that compete but also co-operate" (Porter, 1998b: 197). A cluster influences competition in three ways: It increases firms productivity; it drives the direction and speed of innovation; it stimulates formation of new firms (Porter, 1998a). The introduction of the notion *regional innovation systems* (Lundvall and Johnson, 1992; Cooke, 1998; OECD, 1998) in the early 1990s was a transfer of the concept of national innovation system (Lundvall and Johnson, 1992; OECD, 1997) to the regional level. It was also a response to the challenges posited to the economic growth in Europe, because of globalization and the decreased importance of the national state. The concept combines the acknowledgement of local embedded knowledge

⁵ One kind of innovation system, focusing on the co-operation between firms, government and knowledge creating institutions, e.g. universities, is called triple helix (Etzkowitz and Leydesdorff, 1997)

as a vital source of innovative activity, and the idea that innovation is firmly linked to networks. The systems approach is used to capture the interactive nature of innovation (Miettinen, 2002). *Regional collective learning* represents a regional capability, and an important source of this capability is shared tacit knowledge (Lawson and Lorenz, 1999; Maskell and Malmberg, 1999). Regional collective learning is defined as the creation and further development of a base of common or shared knowledge among individuals making up a productive system which allows them to co-ordinate their actions in the resolution of the technological and organizational problems they confront' (Lorenz, 1996 referred in Keeble, 2000: 201)⁶. Hence, regional collective learning is a capability to solve problems together of both technological *and* organizational kind. Because they are considered to represent valuable contributions to regional co-operation and innovation, the focus in this work will be on cluster, regional innovation systems and regional collective learning.

Regional factors can also inhibit innovation. First, absence of factors which increase firm's absorptive capacity (Cohen and Levinthal, 1990), such as educational facilities, regional R&D activity and the transfer of R&D outcomes to firms, are shown to inhibit innovation (Nooteboom, 2006). Second, close co-operation can both promote and inhibit innovation, depending on the stage of innovation. Asheim and Isaksen (2002) contribute to the debate of ties by arguing that too much embedding entails strong ties that may be positive in early stages of development, while later

⁶ Lorenz, E (1996) *Collective Learning Processes and the Regional Labour Market*. Unpublished research note, European Network on Networks, Collective Learning and RTD in Regionally-Clustered High-Technology SMEs. (I have done a lot of unsuccessful effort to obtain it, e.g. e-mailing David Keeble and Frank Wilkinson)

development stages requires disembedding. Third, Nootboom (2006: 141) claims that “ties should not be too strong in terms of duration”, and in order to promote innovation the cognitive distance⁷ among the actors should be optimal. If relationships become too durable or the cognitive distance becomes too short, lock-in and group-think may occur. Nootboom (2006) distinguishes between three kinds of embedding: Institutional, structural and relational: Institutional embedding relates to infrastructure, labour market and the impact of norms of conduct, taxes and subsidies; Structural embedding relates to network size, number of ties, connectivity and centrality; Relational embedding relates to the strength of ties, trust and features of the relationships. Further, Nootboom (2006) argues that lock-in and group-think may arise from all three kinds of embeddedness. Finally, Cooke (2007) argues that unsuccessful regional innovation systems suffers from three asymmetric knowledge problems: Lack of examination knowledge; Knowledge institutions are not research-oriented, but learning-oriented; One or other of the three partners – firms, government and knowledge creating institutions – dominates knowledge and innovation practice asymmetrically (Cooke, 2007), e.g. the combination of some large and innovative regional companies and a small and learning-oriented regional university, or vice versa, may inhibit innovation. Therefore, the value of regional co-operation seems to be increased at an optimal level of ties duration and cognitive distance, close regional co-operation combined with external co-operation, high level of increased absorptive capacity and symmetric knowledge between firms, government and knowledge creating institutions.

⁷ Cognitive distance is the number of actors involved and the differences in their knowledge and skills (Nootboom, 2006)

The paradox that the increasing globalization seems to magnify the importance of regional co-operation is explained by codified knowledge becoming globally accessible, which makes the value of embedded tacit knowledge more crucial (Maskell and Malmberg, 1999). The empirical context of this work is a cluster of high-technology SMEs. It is therefore of great interest that regional co-operation seems to be especially important to such firms (Keeble, 2000), and to find out why this is. Keeble (2000) identified two reasons: Firstly, people-based informal links and knowledge sharing are more important to such firms than traditional supplier-customer relationships; secondly, research networks are fundamental (Keeble, 2000). It is therefore important to examine the development of technological and organizational research networks, and the development of people-based informal knowledge links in this case.

2.4 Communities of Practice

The purpose of this work is to set up and discuss how to *develop* innovative regional networks. This is needed because the different concepts of regional co-operation constitute objectifying focus and are too vague to be of any real guidance in enhancing innovation in a regional context. More narrow concepts and processes with a subjectifying focus on the micro level are necessary. Beside conferences and reflections, communities of practice (CoP) may be useful. They play a critical role in the debates on innovation (Brown and Duguid, 2000; Swan et al., 2002), represent processes, apply a more narrow focus and may contribute to regional collective learning (Saxenian, 1994; Keeble and Wilkinson, 1999; Pinch and Henry, 1999). Therefore CoP are of great interest to my purpose.

Lave and Wenger introduced the concept of a *community of practice* as: "An activity system about which participants share understandings concerning what they are doing and what that means in their lives and for their community. Thus they are united in both action and in the meaning that that action has, both for themselves, and for the larger collective" (1991: 98). 11 years later, Wenger et al. (2002: 4) stated: "Communities of practice are groups of people who share a concern, a set of problems, or a passion about a topic, and who deepen their knowledge and expertise in this area by interacting on an ongoing basis". These two definitions overlap to a great extent, but the former is more existential in involving the meaning of actions on participants' lives. The latter definition is, however, more connected to practical benefits.

The shape and membership of CoP emerge in the course of the activity; they sometimes incorporate people from outside, and may span organizations (Brown and Duguid, 2001). CoP have an organic, spontaneous, and informal nature and are resistant to supervision (Wenger and Snyder, 2000). Although such communities form naturally (self-organization), it is possible to cultivate their emergence and development (Wenger and Snyder, 2000; Swan et al., 2002; Wenger et al., 2002).

Brown and Duguid (2000) note that knowledge for a firm is both 'sticky' and 'leaky'. They suggest that this paradox could refer to guilds or other types of professional or craft associations, linking people who do similar jobs for different firms. To emphasise the relation to and distinction from CoP, they denote such associations as *networks of practice* (NoP) (Brown

and Duguid, 2000). The relations among NoP members are significantly more loose than those within CoP. NoP members do not necessarily work together, but they are engaged in the same or very similar practice, and share a great deal of insight and implicit understanding (Brown and Duguid, 2000). NoP shape conditions where new ideas can circulate, but these circulate through similar practice, not through collaborative, coordinated practice and direct communication as in a CoP. Hence NoP is considered as a sub-concept of CoP.

2.5 Trust

Trust is essential for innovative co-operation (Keeble, 2000) and how to create trust is therefore of great interest to the research problem. Some theorists, e.g. Granovetter (1985), claim that trust cannot be intentionally created. Other theorists, nevertheless, believe, that the building of trust can be intentionally supported. Personally, I believe, however, that social mechanisms can be intentionally played out as triggering processes creating trust.

Trust has several functions and is defined in different ways across several areas of the social sciences (Ring and Van De Ven, 1992). In this work trust is considered as a mechanism reducing complexity, governing transactions and reducing costs. Trust is a vital component of every interaction system because it is a mechanism that absorbs complexity in so far as someone who trust acts as if the trustee's actions are relative predictable (Luhmann, 1979). Trust can be a substitute for authority mechanisms and serve as an alternative control mechanism (Bradach and Eccles, 1989). Moreover, trust reduce transaction costs (Williamson, 1979) and increases the access to

information that stimulates new ideas. As a component of exchange relationships trust is important because it enriches the enterprise's opportunities, facilitates access to resources and flexibility in ways that are difficult to establish using arm's-length ties (Uzzi, 1997: 45). Lundvall (1996) argues that trust influences the interaction in the process where interactive learning is going on, and knowledge is created. Nonaka et al. (2000) are more specific and assert that interpersonal trust is vital in knowledge creation because it is crucial in sharing tacit knowledge. When trust runs low, people become more occupied with explicit provable knowledge (Krogh, 1998). Constructive and helpful relations enable people to share their insights and freely discuss their concerns (Krogh et al., 2000: 45). In knowledge sharing, trust is reciprocal; trust is important in both sharing and absorbing knowledge (Krogh, 1998). When one mistrusts people one does not share knowledge voluntarily with them and does not accept their advice. Hence trust is important because it reduces complexity and costs and favours access to resources, especially tacit knowledge, the essential resource for knowledge creation and innovation.

Consistently with most inter-organizational studies of trust, this study focuses on interpersonal trust. Mayer et al. (1995: 712) define *interpersonal trust* as "the willingness of a party to be vulnerable to the actions of another party based on the expectation that the other will perform a particular action important to the trustor, irrespective of the ability to monitor or control that other party". To believe in someone means leaving yourself open to hurt and disappointment and hence making yourself vulnerable. This is also a paradox, because to be able to trust, you must be willing to take the risk of trusting. Two dimensions of interpersonal trust promote knowledge creation

and sharing in informal networks: benevolence and competence. Benevolence can be described as “you care about me and take an interest in my well-being and goals”, while competence would be summed up as “you have relevant expertise and can be depended upon to know what you are talking about” (Abrams et al., 2003: 65). The interpersonal trust, interesting to this work is at the inter-organizational level. According to Gulati (1995: 92) ”intuitively, trust is an interpersonal phenomenon”. Trust developed at the interpersonal level, taking place in the context of a transaction, reflects trust at the inter-organizational level. Trust may exist on the inter-organizational level (Bradach and Eccles, 1989), and inter-organizational trust is ”the expectation held by one firm that another will not exploit its vulnerabilities when faced with the opportunity to do so” (Krishnan et al., 2006: 895). The kind of trust explored here, however, is among persons, not among firms. Even if interpersonal trust may influence inter-organizational trust, the focus in this work is on interpersonal trust at an inter-organizational level.

Some degree of trust is established in every encounter with another person. In order to enhance trust, consistent behaviour is important (Krogh, 1998), although trust may break down after repeated abuse (Uzzi, 1997: 44). Because the purpose of this work is to explore trust *creating* processes, trust breaking processes will be omitted.

Although trust is considered an important factor in the literature on innovation, network and communities, studies of production of trust at inter-organizational levels are scarce (Sydow, 1998: 35). In order to create trust people must be connected. In networks, someone must engage in connecting

people. This work takes into consideration the possibility that universities may play this procuress role, and if so, how.

2.6 Regional university and management education

The university's regional role has mainly been that of conducting research and producing competent labour. Nordic universities' traditional missions of research and teaching were during the 1990s supplemented by a 'third mission' of contributing to regional economic development (Etzkowitz et al., 2000; Nilsson, 2006). This broadening of the universities' mission, that emanated from the U.S. (Nilsson, 2006), has among other things resulted in new ways of transferring explicit knowledge to firms, generating spin-offs and establishing science parks (Keeble and Wilkinson, 2000; Macpherson and Ziolkowski, 2005). The regional role of the university is emphasized and challenged within the debates on regional innovation systems and cluster, but it is still unclear. Although it is disputed both outside and inside academia, in order to meet these new demands *universities need to be entrepreneurial* (Etzkowitz et al., 2000; Cooke et al., 2007). Furthermore, universities need to allow and utilize a two-way flow of influence with the increasingly knowledge-based society, and to enter their "role in economic development through extensions of both their research and teaching missions" (Etzkowitz et al., 2000: 315). Although some scholars argue that informal networks may be established by former students as an unintended consequence (Saxenian, 1994; Johannisson, 2000; Keeble, 2000; Tillmar, 2006), the focus on education as a social mechanism triggering innovation and trust represents a novelty.

Innovation demands co-operation – a coalition between actors, and the core element in creating a coalition is to create relationships, or connectedness, and “the evolution of the coalition is a part of the innovation process itself” (Gustavsen et al., 2001: 267). “If innovation is our interest we cannot stay content with ‘interpreting’ the actors in terms of what they bring with them, we need to put the main emphasis on what happens when they meet” (Gustavsen et al., 2001: 253). By choosing a practical turn and emphasizing what happens when the network reflection participants meet, this study aims to describe one way for regional universities to facilitate the creation of relationships.

In his book *Managers not MBAs*, Mintzberg (2004: 254) launched — experienced reflection as a method for education of experienced managers. This work aims to extend this method to increase networking at the regional level. The core activity in network reflection is reflection tasks, organized as a kind of conference (Gustavsen and Engelstad, 1986). By developing the concept of network reflection and investigating the hypothesis that network reflection has a capacity to increase regional co-operation, this work seeks to develop forms of collaboration that energize networking.

2.7 Objectifying and subjectifying

The theoretical insights in this thesis cover the tension between the objectifying theoretical knowledge and the subjectifying of individuals to make them act. This tension consists, among other factors, of deep epistemological and ethical concerns. This section covers some questions of objectifying and subjectifying. Most of the theories in this work represent objectifying contributions, while conferences, reflection and communities of

practice constitute the subjectifying ones. In conferences, reflections and communities of practice, the participants maintain an active self-understanding.

The process of objectifying has to be anchored in a system where individuals are participating. Co-operation between the researcher and the affected participants – in action research – is not just about talking to the participants by e.g. lecturing them. The participants need to be activated and placed in new situations; besides, they have to collaborate with the researcher during some time. The researcher's interventions need to elicit actions from the participants that differ from what they would have been without the intervention. Network reflection provides a combination of the participants wish to learn and collaborate and a facilitated structure of interventions. It constitutes therefore a combination of what is subjective and what is objective. As the researcher, I first facilitated several interventions among the informants, and later I interpreted the results of their changed practice.

2.8 Presentation of the papers

This section starts with some information about the papers and their internal relationship. Then a table will be provided, outlining the papers' key properties, and finally each paper will be shortly introduced. The four papers – all written solely by the author – constitute chapter 4, 5, 6 and 7. They are presented in a theme-based sequence, which is not the chronological order in which they were written. The original sequence is as follows: Paper 3, paper 2, paper 4 and paper 1. Because they are written at

different stages in this PhD project, the papers also demonstrate the authors' process of learning and gaining scientific understanding.

The papers represent different theoretical perspectives, but because they are based on a common case and because they share some basic findings, they do of course somewhat overlap. Paper 3 – which represents a broad screening of theoretical perspectives and findings – constitutes a grounding and a point of departure for the other papers. In addition, paper 1 builds on paper 2. All the papers include context descriptions. Even if the context is the same, the descriptions represent different levels of complexity and focus, and the data are collected in different periods. Paper 1 contains the richest description and the broadest focus.

The papers have been written at different stages in the project, and they were no longer changeable after publication. The texts contain therefore some small differences that call for an explanation. In paper 2 and 3 the network reflection intervention is denoted as courses, but in paper 1 and 4 (the two last ones) the same phenomenon is denoted as programme. The denotation has been changed because 'courses' constitute a somewhat modest concept with regards to the content, and 'programme' seems to be more appropriate. The number of participating firms alternate between 14 and 15, due to the fact that the main teacher was counted as an informant in the rooster rating questionnaire and therefore the University College was consequently counted as an extra firm in paper 2 and 3. Finally, paper 1 and 2 differ somehow with respect to how the increased connectivity is distributed among the participants. Connectivity is measured at three points in time: 2001, 2003 and 2004. After the publication of paper 2, it was

discovered that the comments were based on the differences on connectivity from 2001 to 2004, which accounts for why the primary effect of the course, the differences on connectivity from 2001 to 2003 was not explained. Because this primary effect is nevertheless found to be the most important, this is presented in paper 1.

The use of an event as the unit of observation allows researchers to focus simultaneously on both individual and organizational units of analysis (Ring and Van De Ven, 1994). In this study the unit of observation is the network reflection programme, and the units of analysis are relationships on both individual, firm, cluster association and cluster level. All the three levels are focused upon in the papers, albeit to a different extent. Paper 1 emphasizes mostly the cluster and cluster association level, paper 2 emphasize mostly the individual and firm level, paper 3 emphasize mostly the individual, firm level and cluster association level, while paper 4 emphasizes mostly the individual level. All the papers contribute – on different levels – to the conceptualizing of network reflection. While paper 3 represents a point of departure, paper 1 represents the most advanced – but not yet fully developed – concept.

An outline of the key properties of the four papers are given in table 2.1. below.

Table 2.1 Outline of the four papers' key properties

Paper	1	2	3	4
Title	Developing Regional Communities of Practice by Network Reflection: the Case of the Norwegian Electronics Industry	Developing Regional Communities of Practice – The Role of the Regional University	Towards a regional innovation system? The role of a regional university	Creating Interpersonal Trust by Network Reflection
Author/reference	Gausdal, A.H. (forthcoming 2008)	Gausdal, A.H. (2007)	Gausdal, A.H. (2006)	Gausdal, A.H. (in process)
Status	Accepted for publishing in: <i>Entrepreneurship and Regional Development</i>	Published in Bourmistrov and Mellemvik (eds.) <i>Norwegian-Russian Cooperation in Business Education and Research: Visions and Challenges in Perspectives of the High North</i> . Chap 2. Oslo: Cappelen Akademisk Forlag	Conference proceeding, OLKC2006 - Organizational Learning, Knowledge and Capabilities, University of Warwick, Coventry on 20th - 22nd March 2006. ISBN number 978-0-902610-79-8	Presented at the EIASM workshop on trust in Amsterdam, October 2007
Writing sequence	4	2	1	3

Empirical data	Longitudinal single case. Data collected in 2001 - 2007	Longitudinal single case. Data collected in 2001 - 2006	Longitudinal single case. Data collected in 2001 - 2004	Longitudinal single case. Data collected in 2001 - 2006
Theory development in phases	Design phase and concluding phase	Design phase and concluding phase	Mainly in the concluding phase	Design phase and concluding phase
Conceptualizing network reflection	Most advanced conceptualizing	Somewhat conceptualized	Initiated	Fairly conceptualized
Main theoretical perspectives	Cluster, structural holes, conferences and communities of practice	Innovation, connectivity and communities of practice	Innovation, ties, motivation and regional innovation system	Interpersonal trust in networks
Dependent variables	Regional collective learning	Innovation	Ties and regional innovation systems	Interpersonal trust and trusted weak ties

2.8.1 Paper 1 - Developing Inter-Organizational Communities of Practice by Network Reflection: the Case of the Norwegian Electronics Industry

The primary objective of this empirical paper is to explore the extent to which network reflection has the capacity to increase regional co-operation, and to extend such concepts as communities of practice (CoP), networks of practice (NoP) and experienced reflection to the regional level, in order to analyse the development of *regional collective learning*. To explore the hypothesis that network reflection has a capacity to increase regional co-

operation, the following research questions are posited: 1) Does network reflection influence the development of regional co-operation and communities of practice? 2) If increases in regional co-operation and communities of practice could be identified, did these influence regional collective learning? 3) Does network reflection influence regional collective learning? The paper concludes that network reflection seems to have a capacity to increase regional co-operation, regional communities of practice and regional collective learning.

This paper addresses the lack of empirical examinations on how to develop inter-organizational CoP, and their influence on innovation processes (Swan et al., 2002). Moreover, it turns for theoretical inspiration to micro-level concepts from knowledge creation, organizational learning and management education. In particular it seeks to extend to the regional level concepts developed by Lave and Wenger (1991), Brown and Duguid (2000), Nonaka (1994), Levitt and March (1988), Polanyi (1966) and Mintzberg (2004), to analyse the development of regional collective learning. This paper develops a conceptual model of the influence of network reflection on regional collective learning, and provides a map of Vestfold and the localization of firms and communities of practice. Finally, this paper challenges communities and co-operation theory by focusing on the need for reflection, and, by combining CoP and NoP, it argues for a stronger emphasis on inter-organizational and regional communities of practice.

2.8.2 Paper 2 - Developing Regional Communities of Practice – The Role of the Regional University

The purpose of this paper is to explore how regional forms of co-operation can be developed to enhance *innovation*, and the role of the regional university in this process. The research question is: How can regional forms of co-operation that enhance innovation be developed, and how can the regional university assist in this development? To answer this question, a discussion is required both of aspects related to mechanisms and processes leading to innovation in a regional context, and of the role of the university. A conceptual model and three propositions are developed and discussed. The propositions are: 1) Did network reflection increase connectivity over time? 2) Did network reflection influence the development of inter-organizational CoPs over time? 3) If increases in connectivity and in development of CoPs could be identified, did these enhance innovation?

This paper contributes to several debates. The debates on co-operation concepts such as regional innovation systems, clusters, and triple helix emphasize the regional university's role; regional universities are challenged to institute forms of co-operation that energize networking (Brulin, 2001). This paper discusses one way to meet this challenge. It also contributes to the debates on how to stimulate development of inter-organizational CoPs which have rarely been examined empirically (Swan et al., 2002). Besides filling this empirical gap, it enlarges these CoP debates by introducing the role of the regional university as a new element. Finally, the paper contributes to the debates on management education by its investigation of a secondary effect – developing forms of co-operation which enhance innovation. Although this paper is not a traditional evaluation of education, it contributes to these debates through its focus on the secondary effect and its empirical examination of experienced reflection.

2.8.3 Paper 3 - Towards a regional innovation system? The role of a regional university

This is a study of development of a network towards a *regional innovation system* in the context of a cluster in mature electronics industry, and how the regional university can contribute as a catalyst in this process. A regional university may contribute in developing a network towards an innovation system by arranging tailored inter-organizational courses, on the condition of a pedagogy based on network reflections. Two questions arise in this study of the long-run effects of such a course: (1) *Did Network Reflections succeed in increasing network relationships within Electronic Coast?* (2) *If increases in network relationships could be identified, did these have any bearing on innovation?* The findings consist of several qualities leading to innovation, but also increased trust, interpersonal knowledge, friendship and intrinsic motivation.

The connectedness and the number of weak ties among the participants increased considerably during and after the programme. Efforts to continue the work of the EC within the framework of an *association* were crowned with success in June 2003. Many of the crucial persons who made this effort were students from the network reflection programme. Two years later (in 2005), the network activity in Electronic Coast (EC) had grown significantly. Therefore Network Reflections succeed in improving on network relationships within Electronic Coast. Because of the empirical findings, the present Electronic Coast system involves co-operation in innovation activity between firms and knowledge-creating organizations such as universities and business associations. It is therefore reasonable to

assume that the tailored network reflection programme has contributed to the creation not only of specific innovations, but also to the further development towards a regional innovation system. The paper concludes that a regional university may contribute in developing an existing network towards a regional innovation system by organizing tailored inter-organizational courses in collaboration with the network. An important condition in such courses may be network reflections, a pedagogic method based on experienced reflections (Mintzberg, 2004), with relatively short theoretical presentations followed by tasks to reflect and discuss the participants' practice and experience in relation to the theories presented, combined with inter-organizational network collaboration.

2.8.4 Paper 4 - Creating Interpersonal Trust by Network Reflection

The primary objective of this empirical paper is (1) to explore the research question: How can management education contribute to the creation of *interpersonal trust in networks*? (2) To conceptualize network reflection, and (3) To develop a framework of trust-creating social mechanisms and processes in networks. Management education is introduced as a social mechanism for creating interpersonal trust in networks. Most importantly, this paper suggests a new combination of the debates on development of trust in networks and those on management education.

The paper contributes to several debates. Although trust is considered as an important factor in the literature on innovation, network and communities, studies of development of trust at inter-organizational levels are scarce (Sydow, 1998: 35). Beside filling this gap, this paper contributes to the

ongoing debate of the roles of universities within innovative networks (see e.g. Nilsson, 2006). Moreover, it contributes to the debates on management education (see e.g. Currie, 1999; Mintzberg, 2004; Mintzberg and Gosling, 2006) by investigating a secondary effect – developing trust in networks. The paper concludes that the educational method network reflection may be a social mechanism that develops trusted weak ties and enduring interpersonal trust in networks.

3. Method

The present work is an in-depth single case study of the 2001-2002 programme at the Management Academy, and its long term effects. Besides participating in the network team that started the Management Academy, I was the head of the project and the main lecturer. The method of network reflections was developed practically before and during the programme in collaboration with the network team and a supervisor. The idea of this study originated somewhat halfway in the programme, and was inspired by the experience that ‘something’ happened among the participants, ‘something’ that perhaps was a valuable plot (Czarniawska, 2004) of a passage from one equilibrium (sleeping network) to another (active network). The aim of this study is twofold: Firstly, to describe and explore what happened at the network reflection programme, in order to better understand the passage in question. Secondly, to study the long-term effects of the new equilibrium in an interpretive way by searching for patterns, synergy effects and analyzing how the variables influence each other, and their reciprocal effects.

This chapter is organized in the following manner: First a discussion of philosophy and methodology, followed by a presentation of methods, research design and research quality, and finally, some ethical considerations.

3.1 Philosophy and methodology

Methodological perspectives in economic research can be considered and classified in several ways. Arbnor and Bjerke (1994) identify three main

alternative methodological perspectives: the analytical perspective, the systems thinking perspective and the actor perspective. Features of the *analytical* perspective are: assumptions about reality are built on summarizing its component parts; knowledge is independent of the individual; the effects of theory are expressed as causal effects. Features of *systems* thinking are: the assumptions about reality are built on synergy effects, which means that the totality is not exactly the sum of its parts; knowledge is system-dependent; the effects of theory are expressed as finality and indicator effects, when the variables interact simultaneously. Features of the *actor* perspective are: the totality only exists as structures of coherences; knowledge is dependent on the individual; the totality is an interpretation of the actors' pictures of reality.

Although only one dominant methodological perspective is chosen for the purpose of this study, this work will also be somewhat influenced by the other perspectives. Because the focus is on how the variables influence each other and their reciprocal effects, and knowledge is not viewed as independent of the individual, the analytical perspective is excluded. The main phenomenon, network reflection, is organized by and for the system; moreover the network reflection programme itself is also regarded as a system. The main focus is on the building of relationships among the participants, who are individual actors, but represent different firms (systems) that are parts of a network (system). Furthermore, synergy and indicator effects are investigated. It could be argued that the actor perspective is most appropriate when studying relationships among individual actors. In systems thinking, however, the component parts are analysed and explained from the characteristics of the totality, while in the

actor perspective the totality is analysed from the characteristics of the component parts (Arbnor and Bjerke, 1994). The point of departure in this work is the totality, where the relationships between the component parts, and the synergies of the effects of these relationships constitute the *main* focus. The point of arrival—the influence of network reflection on regional collective learning and innovation at the systemic Electronic Coast level—is also the totality. Furthermore the point of arrival is on the emergence of new sub-systems—communities and networks of practice. Hence, systems thinking has been chosen as the dominant methodological perspective.

3.1.1 Systems thinking

Systems thinking is inspired by biology. It was launched by Bertalanffy in the mid 1940s (Checkland, 1999) and established as a scientific category in 1947 (Wiener, 1948). The first contributions in systems theory, from the 1940s to the 1960s, were about complicated, but basically linear and mechanical systems, and is called the ‘older’ systems theory. The ‘younger’ systems theory, which emerged during the 1970s, is about non-linear and complex systems. Its concepts were, and still are, complexity, self-organization, emergence and learning (Uhlen, 2000). Systems thinking is heavily disputed (e.g. in Gustavsen et al., 2001; Miettinen, 2002), but this critique is mainly aimed at the older systems theory. This section relies mainly on the younger systems theory and the work of Checkland (1999), which I find well structured and balanced, and therefore appropriate to use.

A systems account of the observed world and the systems approach to its problems are found in many different disciplines. This [younger] ‘systems movement’ may be described as meeting the challenge which the scientific

method finds so difficult i.e. the problem of organized complexity (Checkland, 1999). The ultimate objective of systems thinking is the attainment of public knowledge accumulated by scientists, by means of a modified scientific method in which a form of holism replaces reductionism. We are still relatively far from achieving an agreed systems account of reality, hence in considering systems accounts of the world we need to know the observer's purpose (Checkland, 1999). In this work I am the observer, and I have tried to raise my consciousness and describe my purpose. Moreover, both input (e.g. observations, experiences and interviews) and output (e.g. increased connectivity, trust, regional collective learning, innovation and the emergence of new systems, CoPs and NoPs) have been described here. The internal state of the system will be considered in terms of suitable variables and in terms of the trajectory from one state to another under the influence of external conditions (e.g. particular characteristics of the pedagogical method employed, denoted as 'network reflection').

Systems thinking renders a holistic view of organizations possible. The central system concept embodies the idea of a set of elements connected together forming a whole, showing properties of the whole, rather than properties of its component parts (Checkland, 1999). In systems thinking the whole is more than the sum of the parts and linear causality is not the objective, rather a pattern or a combination of patterns and a circular causality, as illustrated in the conceptual model in figure 4.4. "The peculiar thing about patterns is that cause and effect are difficult to identify. A pattern can metaphorically be regarded as a circle, and in a circle there is neither a beginning, nor an end" (Johannessen et al., 1999b: 27). A broad perspective – neither a one-level epistemology nor a one-level ontology is

possible – is central to all discussion of systems thinking (Checkland, 1999). The holistic view is justified because systems thinking takes this broad perspective, tries to take all aspects into account, and concentrates on interactions between different aspects of the problem.

Systems thinking allows to study hierarchies of systems. The highest level in this hierarchy is the super-system, then the sub-system, and then one ‘sub-‘ is added for each further level. In systems thinking systems can be synthesized and expanded. Every super-system can be viewed as the environment for its sub-systems; on the other hand, every system is a product of the interaction between its sub-systems (Bruzelius and Skärvad, 1989). Figure 3.1 presents the setting in this work as a hierarchy of systems, and the dotted arrow illustrates the way in which the existing systems have influenced the emergence of the new ones.

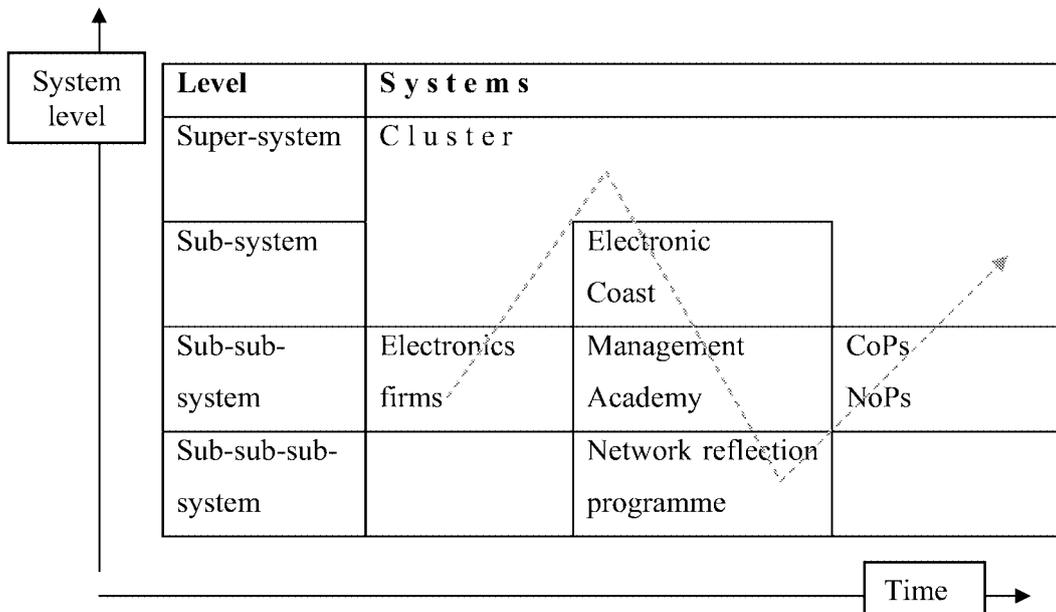


Figure 3.1 The present Electronic Coast hierarchy of systems

Checkland (1999) classifies systems using different typologies, building on both Jordan's (1968) taxonomy and Boulding's (1956) hierarchy. Social systems can be natural or designed (Checkland, 1999). Tönnies divided social systems into two kinds, *Gemeinschaft und Gesellschaft*, translated as Community and Association (Checkland, 1999). A community is a natural system and an association is designed (Checkland, 1999). Because these two different kinds of social systems are expected to have different influences on learning and innovation, this is a very important distinction. *Natural systems are found to be positive for learning and innovation, while designed systems are not.* Natural systems results of a combination of a unique mix of often strongly localized conditions and development that have evolved over time. A cluster is a natural system, consisting of independent and informally linked firms and institutions and representing a robust organizational form (Porter, 1998a). Designed systems are man-structured for a purpose. Like many innovation systems, they should be developed by understanding and regarding these particular conditions (Miettinen, 2002). "The idea of directly creating institutional structures or innovation-inducing networks without taking historically formed specific conditions into account, may be an important reason for the failure of many attempts to deliberately create regional innovation systems" (Miettinen, 2002: 97).

The social systems in this work – as outlined in figure 3.1 – are classified according to these two kinds of social systems – natural or designed. The cluster, the Management Academy and the emerged communities and networks of practice are classified as *natural* systems, the Electronic Coast is classified as *both a natural and a designed* system, while the network reflection programme is classified as a *designed* system. The development

of the *cluster* of electronics firms in Vestfold is rooted back into the 1880s, when the navy fleet changed from sailboats to steamboats, which demanded local engineering competence, especially since the national naval base was located in Horten. In the 1960s four electronics firms were established, and their growth during the next 30 years was dominated by spin-offs (Isaksen, 1993). Because the cluster has evolved organically over decades, it is classified as a natural system. The findings show that after the programme ended, some *communities of practice* (Avanse and Production) and several new *networks of practice* have emerged. Since these communities have grown organically and have not been designed or contrived, they are classified as natural systems. The *Management Academy* emerged as a result of a desire by the Electronic Coast network to establish a common management education programme. The Academy is 'virtual' and its activities are coordinated by a relatively informal network team with some written direction. The activities are planned as a result of expressed requests from the firms, and suggestions from the members of the network team. Although it has a modest formal purpose and is defined as a team in the Electronic Coast structure (see <http://www.electronic-coast.no>), the Management Academy shows some typical characteristics of a community and is classified as a natural system. *Electronic Coast* is an association of electronics, micro-technology and ICT firms, the municipality, the county and the regional university college. The association emerged from an informal community of firms in 1998, and entered into a period as the formal Electronic Coast project with public support, which was canonical and undoubtedly contrived. In 2003 Electronic Coast was founded as an association, albeit formed from the inside, by people working together, and is therefore considered to be a more natural system. The *network reflection*

class was created to carry out a task, and did not emerge from people working together. The creation of thesis groups was almost non-canonical, the participants were encouraged to arrange inter-organizational groups. This resulted in groups consisting of participants from 2 to 4 firms, and only 1 of 7 groups needed assistance from the lecturer to become organised. In addition they appeared to discover a lot of common tasks outside the formal educational process and found it useful to visit each other's firms. This shows that some elements of networks of practice emerged in the process of activity in the thesis groups. Nevertheless, since the class started and finished with the network reflection programme, it is somewhat contrived. I have therefore chosen to keep the classification of network reflection as a designed system.

All the systems are classified as abstract social systems. *Abstract* because they are not physical objects, but represent ordered conscious products of human minds and knowledge that can be captured in physical systems such as papers, books, and web sites. *Social* systems are groupings of people who are aware of, and acknowledge, their membership of the group. The most important asset for a person in a social system is the texture of interpersonal relationships involved, and the extent to which membership engages our emotions as individual personalities.

The typological conclusions are that the network reflection programme is classified as a '*designed abstract social system*'. Furthermore, Electronic Coast developed from a natural system to a designed system in 1998, and then back to a more natural system in 2003. The cluster, Electronic Coast

after 2003, the Management Academy and the emerged communities and networks of practice are classified as '*natural abstract social systems*'.

3.1.1.1 View of knowledge - Explanation or understanding?

Knowledge can explain and understand. The explanation view of knowledge dominates in the analytical perspective, while the understanding view of knowledge dominates in the actor perspective (Arbno and Bjerke, 1994). Whereas an explanatory view of knowledge tries to explain the phenomenon's nature, an understanding view tries to interpret its culture, which is denoted as hermeneutic. In systems thinking there can be either an explanatory or a hermeneutical view of knowledge. If individuals are viewed as acting according to the system of which they are a part, and bent on conserving and improving the system, this denotes an explanatory view of knowledge. If the point of departure, however, is that actors are seeking to make sense of their actions, and are people who, at least partly, apply their own subjective interpretations to what happens around them, this can be classified as hermeneutical. The hermeneutical system thinker believes in making these subjective views of reality objectively available in a way that allows the researcher to create an objective conception of these realities, shape an understanding of different actors' views of the world, and put them into a systemic relationship. This I accomplished when asking the former participants about the qualities of their increased connectivity. I therefore position myself as a hermeneutical system thinker.

3.1.1.2 The actor concept in hermeneutical systems thinking – and in this work

Although it can be argued that the actor concept is absent in system thinking, it can still be identified both explicitly and implicitly. A system is defined by elements related to each other, and to other systems. Systems thinking tends to view action as a reflection of the characteristics of a social system figured as impersonal processes outside the control of the organization's actors (Bruzelius and Skärvad, 1989). In systems thinking, social systems are “composed of people and their artefacts” (Bunge, 1996: 21) kept together by dynamic social relationships and social actions. A system is influenced by, and influences, its actors. In a system, actions are achieved by the actors and their interpretation of social reality (Bruzelius and Skärvad, 1989). Their interpretation is influenced by the organizational culture, which is a result of the actors' basic assumptions and the kind of values denoted as theories-in-use (Argyris and Schön, 1974). When actors in social systems have a view of the world displaying great similarities over a period of time, it is these viewpoints and assumptions which control the entire pattern of thinking and acting among human beings in the social systems which are encompassed by these expressions of value (Polanyi, 1966; Johannessen and Olsen, 2003). To understand human actions it is necessary to understand their context and how the actors interpret their actions. On one hand the society creates the actors and, on the other hand, the actors create the society. It can thus be claimed that systems thinking and the actor perspective are two aspects of the same subject, complementing each other, rather than two incompatible opposites, which is a common view.

According to Bunge (1985), organizational structure comprises: 1) Elements, e.g. individuals, groups, departments. 2) Relationships between the elements. 3) Relationships as a whole constituting a single unit. Hence, structure constitutes the superior composition of relationships among actors (Johannessen et al., 1999b). In trying to change a system, relationships must be changed (Weick, 1979). Because relationships are between actors, systems can be analysed by examining the changes in relationships between actors, who in turn are influenced by changes in the system. It follows that to find out whether, and perhaps also how, a system such as the network reflection programme changes the overall system, it is interesting to look at the changes in relationships. I have therefore examined connectivity, ties, trust and the quality of contacts among the participants. The changes in the systems in this project are e.g. the creation of the Management Academy, the creation and completion of the network reflection programme, and the emergence of communities and networks of practice.

This project describes the network-reflection-programme-system and its super-systems, examines how the system changes relationships and network activity amongst the participants, and shows how this activity influences: (i) the super-system and other sub-systems, (ii) the emergence of communities and networks of practice, and (iii) innovations, trust and learning in the system. According to Johannessen *et al.* (1999b) the informal network activity will emerge as the interesting area of knowledge pertaining to the influence of behavioural change in the system.

Bruzelius and Skärvad assert that:

“En organisation förutsetter individer som deltar i organisationens arbete. En organisation kan därför ses som ett socialt system som består av aktörer. Dessa interagerar med varandra inom tekniska, marknadsmässiga, ekonomiska, administrativa och andra restriktioner. Det finns ett viktig samspel mellan organisationen och de inblandade aktörerna. De individer som arbetar inom eller på annat sätt fungerar i en organisation blir ofta starkt präglade av denna. Samtidig är det individer som skapar, utvecklar och förändrar organisationer. Individen formas av sina organisationer samtidig som hon formar dem”⁸ (Bruzelius and Skärvad, 1989: 18)

To understand an organization, it is not enough to analyse its structure and procedures, it is also necessary to understand the actors involved, their relationships and subjective frames of understanding, and the constraints under which they work. The relationships here are not causal, as in the analytical perspective, because individuals, especially those with power, are able to change every relationship they may wish to. Nor are the relationships dialectical, as in the actor perspective. What is found are finality relationships (indicator-effect connections) as in systems thinking, where relationships suitable for the purpose, among individuals or in the system as a whole, are built to achieve various results. The fundamental difference

⁸ Translated into English by the author: An organization assumes individuals participating in its work. An organization can therefore be regarded as a social system consisting of actors. These actors interact with each other within technical, market, economic, administrative and other types of limitations. An important interaction exists among the organization and the involved actors, which strongly informs the individuals working or functioning in other ways within an organization. At the same time, it is the individuals who create, develop and change organizations. Individuals influence their organizations just as much as they are influenced by them.

between actors in systems thinking and in the actor perspective is that in systems thinking the actors are regarded as acting within objective frameworks and with objective results. From this perspective knowledge enablers believe that subjective ideas can be made objectively available. From the actor perspective, actors are regarded as free and creative persons who treat different actions as if they were objective. The released interest of knowledge inside the actor perspective is therefore striving to show that these actions are only treated as objective by us independent of being so (Arbnor and Bjerke, 1994).

The systems in this work are all classified as social systems, which are groupings of people who are aware of, and acknowledge, their membership of the group. Such systems obtain, by virtue of collective acceptance or recognition by individuals acting collectively, certain functions, which Searle (1999) calls 'status functions'. This collective acceptance forms the basic conceptual structure behind institutional reality. "It is generally the case with institutional structures that the structure cannot perform its function in virtue of its physics alone but requires collective acceptance" (Searle, 1999: 126). The actors' acceptance of the social systems as systems is thus crucial for their existence and functioning. The main way in which the actors show their acceptance of the systems as systems in this project is by interaction, e.g. at the network reflection programme and in the communities and networks of practice.

The discussion above indicates that Arbnor's and Bjerke's (1994) assumption that in systems thinking the parts can be explained or understood from the characteristics of the totality is too simple and not

enough nuanced. Moreover, the actor concept is both explicit and implicit in systems thinking, and the actors' acceptance of social systems as systems is crucial for their existence and functioning.

3.1.2 Methodology

The word science is derived from the Latin word *scire*, 'to know', and the purpose of science is to create new knowledge. Scientific methodology is about knowledge strategy, or how I conduct myself philosophically to knowledge and knowledge creation. This rises the classical question of what is knowledge. I view knowledge as justified true belief, and as a construction of reality, rather than something that is true in any abstract or universal way. The gigantic discussion of social construction of reality started in the Antiquity with Plato and his cave metaphor (Plato and Bloom, 1991: 514a-517b). One great question is if there is a reality, or if everything is social constructions, or if there is a mix of both a reality and social constructions. Kant (1787/1990) argued that we can never find reality as it is, or as he said 'das Ding an sich'. What we can find, he claimed, is how we see it through our eyes, 'das Ding für uns'. By these statements he also acknowledged that he believed that reality existed, although we cannot come closer to it than our "two pure forms of sensuous intuitions or principles of knowledge *a priori*, namely space and time" allow (Kant, 1787/1990: 23). Berger and Luckmann launched 'The Social Construction of Reality' in 1966 (Alvesson and Sköldbberg, 2000), a concept which became quickly popular and by its title acknowledge that the reality exists. The question of reality, however, is a very complex issue. My point of view is I think reality may exist, but, on a line with Kant, that it is inaccessible to

us. Thus my orientation is towards a social constructionist view of research. From this social constructionist perspective, human knowledge is regarded as constructed between people in common day-to-day activity in social situations, and patterns of sense-making are constructed through interpretation (Hatch, 1997).

The positivistic and the constructionist approaches are opposites in the way they consider the social phenomena that researchers set out to investigate. The positivists have a long tradition of thinking, of which Descartes (1637) is an important exponent. The roots of positivism are based on his four classic rules of method: 1) "Never to accept anything as true that I did not know to be evidently so"; 2) "To divide each of the difficulties that I was examining into as many parts as might be possible and necessary in order to solve it"; 3) "To conduct my thoughts in an orderly way, beginning with the simplest objects and the easiest to know, in order to climb gradually, as by degrees, as far as the knowledge of the most complex, and even supposing some order among those objects which do not precede each other naturally"; 4) "Everywhere to make sure complete enumerations and such general reviews that I would be sure to have omitted nothing" (Descartes, 1637: 41). In the first rule, Descartes tells us that we are capable of knowing when things are evidently true, thus he acknowledges both that reality exists, and that it is accessible to us. He further claims that reality is accessible to us by dividing things into as many parts as possible, and by analysing and enumerating each of the parts precisely. Positivists see phenomena as having their own existence independently of how and when we view them, and they remain as such long enough to be measured. The constructionist view does not acknowledge this objective existence, but rather sees reality

constantly changing due to how it is interpreted in a social process. Social constructionists argue that the world we experience and the people we find ourselves to be, are first and foremost the product of social processes (Alvesson and Sköldbberg, 2000).

My aim is to provide opportunities for understanding rather than to establish truths, hence empirical research in a reflecting mode will be appropriate in this thesis. Reflective research has two basic characteristics; careful interpretation and reflection (Alvesson and Sköldbberg, 2000). This implies that all references to empirical data are results of interpretation. “Reflection turns attention ‘inwards’ towards the person of the researcher, the relevant research community, society as a whole, intellectual and cultural traditions, and the central importance, as well as problematic nature, of language and narrative (the form of presentation) in the research context” (Alvesson and Sköldbberg, 2000: 5). Systematic reflections may influence the quality that makes empirical research valuable. Reflection can be defined as interpretation of interpretation, and reflective research can be applied by quadric-hermeneutics (Alvesson and Sköldbberg, 2000). In reflective research there are four elements: 1) Systematics and techniques in research procedures; 2) Clarification of the primacy of interpretation; 3) Awareness of the political-ideological character of research; 4) Reflection in relation to the problem of representation and authority (Alvesson and Sköldbberg, 2000). Although they are not positivistic, these four elements seem to be influenced by Descartes. The first element corresponds to Descartes’ third rule of working systematically, but the content of the systematic work is quite different. The second element about clarification of rules for interpretation, is corresponding to Descartes’ second rule of reductionism.

The similarity however is limited to their being rules for interpretation, whereas content-wise they are indeed very different. Descartes imparted to work deductively, while we in reflective research work with induction or abduction. The third element – awareness – corresponds somewhat to Descartes' first principle of never accepting anything as true before he knew himself that it was. Descartes tried to elevate himself above everybody and everything, but recognized “that there must of necessity be another more perfect, upon whom I depended, and from whom I had acquired all I had” (Descartes, 1637: 55), the perfection of God. The fourth element of the problem of representation is a parallel to Descartes' fourth rule about granting complete enumerations, making sure to have omitted nothing. However, they differ with regards to how to solve the problem of representation and transferability. In this work, I intend to follow Alvessons's and Sköldberg's four elements of reflective research.

3.2 Method

“A common view is that the choice between quantitative and qualitative methods cannot be made in the abstract, but must be related to the particular research problem and research object” (Alvesson and Sköldberg, 2000: 4). Hence the choice of methods is related to the research problem and the case. Research design is a program that guides the investigator as he/she collects, analyzes and interprets observations (Frankfort-Nachmias and Nachmias, 1996). The overall research question is: *How can regional forms of co-operation that enhance innovation be developed, and how can the regional university assist in this development?* To answer ‘how’ and ‘why’ types of questions, case study is an appropriate research strategy (Yin, 2003). Case studies are, furthermore, appropriate to investigate the dynamics present

within a single setting (Eisenhardt, 1989) and to employ an embedded design with multiple levels of analysis within a single study (Yin, 1984). This study is based on case study methodology (Yin, 1984; Eisenhardt, 1989), longitudinal data (Pettigrew, 1990) and some elements of action research (Whyte, 1991; Reason and Bradbury, 2001a). I am looking for rich data, and since conceiving enacted narratives is the most typical form of social life that provides a rich source of insight (Czarniawska, 2004), narratives are used in the interventionist phase and in the more distanced research phases.

Yin (1984) and Eisenhardt (1989) agree that case is an appropriate research strategy to generate theory, but their use of theory in the design phase differ significantly. While Yin (1984: 28) argues that "theory development as part of the design phase is essential", Eisenhardt (1989: 536) claims that "theory-building research is begun as close as possible to the ideal of no theory under consideration and no hypotheses to test". By starting out with elaborating research questions or hypotheses and preliminary models from theory, the design phase of this work follows Yin's argument. Paper 3, however, set off with a slightly more open perspective, and is therefore somewhat closer to Eisenhardt. Since I was the main lecturer and facilitated most of the interventions myself, I brought together action and reflection, theory and practice in participation with others. These are, according to Reason and Bradbury (2001b), the features of action research. This study is a first step towards theorizing by summarizing the empirical richness of a single case. According to Siggelkow, "inductive research strategy that lets theory emerge from the data can be a valuable starting point" (2007: 21). A single-case provides the opportunity for unusual research access allowing

exploration in a specific population (Yin, 1984); it also provides opportunities to explore and richly describe the existence of a phenomenon (Siggelkow, 2007). Yin (1984) suggests, on the other hand, that multiple-case studies typically provide a stronger base for theory-building. Nevertheless, a single-case can be a very powerful example providing a more convincing argument about causal forces than broad empirical research (Flyvbjerg, 1991; Siggelkow, 2007).

I have argued that I am a hermeneutic system thinker. This means that I use a hermeneutic interpretation (Alvesson and Sköldbberg, 2000) and try to understand the meaning of a part by relating it to the whole, and switch between preunderstanding and understanding. By way of example in my development of the concept of 'network reflection' I started with the demand of the programme to build network relationships (the whole) and worked together with a supervisor and the participants in the classroom to develop it practically (a part), by use of theories of learning arenas and conferences (preunderstanding) and gained practical experience (understanding). From the point of departure, the pedagogical method was denoted 'network education' and later 'network learning' (preunderstandings of a part). Then I apprehended Mintzberg's (2004) 'experienced reflection' concept (a whole), and because it was closely related, it was utilized in the development of the 'network reflection' concept (understanding). The concept of network reflection is used when describing the programme (part) to increase the dependability and search for the explanations of its effect (whole), to augment the transferability and to try to increase both my readers' and my own preunderstanding of the

equilibrium of the point of departure. Lastly it is used to gain an understanding of the results.

3.2.1 Empirical phases

The empirical part lasted seven years and consisted of 732 hours of work planning and executing the programme-intervention, 391 hours of observation, 109 hours of working with another intervention, participation in 44 meetings in Electronic Coast, collecting secondary data, one questionnaire, 42 telephone interviews and eight personal interviews. The informants were the programme participants and management groups in two of the participants' firms and at Vestfold University College.

The empirical study consisted of six phases:

Phase 1, involving 732 hours of fieldwork and action research, began in February 2001 with the planning and execution of a large scale intervention, which was followed by the network reflection programme which took place from September 2001 to June 2002.

Phase 2, involving 391 hours of fieldwork, consisted of network participation and observations of network activity in Electronic Coast. I was the coordinator of one network team from June 2002 to December 2005 and participated in 7–11 network meetings yearly.

In *Phase 3*, involving 109 hours of fieldwork, I performed another intervention by being engaged in the planning and executing of AKOM⁹ from August 2003 to June 2004.

Phase 4, consisting of three parts, was carried out between October 2004 and January 2005:

a) Connectivity was measured by participants' responses to a questionnaire in telephone interviews of all the participants and the main teacher (N=28, response rate 100%). These social network data was collected through a roster rating questionnaire (Wasserman and Faust, 1994). Each participant was presented with a complete list (roster) of the participants, "where ratings were made by choosing one of five possible categories" for the frequency of each kind of contact with each participant (Wasserman and Faust, 1994: 48). The questionnaire, along with a brief guide, was e-mailed to the participants the day before the interviews started; *b)* The quality of increased connectivity was measured by informants' responses in open-ended transcribed telephone interviews with those participants who had lasting increased connectivity (N=14, response rate 93%); *c)* The quality of network co-operation was measured by responses in personal open-ended transcribed interviews of a stratified sample of three groups of firm and university managers. Recording interviews in Phase 4a involved filling out a questionnaire; recording in Phases 4b and c involved taking handwritten notes and transcribing them within 24 hours.

Phase 5 consisted of personal long interviews (McCracken, 1988) of a stratified sample of five participants which were performed in January and

⁹ A project for unoccupied labour

February 2006. The interviews lasted between 1 and 2 hours, were conducted by an interview guide, sound-recorded and fully transcribed. The interview guide consisted of nondirective grand-tour questions and planned prompts, such as category questions, special happenings and contrast prompts (McCracken, 1988).

Phase 6 consisted in collecting descriptive and secondary data from the Electronic Coast, Vestfold University College and the cluster in 2007.

3.2.2 Instruments

In the important activity of interpretation informing nearly the whole research process, the researcher uses literature and theories to interpret the data (McCracken, 1988). Therefore, in order to establish a set of expectations that can be challenged by the fresh data, this work started with a literature review.

A roster rating questionnaire (Wasserman and Faust, 1994) was developed to measure connectivity, structured holes and ties in phase 4a (appendix I). Each informant was presented with complete lists (rosters) of the participants, "where ratings were made by choosing one of five possible categories" for the frequency of contact with each participant (Wasserman and Faust, 1994: 48). The scale was based on Granovetter's (1973) classification system (often, occasionally, and rare), but was more finely graded to catch several nuances in the frequency. The 6 points on the scale were: 0 (no contact at all), 1 (once yearly or less), 2 (between once and four times yearly), 3 (between four times and twelve times yearly), 4 (between

once a month and twice a week), and 5 (at least twice weekly). The participants were asked to fill in different letters for the three kinds of contact, F for face-to-face, T for telephone, and E for e-mail. Each informant was presented with three rosters, one for each point in time: The spring of 2001, the spring of 2003 and the autumn of 2004.

Qualities of increased connectedness, including trust, were measured by observation and open-ended telephone interviews, group interviews and personal interviews. The opening question in the telephone interview, in phase 4b, was: "Last time we talked together you told me that your contact with the other participants had increased. How do you think you have benefited from this contact?". I also asked most of the interviewees whether they recalled which participant their contact had increased with, and I was ready to supply their names. The interviews with the management groups about their own judgement, in phase 4c were open ended, without an interview guide, and the opening question was: "What do you think are the main results and benefits from the collaboration between the firms and between the firms and the University College?" The personal interviews, in phase 5, constitute the main part of the data collection on qualities. The interviews were conducted by an interview guide (appendix II). A crucial moment in interviews is drawing out the informant in precisely the right manner, therefore I resisted engaging myself as an 'active listener', trying to read the hidden meaning and play it back to the respondent. Instead I tried to allow the informants to tell their stories in their own terms, by asking nondirective grand-tour questions (McCracken, 1988). On the other hand, I did try to keep the interview under control e.g. by asking questions to deepen the story, and encouraged them to tell what their actual thoughts

were. I used floating prompts and listened out for key terms. When I thought the informant touched upon a key-term, I repeated it in an inquiring way (McCracken, 1988). I also tried to catch both espoused theories and theories-in-use (Argyris and Schön, 1974) by asking them both to describe their thoughts as well as to tell stories about what they had actually done together. To turn the narratives into stories, I asked questions to identify plots. Plots are defined as “the passage from one equilibrium to another” (Czarniawska, 2004: 19). So when they told me about some events that seemed to constitute such a passage, I would ask questions like “That was an interesting story, will you please tell me a little about the situation before it happened?”, and afterwards: “What was the new situation like?” And/or: “Will you please tell me about the difference between the situation before and after the event”. I also tried to create some distance between what the informants believed and what they did, by asking questions aimed at helping them recover their beliefs and actions from the taken-for-granted state (McCracken, 1988).

3.2.3 Data collection

Selection of subjects

This is a case study of the story and long term effects of the first programme at the Management Academy. This case was selected because the programme seemed to be a kind of turning point for the Electronic Coast network. Selection of case(s) may be done by specified populations (Eisenhardt, 1989), like in this case where the selection is prompted by empirical experience. The sample of informants for measuring connectedness in phase 4a was all the 27 participants and the main teacher

and head of the project, myself. The total number of respondents was thereby 28. The lasting increase in connectedness was mainly attributable to 15 of the 28 respondents. These 15 were therefore the target group of the investigation of the benefit of increased connectedness in phase 4b. One was not available owing to surgery and long-run illness. The stratified sample for the open-ended interviews of participants' managers, in phase 4c, was the Vice-CEO of the largest firm (with 6 participants), the CEO and the HR manager of a smaller firm (with 1 participant), and the President and Dean at the College (the president was the EC network entrepreneur, and was at the time of the interview a member of the EC board). To create contrasts in the respondent pool in the stratified sample of the personal interviews in phase 5, the interviewees were chosen according to their level of connectivity, executive position, education, gender, firm, occupation, CoP participation and their perceived reflexivity in the previous interview. The five interviewees can be characterized by the following features and hallmarks: Connectivity: One somewhat decreased, one somewhat increased, one moderate increased and two highly increased; Executive position: Two CEOs and three middle managers; Education: Four engineers of whom one master, two with certificate of apprenticeship, five with management education of whom one master; Gender: Three males and two females; Firm occupation: Two firms in Horten, one firm in each of three other municipalities; CoP: One participant in Production and two in Avanse.

How data was collected

Data was collected in several ways. In phase 1, 2 and 3 data was gathered by participating, receiving several documents and e-mails, using the website, collecting programme information and planning documents, thesis and

tasks, and writing experiences in field-notes. In phase 4a the questionnaire data was collected by structured telephone interviews from October 7th to 14th 2004. The day before the interviews started, each respondent received an e-mail with a short presentation of the theme of the questions and the roster rating questionnaire, to help them remember the names of the other participants, and to reflect on the frequency of the type of contact. I, the interviewer, filled out the questionnaire during the interview. The response rate was 100%. Four of the respondents had changed workplace since the programme had ended, two inside the regional electronics industry and two to workplaces outside Vestfold. All four still live in Vestfold. Qualities of increased connectedness were measured by telephone interviews in the period from December 6th to 13th 2004. The interviews lasted from three minutes up to half an hour, depending upon how much the respondent wished to relate, and how busy he or she was. I used a head set to talk and listen, and took down the informants statements by pen and paper. To avoid misunderstandings and to get the interviews accepted, the transcripts were e-mailed to the respondents within one week after the interview.

The three open-ended interviews with the management groups, searching for the managers' judgement, were all conducted on January 19th 2005. Each interview lasted approximately one hour. The interviews were enacted by two persons, an experienced professor in the leading role and myself taking notes and asking supplementing questions. The aim of the interviews was twofold: testing the main results and ascertain the benefits resulted from the firm – university cooperation in order to prepare for a conference presentation, and collecting empirical data to this project. The informants from the firms were interviewed in meeting rooms at their plants, and the

informants from the College, for practical reasons, sat in a meeting room at a historical centre near the College. This time as well, the transcribed interviews were e-mailed to the respondents for acceptance within one week.

The long interviews in phase 5 were conducted from January 27th to February 13th 2006. The interviews took place at the informant's workplace, and were conducted by me alone. I used a digital recorder and transcribed them word by word afterwards. The interviews took place with some days' interval. Before moving on the next one, I transcribed the completed interview and reflected on it. To avoid misunderstandings and to get the interviews accepted, the transcripts were e-mailed to the respondents within one week.

3.2.4 Data analyzing

The first and preferred analytical strategy is relying on theoretical propositions, which is reflected in the literature review, as well as in the research questions and in the preliminary conceptual models (figure 4.2, 5.1 and 7.1) (Yin, 2003). The second research strategy is to think of rival explanations, not taking for granted that the observed outcomes are the result of the network reflection programme. The third analytical strategy is to develop a case description (Yin, 2003), which is done as thick descriptions (Geertz, 1973) in paper 1 and 3. The fourth and last analytical strategy for generating theory from the qualitative data involves the systematic use of coding procedures through which the concepts, the conceptual categories and the dimensions are specified, refined and related.

Because the strategies and techniques have not been thoroughly defined, analysing case study evidence is especially difficult (Yin, 2003), but defining and following the strategies above will help in the analysing process. “In qualitative research, the investigator serves as a kind of ‘instrument’ in the collection and analysis of data” (McCracken, 1988: 18), and my experience along with my practical and theoretical knowledge have been important instruments to identify patterns in the data. I also performed analysis during the interviews and formulated on-the-spot new questions in order to identify themes within the interviewees’ stories. Data are analysed by within-case analysis with detailed write-ups for each site (Eisenhardt, 1989), using synergy effects in the data. For instance, the field experiences with increased connectedness, documented by field-notes such as self-made minutes, were followed up by the quantitative analysis in phase 4a. Knowledge and data from field experience such as self-made minutes, official minutes and annual reports were used to analyse the transcribed interviews on the benefit of increased connectedness and the managers’ judgement in phase 4 b and c; the results were coded into tables, presentations and discussions in the articles. Although the methods are employed to discover how the informants see the world, I have tried to keep the system thinking perspective in focus, e.g. by interpreting the informants as representatives for a system, and how it was the systems that made the difference.

The values of frequency of contact were summarized for each kind of contact, and mean values were calculated for each of the three moments. The value of connectedness for each informant was found by multiplying

the number of scores for all three kinds of contact for each frequency with the value of the frequency (0-5), and then summarizing the numbers for each frequency. The mean values of connectedness were arrived at by dividing the sum of connectedness for all informants by the number of informants (28) and the number of kinds of contact (3) at each measured point in time. The mean values of connectedness were 3.5 in spring 2001, 10.2 in spring 2003 and 8.1 in autumn 2004.

Different methods and techniques were used to analyse the transcribed interviews. When reading and analysing the transcribed statements of benefit from increased connectedness (phase 4b), different categories of benefit were sorted out and counted: 10 categories were created out of the data, as shown in table 6.2, using a coding-like procedure (Glaser and Strauss, 1967). Such categories are of two kinds: 'in vivo codes', stated by the actors and found direct in the material, or 'in vitro codes', which researchers construct from the material (Alvesson and Sköldberg, 2000). One example of 'in vivo code' is *trust*, which was found for instance in the quotation "it is again about trust". *Interpersonal knowledge* is an in vitro code constructed by me out of quotations such as "I know many more people, when I have a problem I know whom to call". Then each of the categories were interpreted and discussed, on the basis of theory, field experience and the transcribed texts. The analysis of management judgement (phase 4c) was carried out by a juxtaposing of the transcribed interview text into 6 different results. In this work I also used the backdrop of all the field experience. Then the results were matched to my knowledge and data from all the previous phases. When reading and analysing the transcribed interviews in phase 5, answers to each interview-guide question

were gathered together in tables and then analysed. Furthermore, to discover results not covered in the interview guide, different categories of quality – for instance time saving and augmented reflection activities – were identified in the transcribed interviews, using a coding-like procedure (Glaser and Strauss, 1967) on each paragraph in all the transcribed text. All paragraphs of transcribed text for each category were collected and analysed. The results were also supplemented by findings from earlier interviews (phase 4). Further data from the theses written and tasks performed by the participants during the programme were used in the analysis, employing methods such as matching and imaginative reconstruction (McCracken, 1988). Theorizing involves – according to Glaser and Strauss (1967) a 'constant comparative analysis' which means to systematically look at similarities and differences between incidents to guide the development of conceptual categories and conceptual dimensions – the building blocks of theory. The researcher therefore jointly collects and analyses the data by using explicit coding and analysis procedures and theoretical sampling (Glaser and Strauss, 1967). Theoretical sampling concerns both maximizing similarities with the purpose of identifying patterns in the data, and maximizing differences in order to identify evidence that does not fit the emerging theory. The core activity in theoretical sampling is constant comparison, characterizing categories and relations to other categories.

3.2.5 Research quality

This study is mostly qualitative, and because the quality standards for qualitative research differ from the common validity and reliability discussion on quantitative studies, they will be discussed separately.

The quantitative part

A pre-test form was completed by two of the respondents, and later modified to make it clearer. This was done to avoid misunderstandings and to simplify the data collection. According to *construct validity*, it can be argued that a quantitative measure of face-to-face contact, telephone contact, and e-mail contact is not a suitable measure for connectedness. You can meet someone face-to-face without interaction, and when you have someone's e-mail address it is easy to send them an e-mail to someone. But you do not pick up the phone and call someone if it is not for the purpose of interaction, and especially not when you have the more neutral possibility to send an e-mail to convey a message or some information. The reliability of the three kinds of contact measured at the three points in time showed a Chronbach's Alpha of 0.88 in spring 2001, 0.81 in 2003 and 0.89 in autumn 2004. Factor analysis at the three points loaded significantly on one factor. The high reliability and significant factor analysis strongly indicate that the same phenomenon – denoted as connectedness – has been detected.

Reliability. There is a danger of both over-reporting and under-reporting the frequency of contact. Over-reporting could occur because the respondents perhaps wished to satisfy the interviewer, who also was their main lecturer during the programme. Some of the respondents also excused themselves for not having much or any contact with the others. I see no obvious ways in

which to interpret this phenomenon. It may be that those who openly excused themselves were most likely to over-report contacts, but this does not stress the likelihood of over-reporting from the other respondents. Further, it may well be that the most eager over-reporters were respondents who did not excuse themselves, because their reason for over-reporting was precisely not to have to excuse themselves. In order to avoid this effect, respondents were informed at the outset that what was sought after was going to be the truth, not the 'best practice'. The danger of under-reporting existed perhaps because some respondents did not remember all their past contacts. Some of these contacts were disclosed by the control questions mentioned above. Since all the questions were about bilateral contacts, one way to check reliability was to compare the answers from two respondents against each other. Five sampling tests were undertaken, and the answers were the same or a variation of one point on the frequency scale. It could also be argued that there is a risk of reporting several values in just two categories, for example once a year and once a month. This was avoided by collecting the questionnaire data through telephone interviews. If the answer was "once a month", the interviewer asked: "Do you think it is a bit more often, or a bit more seldom than once a month?"

Tie strength was measured by using Granovetters' (1973) scale for frequency of communication. This scale is further developed by Hansen (1999), e.g. by adding closeness of interaction. However, since Hansen (1999) and Levin & Cross (2004) found that these two items gave similar results, following Granovetters' suggestion of measuring only frequency is presumably not too inadequate for the purpose of this study.

The qualitative part

The research quality will be discussed by employing logical reflections based on Peirce's (1923) conviction that quality as such is never an object of observation, rather a product of logical reflections. Since my experience, my practical and theoretical knowledge and my imagination have been the most important instrument for the analysis and because people are notoriously poor processors of information (Eisenhardt, 1989), there is a certain danger that the conclusions may be false or premature. Criteria for judging the research quality are therefore important also in qualitative research. Because the concepts of validity and reliability are based on the positivistic approach, the same measurements can not be used in qualitative research. Alternative criteria for evaluating qualitative research are credibility, transformability and dependability (Guba and Lincoln, 1989; Miles and Huberman, 1994). It is not possible to define standards for such procedures, but Sørnes (2004) has provided a table (adapted from Guba & Lincoln, 1989, Miles & Huberman, 1994; and Munkvold, 1998) to compare these interpretivist criteria with the conventional positivist criteria, and to explain their common goals and research tactic associated with each of them, which is presented in table 3.1.

Interpretivist Criteria	Positivist Criteria	Goal	Tactic
Credibility	<i>Internal validity</i>	Establishing the match between the constructed realities of respondents (or stakeholders) and those realities as represented by evaluator and attributed to various stakeholders	<ul style="list-style-type: none"> - Field work - Discussion of data and results with fellow researchers, external peers and informants (member checks)
Transferability	<i>External validity</i>	Presenting a sufficiently detailed account of the findings to enable the reader to judge how they can be transferred to other contexts	<ul style="list-style-type: none"> - Thick description
Dependability	<i>Reliability</i>	Ensuring that methodological changes and the interpretive process are documented so that the reader can follow the process and the researcher's choices	<ul style="list-style-type: none"> - Making the process explicit - Making data available - Describing the logic used for moving from data to the final results

Table 3.1 Criteria for evaluating interpretive research (Sørnes, 2004: 89)

Credibility. This is a question about authenticity and truth value: we wish to ascertain whether the findings make sense and are credible to the people we study and to our readers (Miles and Huberman, 1994). In this study the theory-building process is intimately tied to the evidence, which produces a

theory that is likely to be empirically valid (Eisenhardt, 1989). The informants' narratives offer an alternative mode of knowing (Czarniawska, 2004). To relate what actually happened, factual narratives are retold in the papers, which may increase the truth value. The informants read transcription of their interviews, and were allowed to correct themselves. The managers were invited to read the juxtaposition of 'managers judgement ', and comment on it, which one of them did. The participants were given a draft of paper 3 before it was dispatched for publishing, among other things to see how I have used their quotations. They were also invited to give feedback if they disagreed with something, and the only feedback received was of a positive nature. Thus, the informants were given the faculty of reinterpreting their statements and of reading and clarifying my interpretations, which may have increased the credibility and truth value. The work provides different approaches to data collection. The triangulations of methods yield converging conclusions, e.g. the increase of connectedness and the emergence of trust. The validity of findings using very different approaches to data collection is one of the most obvious advantages of the triangulation (Bryman, 1989).

Eisenhardt (1989: 538) argues that multiple investigators may enhance both creative potential and confidence, and that co-operation with investigators who have not met the informants and have not immersed themselves in case details may bring a different and possibly a more objective view of the evidence. Although I have carried out most of the research by myself, there are some important exceptions. Firstly, in phase 1 I developed the method of network reflections in a creative and instructive co-operation with a colleague-supervisor. Secondly, the interviews in phase 4c were conducted

by an experienced professor who had not met the informants before and did not know the empirical field very well. Thirdly, my main supervisor does not know the empirical field at all. Finally, the secondary supervisor has been conducting research on the Electronic Coast network for several years himself, e.g. in 2001 he stated that “the regional innovation system of Vestfold *is not yet realised*. There is no visible innovation system” (Uhlin and Johansen, 2001: 2).

Transferability. Do the conclusions ‘fit’ other contexts, and to which extent can they be generalized? The original sample of persons, settings and procedures are carefully described to permit adequate comparisons with other samples (Miles and Huberman, 1994). The description of the context of the Electronic Coast, the Management Academy and network reflections in the first article are classified as ‘thick’ (Geertz, 1973) enough with regards to both details and interpretation of the circumstances, meanings, intentions and strategies, to provide appropriateness for other settings. Because the system did not start from scratch, the respective histories of the electronics industry in Vestfold and the Electronic Coast are related. The narrative sequences are preserved unobscured (Miles and Huberman, 1994). The concept of network reflections is new, and, to the best of my knowledge, has not been replicated in any other settings yet. Geertz’s (1973) thick description, facilitates replication efforts. Given the explorative purpose of this thesis, the objective is not to investigate *all* the qualities of *all* the processes and outputs, but rather to illuminate some of them. As the present work does not enumerate frequencies, statistical generalizations can not be provided. Nevertheless, by starting off with theories whose domain is

enlarged by means of a case, this study provides a number of analytical generalizations (Yin, 1984).

Dependability. This is a question of ascertaining whether the process of the study is consistent, reasonably stable across researchers, methods and over time, and methods (Miles and Huberman, 1994). The consistence and methods will be discussed first.

The researcher's role has been explicitly described (Miles and Huberman, 1994). The basic analytic constructs, such as connectedness, trust, ties, innovation, regional innovation system, regional collective learning and network reflection are clearly specified in the papers, the latter in a specific position because it is developed in this study. Peer and colleague review have been in place several times, for instance by supervisors, on PhD seminars, conference presentations and several journal reviewers and editors, to judge the process and the findings.

The 10 categories of benefit of increased connectedness – in paper 3 – somewhat overlapped. They were also at many levels, for instance with respect to knowledge: from whom the knowledge was learned, how the knowledge was utilized, and its usefulness. This may be the price to pay for open questioning. The advantage lies, however, in richer answers. It may be misleading to count the different categories of statements, because it could lead us to believe that the numbers express all the activity in the categories, which they do not. The question: “how do you think you have benefited from this contact?” is a very open question, and was the first in a telephone interview when the respondents were at work and surely engaged with other

matters. The only warning given was an e-mail 1-2 weeks before the interview. If the question had been asked at the end of the first telephone interviews, straight after the questionnaire about frequency of contact, the respondents would have been more 'hands-on' with their reflections concerning their contacts and benefits, and the content of the answers would have been richer. Nevertheless, the answers gave an appropriate picture of the benefits, and their importance according to content and relative frequency. In a qualitative interventionist study like this, the researcher's knowledge and imagination are the most important instrument for both data collection and analysing, hence the fact that all data collection and analysing have been performed by the same researcher also increases the reliability.

According to Pettigrew (1990), the moment in time at which the researcher writes influences what he/she can see and say. Because I have been writing on this work since 2004, I have presumably caught different important moments on my way. The four papers have been finished at different stages in the process, which document my learning process. Furthermore it shows that the interpretation of the findings is not stable for the same researcher over time. The goal of whether the process of the study is reasonably stable across researchers and over time, is, however, not the case in interventionist studies like this. I have been highly involved in the field, my knowledge, experience and imaginations have been important instruments in both data-collection and analyzing, and it is unlikely that other researchers would do the exact same findings. The stability over time is not of current interest, the aim of the first phase of the process in this work was to create changes in relationships and hence instability, and in the next phases to analyse the long term results of this instability.

This is a longitudinal study; therefore I am analysing, partly in real time, partly in retrospect, and mostly by interviewing people, the effects of a process that started until five years earlier. Is it possible to presume that we can remember what we did and felt that long ago? Pettigrew (1990: 271) claims that it is possible, but he further argues that "time sets a frame of reference for what changes are seen and how these changes are explained" and he summarizes his opinion by the old saying "truth is the daughter of time". How is this to be understood? In the context of this work the saying that truth is the daughter of time must not be understood like the truth will eventually emerge as time goes by. Here the focus is on the concept of time, and truth is, according Pettigrew (1990) a *function* of time. That is, truth is not absolute but varies in relation to time. This is the way we perceive time - and truth - in our everyday lives. In many respects we see our lives as a united whole of past time, present time and future time (Lundmark, 1984). That is, and for instance, when interviewed we have past time (recollections), present time (the actual situation) and future time (plans and expectations) simultaneously in our minds. And what is more, there are many different kinds of time in our heads, natural time (morning, night, summer, spring, etc.), chronological time (seconds, hours), biological time (childhood, youth, etc), private time (when we married, life as retired, etc.), historical time (the cold war era, etc), and so on. Koselleck (1985: 266) argues that "the nonsimultaneously [is] occurring simultaneously". That is, the present is not just the place where the future is transformed into a past; it is also the space of action where the battle is fought over our understanding of the past, and, at the same time, the field where we are fighting over the shape of the future.

So, of course they remember. But *what* they remember is piled upon other memories and experiences. And not only that, memories of once held expectations for the future, i.e. futures past, are also stacked amongst all the recollections. This is an important circumstance, because quite a few of the interviewees told me that they were so impressed by the results of the lunch intervention that they later on themselves organised similar activities. That is, the outcome of the original lunch raised expectations, which at the time of the interviews are futures past, i.e. simultaneous memories and experiences together with the ‘original’ ones. And what is more, old expectations turned into futures past affect earlier memories and experiences. This is of course the reason why there is always a need for reinterpreting and rewriting history. In sum, I do not need to worry that my interviewees do not remember, but I have to be aware that they might remember ‘too much’, i.e. that their ‘original memories’ have been affected by later expectations that have turned into new recollections.

3.2.6 Self reflective discussions

Strength/weaknesses

When building theories from a case with enormous quantities of rich quantitative data, there is a risk that the resultant theories may be too rich in detail, trying to capture everything and lack the simplicity of overall perspective (Eisenhardt, 1989). I have tried to avoid this risk by focusing on the preliminary models and the research questions, and by separating the process into different phases. Moreover I have written four papers with different theoretical perspectives.

It can be seen as a paradox that I introductorily criticise Descartes and his rules of dividing things into parts for analysing, when I myself have disaggregated empirical data and broken them down – by comparison, characterizing categories and relations to other categories – to segments. Like I did by outlining qualities and output of network reflection and increased regional connectivity (table 4.3) and categories of benefit (table 6.2). The difference between me and Descartes here, is that I involved a relatively high level of interpretation including an implicit conceptual structure in the hermeneutic comparison and characterizing process (Alvesson and Sköldbberg, 2000: 99), which Descartes (1637) did not mention. He seems to have been occupied with the objectivity and a mechanical way of analysing, splitting up and investigating all the objects starting with the simplest one.

I argue with Eisenhardt (1989) that the combination of quantitative and qualitative empirical data may be highly synergistic, and that quantitative evidence can indicate relationships that may not be salient to the researcher. In this study I also think the quantitative investigation of connectedness, structural holes and ties makes the findings both heavier and more visible, and hopefully also attracts the readers' attention. The heart of building theory from case studies is analyzing of data, but discussions of analysis are often scarce, and a huge chasm often separates data from conclusions (Eisenhardt, 1989). I have tried to avoid this by doing within-case analysis. But I also argue that this problem is not so relevant in this case, because it is an in-depth study of a single case and the amount of data is not too large (Eisenhardt, 1989).

The role as a researcher during field studies

In doing action research, I have to deal with the age-old philosophical problem of bridging. First reaching an understanding of the practical situation and initiating action in cooperation with practitioners, and then returning to a more distanced realm of pure reason, writing the narrative that makes sense to those who were not there (Agar, 1986). But I think that the interventionist and action experience, and several years with participating and observing activities definitely help me in the hermeneutical understanding of the network. Moreover, being a more distanced researcher since 2005 enables me to approach pure reason.

The participants' statements might be biased, prejudiced, partial, influenced and/or subjective. Truth is a function of time and the short euphoric period that characterized the time right after the end of the programme has long since vanished. On the basis of rigorous and longitudinal research methods, it is reasonable to believe that I have measured the *lasting* effects.

Although this case may look successful, the findings may be subjected to criticism. The fact descriptions on Electronic Coast and the cluster are, however, confirmed by several central persons in these systems. As the main lecturer performing the programme interventions, I played an important role in the programme. After the programme I recruited participants to network teams, was a member of the nominating committee, the coordinator of the network team Management Academy from 2003-2005, and I was partially involved in one new programme at the Management Academy in 2003. I was, however, not at any time involved in

the CoP or in any other reported co-operation other than those mentioned above. An action researcher from the University acted, however, as a coordinator for one CoP. My wish to describe the programme as a success might have biased the results. In spite of this eventuality, the high rate of participation and completion of the programme, the lasting weak ties and co-operation activities among former strangers speak for themselves. To let the case speak, like I have done, is recommended by Siggelkow (2007) as a good way to demonstrate connections.

3.3 Ethical issues

Science ethics as a subject is induced by the want of ethic regulation of research (Gilje and Grimen, 1993). Each stage of the research process may involve ethical considerations in addition to purely scientific considerations (Frankfort-Nachmias and Nachmias, 1996). "Etical issues arise from the kinds of problems social scientists investigate and the methods used to obtain valid and reliable data" (Frankfort-Nachmias and Nachmias, 1996: 77). They may be evoked by the research problem itself, the setting, the procedures required by the research design, the method of data collection, kind of informants, and the kind of data collected (*ibid.*). Science ethics challenges may arise in two ways, in the research process or by use of the research results, and it is important that researchers are aware of them both (Gilje and Grimen, 1993). Reynolds (1979) has put together a useful composite code of ethics related to the conduct of social science research. The code is divided into the following parts: Principles (General Issues Related to the Code of Ethics, Decision to Conduct the Research and Conduct of the research), effects on and relationship with the participants (Informed consent, Protection of rights and welfare of participants, Benefits

to Participants and Effects on aggregates or communities) and Interpretation and reporting of the results of the research. These codes state what is required and what is forbidden, and I have tried to follow these codes. One special ethic challenge that had to be handled in my study is that I am personally involved in the field, and have personal interests in the findings and results.

Informed consent and protection of rights and welfare of participants were handled by trying to use all the quotations in a way where either the informant or their firm could be identified. In reporting some official facts from the cluster, the firms are identified. In all other reporting of results, informants and firms were made anonymous, e.g. all participants are referred to as 'he' and findings that allow identification of a particular firm or participant are not used directly in the four papers. Further, during the data collection in phase 4 and 5, all the informants were informed before the interviews that the aim was data for this work. One exception is phase 4c where the informants were asked for permission to use the information for this study some days later. After all the 22 personal interviews (phase 4b, 4c and 5) the transcriptions were e-mailed to the informants for acceptance. All the transcriptions were approved by the informants. One of the informants wanted, however, to see and approve his quotations before I used them, which I have followed up.

I have tried to interpret and report the research results in an honest way, not hiding anything I did not want to find. Since I have been so much involved in the field, the interpretations and report is of course coloured of my knowledge and feelings. There is a danger that I have interpreted too much

as results of the network reflection programme. I have tried to avoid this by being aware of this problem. Moreover by use of my analysing strategies: Relying on theoretical propositions; analysing rival explanations; developing a (thick) case description; systematic use of coding procedures. Finally, the problem is avoided by involving other investigators and by having central persons in the network approve my description.

4. Paper 1 - Developing Regional Communities of Practice by Network Reflection: the Case of the Norwegian Electronics Industry

Forthcoming as:

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4.0 Abstract

In 2001 a cluster association of Norwegian high-technological SMEs challenged their regional university college to develop a management education programme, aiming at improving both their management practices and co-operation within the cluster. To meet this challenge, the university developed an educational method, which is here denoted as network reflection. The primary objective of this empirical paper is to explore the extent to which network reflection has the capacity to increase regional co-operation, and to extend such concepts as communities of practice, networks of practice and experienced reflection to the regional level, in order to analyse the development of regional collective learning. To achieve this objective, a case study of a network reflection intervention and its longitudinal effects on forming regional co-operation has been conducted. The research questions are: 1) Does network reflection influence the development of regional co-operation and communities of practice? 2) If increases in regional co-operation and communities of practice could be

identified, did these influence regional collective learning? 3) Does network reflection influence regional collective learning? The paper concludes that network reflection seems to have a capacity to increase regional co-operation, regional communities of practice and regional collective learning.

Keywords: regional collective learning; regional communities of practice; regional university; experienced reflection; network reflection

4.1 Introduction

In 2001 a cluster association of Norwegian high-technological SMEs challenged their regional university college to develop a management education programme, aiming at improving both their management practices and co-operation within the cluster. To meet this challenge, the university developed an educational method¹⁰, which is here denoted as network reflection. The participants – 27 managers from 14 firms, who were mostly strangers to each other – increased their co-operation considerably both during the programme and later on, after the programme ended. The participants established strong and stable communities presenting high level of trust and learning, and systems to coordinate actions aimed at confronting common problems. Moreover the activity in the cluster association increased considerably. With the purpose of finding the cause of this effect, this inductive case study follows these managers for five years, investigating the hypothesis that network reflection has a capacity to increase regional co-operation.

¹⁰ This development was inspired by theories of knowledge creation (Polanyi, 1966; Nonaka et al., 2000), conferences (Gustavsen and Engelstad, 1986), cluster (Porter, 1998a) and innovation systems (Lundvall and Johnson, 1992; Cooke, 1998)

Regional co-operation is an important precondition for regional collective learning, as regions with high levels of collective learning are found to be highly innovative (Keeble, 2000). Moreover, the increasing globalization paradoxically seems to increase the importance of regional co-operation to firms' competitiveness (Saxenian, 1994; Maskell et al., 1998). This paradox is explained by codified knowledge becoming global accessible, which makes the value of embedded tacit knowledge more crucial (Maskell and Malmberg, 1999). Regional co-operation seems to be especially important to high-technology SMEs (Keeble, 2000) for two reasons: Firstly, people-based informal links and knowledge sharing are more important to such firms than traditional supplier-customer relationships; secondly, research networks are fundamental (Keeble, 2000). Regional collective learning is 'the creation and further development of a base of common or shared knowledge among individuals making up a productive system which allows them to co-ordinate their actions in the resolution of the technological and organizational problems they confront' (Lorenz, 1996 referred in Keeble, 2000: 201).

The university's regional role has mainly been that of producing competent labour, transferring explicit knowledge to firms, generating spin-offs and establishing science parks (Keeble and Wilkinson, 2000; Macpherson and Ziolkowski, 2005). Some scholars argue, however, that informal networks may be established by former students (Saxenian, 1994; Keeble, 2000), and that regional co-operation tends to emerge as an unintended consequence of management education (Johannisson, 2000; Tillmar, 2006).

Saxenian (1994) and Keeble and Wilkinson (1999) acknowledged the influence of communities to create regional collective learning in clusters. The attention is therefore turned to the literature on communities of practice (CoP) (Lave and Wenger, 1991), networks of practice (NoP) (Brown and Duguid, 2000), and the similar community of knowledge (Pinch and Henry, 1999), which are seen as playing a critical role in enhancing innovation. The concept of network reflection is developed by combining inter-organizational networks of practice and communities of practice with Mintzberg's (2004) experienced reflection concept in management education. An important feature of experienced reflection is reflection on practice, which Schön (1983) sees as the main characteristic of professional creativity. Moreover, experienced reflection consists of facilitating several interventions and combining lectures, reflections and interactions. In addition, network reflection includes network activities such as inter-organizational interventions, firm presentations and plant visits. To explore the hypothesis that network reflection has a capacity to increase regional co-operation, the following research questions are posited: 1) Does network reflection influence the development of regional co-operation and communities of practice? 2) If increases in regional co-operation and communities of practice could be identified, did these influence regional collective learning? 3) Does network reflection influence regional collective learning?

The most important difference between this work and most literature on regional co-operation, regional collective learning and innovation, is the process focus on how to enhance co-operation at the micro level. This paper addresses the lack of empirical examinations on how to develop inter-

organizational CoP, and their influence on innovation processes (Swan et al., 2002). Moreover, it initiates conceptualizing network reflection and turns for theoretical inspiration to micro-level concepts from knowledge creation, organizational learning, trust, action research and management education. In particular it seeks to extend to the regional level concepts developed by Lave and Wenger (1991), Brown and Duguid (2000), Nonaka (1994), Levitt and March (1988), Polanyi (1966) and Mintzberg (2004), to analyse the development of regional collective learning. Finally, this paper challenges communities and co-operation theory by focusing on the need for reflection, and, by combining CoP and NoP, it argues for a stronger emphasis on inter-organizational and regional CoP.

This study of a network reflection intervention and its longitudinal effects on forming regional co-operation is based on case study methodology (Yin, 1984; Eisenhardt, 1989) and longitudinal data (Pettigrew, 1990). It also includes elements of action research (Whyte, 1991; Reason and Bradbury, 2001a). The context is a cluster association of Norwegian high-technological SMEs, the Electronic Coast. The discussion is organized in the following manner: In the next sections, network reflection is described and the causality problem of events influencing systems is discussed, before the context and the case are presented. Then the research questions are elaborated, a preliminary conceptual model is developed, and the methods and findings are described and discussed. The closing section provides a revised conceptual model, implications for practitioners and suggestions for further research.

4.2 Network reflection and causality

4.2.1 Network reflection

Network reflection is a method for inter-organizational, part-time management education, composed of a network for inter-organizational network activities and reflection for Mintzberg's (2004) experienced reflection. Experienced reflection is a method for management education including, in addition to short lectures, seminars and theses, also reflection tasks. During these tasks the participants reflect on their practice alone, collectively in small groups and during class. The reflection process consists of 'wondering, probing, analyzing, synthesizing and connecting' applied to why things happen the way they do (Mintzberg, 2004: 254). It requires struggling with theoretical models and experience during the programme; participants need to be curious, alert and engaged. 'It is critical that this reflection alone be allowed to happen on the manager's [i.e. participant's] own terms' (Mintzberg, 2004: 255). Hence the cases must be the participants' very own. This method of utilizing participants' actual experiences in conjunction with organized reflections and inter-organizational tasks enables the participants to create and share local explicit and tacit knowledge. Because the participants are practitioners, and their experiences and actions are essential in the interventions, reflection-in-action is very likely to occur. According to Schön (1987: 28), when we reflect-in-action 'we may, in the process, restructure strategies of action, understandings of phenomena, or ways of framing problems'. The facilitating role is to prepare the right context (Schön, 1987), thus the pedagogy is facilitating (Mintzberg and Gosling, 2006). The network part of the concept is different from experienced reflection, as it consists of several

network interventions: Recruiting participants from a cluster; a planned ad-hoc lunch intervention at the first seminar; seminars involving firm presentations, plant visits and network news; inter-organizational theses dealing with challenges within the firms; tailoring the content and study methods to the participants expectations, and providing participants with the same concepts, literature and lectures as mutual backdrops for communication.

The interventions of network reflection build trusting relationships. The reflection tasks have features of conferences (Gustavsen and Engelstad, 1986). 'The conferences function as meeting places; where participants are making points; in discourse; in groups; with short reports in the plenary; drawing on their experience; in fluid and shifting relationships to others' (Gustavsen, 2001: 21). The facilitator helps to organize the event, and takes care 'to present comments and points in such a way that they emerge as natural elements in ongoing conversations', but does not summarize or analyse the outcome of the tasks (Gustavsen, 2001: 21). Trust is considered to be crucial in innovative networks involving creation and diffusion of knowledge (Lorenz, 1992; Keeble, 2000; Newell and Swan, 2000). Creation of trust is normally a slow process (Zucker, 1986), but *swift trust* may develop over short, intense periods of interaction in temporary groups (Meyerson et al., 1996). Hence several interventions – reflection tasks, the lunch project and theses work – are organized in temporary groups. All groups are inter-organizational, and for each gathering the reflection tasks are conducted in different groups arranged by the lecturer. Moreover, frequent and collaborative communication sharing expertise and tacit knowledge – as the participants do during reflection tasks, theses-work and

plant visits – contribute, according to Abrams et al. (2003) to build trusting relationships. Finally, these interventions constitute a plurality of relationshipbuilding events. Such events may, according to Gustavsen (2001), be a main constructing activity resulting in ‘an improved capacity for developing ideas, pursuing them into action and generally creating a rich landscape of different institutions, organizations and activities that can enter into fruitful and complementary relationships to each other’ (Gustavsen, 2001: 22). Network reflection therefore constitutes trust and relationship-building events.

It could be argued that network reflection boils down to social learning or just some deliberate actions, taken by the regional university, to form or support regional networking. But network reflection is actually something more than that. It is in fact a major intervention, consisting of several smaller undertakings, e.g. lunch projects, reflection tasks, temporary groups, plant visits, overnight stays, joint meals and theses, in other words it is a complex system of interventions. According to this system, the participants are placed in new and uncertain situations, where surprises occur and their routines are questioned. The main role of the lecturer in network reflection is that of an active facilitator, implementing interventions and connecting people, playing a procuress role (Wenger et al., 2002) or acting as a kind of knowledge activist (Krogh et al., 2000). Also important is to facilitate participants reflecting alone (Schön, 1987) and collectively (Mintzberg and Gosling, 2006). The combination of the lecturer as a facilitator and all the single activities make network reflection a system of interventions.

4.2.2 Causality problem

In this section I will build an argument on the influence of historical events (such as a network reflection programme) on systems (such as regional collective learning). By definition, regional collective learning makes up a productive system. The causality between events and systems or structures calls for the methodological problem of individualism or collectivism. In this important discussion, the attention is turned to critical realism, systems thinking, organizational learning, economic geography and history for arguments. Instead of focusing on the traditional conflict, critical realism regards individualism and collectivism as complementing each other, asserting the following methodological duality: Structures make and limit human actions, while human actions lead to or change structures (Bhaskar, 1978). In systems thinking, structure constitutes the superior composition of relationships among actors (Johannessen et al., 1999b). To change a system, relationships must be changed (Weick, 1979), and when the system is changed, the actors are influenced. In organizational learning, Levitt and March (1988: 319) claim that ‘organizations are seen as learning by encoding inferences from history into routines that guide behavior’. In economic geography, Pinch and Henry (1999) argue for the limitation of Krugman’s (1986) historical accidents explaining regional structures, emphasizing social construction of knowledge and detailed considerations of longer-term historical processes. Moreover, Maskell et al. (1998) maintain that ‘history matters’, i.e. that regional capabilities like structures, knowledge and skills develop through historical processes of several incremental events. They further emphasize the influence of structures on events, e.g. they argue that the world’s most developed telephone systems in the Nordic countries was an important factor to the emergence of their own

successful Telecom industry. Finally, in the field of conceptual history, Koselleck (1985) claims that events and structure represent different levels, related to each other yet without merging. Thus, the event becomes the presupposition of structural expression, and, conversely, long-term structures function as condition for possible events.

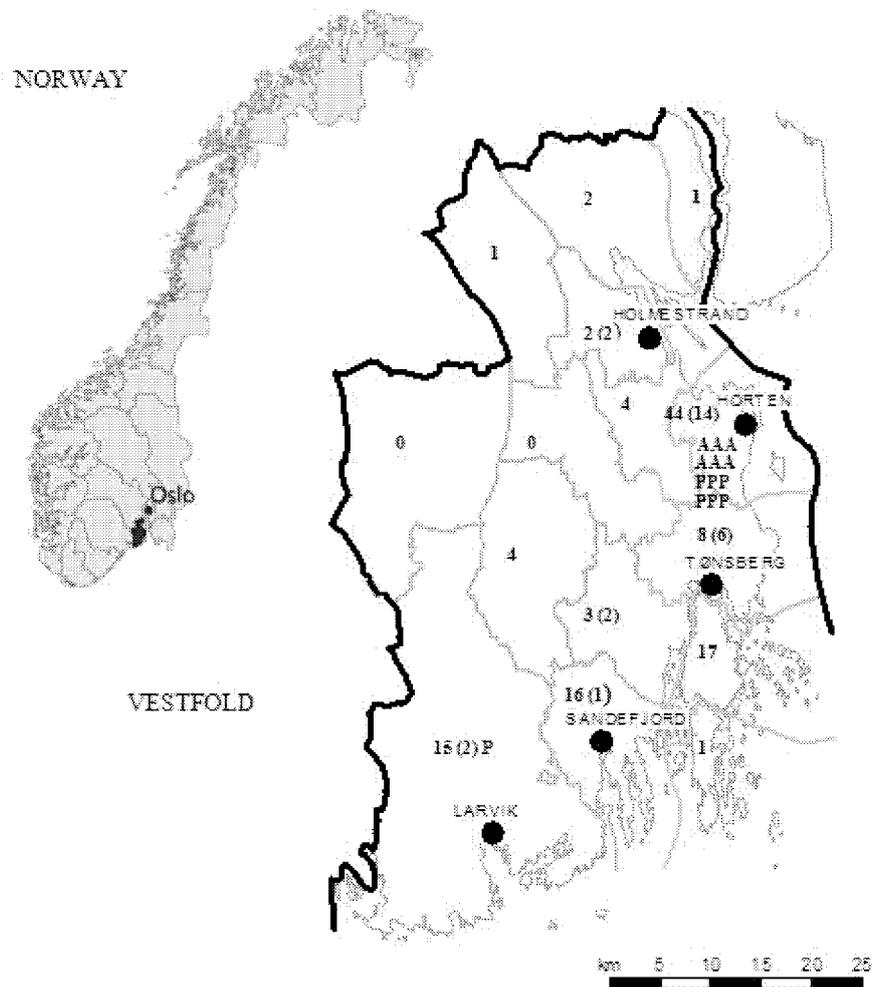
The question of causality also implies the question of causal laws in social science. Bhaskar (1978) states that the objects of social science are both socially defined and socially produced. Causes do not only exist in relations to their effects, they also exist as capacities or tendencies, even if they are not realized, e.g. the water has the capacity to put out the fire (Bhaskar, 1978). An event is a complex effect influenced by several mechanisms. Because the mechanisms are not always activated, the effects do not always take place. Causal laws can therefore not be regarded as universal, empirically-established rules, rather they must be analysed as capacities (Bhaskar, 1978: 50). The hypothesis and research questions therefore indicate that the socially-defined object 'network reflection programme' has a capacity to influence regional co-operation, regional CoP and regional collective learning.

4.3 Context and case description

4.3.1 Context

Driving one hour by car southward from Oslo – the Norwegian capital – you arrive to Vestfold, the smallest and one of the most densely populated Norwegian counties (222 000 inhabitants). It is located by the coast, has a sunny climate and is a popular place to live. The electronics firms are

mainly clustered in an 8-km circle around the city of Horten, and the most peripheral firms are located within 75 km (see figure 4.1 – a map). R&D consultancies are absent in the region, and the only R&D institution is Vestfold University College, which is located in Horten. The electronics industry in Vestfold consists of around 100 firms, encompassing some 2 500 workplaces (Idås, 2000). The electronics firms are mostly classified as SMEs; most of which are sub-suppliers. This is a high-technological, research- and export-intensive cluster, competitive in the global market. Its development is rooted back to the 1880s, when the navy fleet changed from sail to steamboats, which demanded local engineering competence, especially since the national naval base was located in Horten. In the 1960s four electronics firms were established, and their growth during the next 30 years was dominated by spin-offs (Isaksen, 1993). Over the next 10 years there were some modest ups and downs, but close to zero growth in the number of firms and employees. Nevertheless, some firms went bankrupt or were closed down by their foreign owner, but nearly all re-emerged in a slimmer form. From 1998 to 2002 the number of electronics workplaces in Horten decreased by 25%, while similar industry elsewhere in Norway reflected a stable employment (Onsager, 2005).



Figures: Number of electronics firms in this municipality
 Figures in brackets: Number of course participants from firms in this municipality
 A: Firm member in the CoP Avanse
 P: Firm member in the CoP Production

Figure 4.1 Map of the Vestfold region with municipalities and the respective amount of electronics firms, participants and CoP members.
 (Vestfold is located southward from Oslo, and is shaded in black in the inserted map of Norway)

‘A relatively close business environment does not necessarily lend itself to co-operation and interaction’ (Maskell et al., 1998: 94). The reason is, according to Giuliani (2007: 161), that business networks (e.g. clusters) differ structurally from knowledge networks as the former are more densely connected than the latter, and business linkages are more homogeneously distributed than knowledge linkages. In this cluster, no regional innovation system was developed in the end of the 1990s (Isaksen, 1999; Uhlin and Johansen, 2001) and ‘at the best it is possible to detect capacities and tendencies that point towards a future realisation of such a system’ (Uhlin and Johansen, 2001: 2). Hence a disintegration of the cluster could be expected.

Electronic Coast is committed to arena and network building with the aim of promoting growth and innovation in the region’s electronics-based firms. In addition to the firms, the county, some municipalities and the regional university have also been participating in this project, which is therefore considered as a regional collective initiative (Keeble, 2000). In the early 1980s, the Electronic Coast network grew out of relationships among the firms. In 1998 it was re-invigorated – after a period of little activity – as a project financed, by The Research Council of Norway¹¹ until 2001. At that time Electronic Coast was in serious trouble: they had no more state funding, no secretarial help, no newsletters, their web site was not updated, and the monthly seminars were suspended for lack of interest. In 2001 the firm representatives, in the only active team, went in to set up a common management programme to improve management practices and increase

¹¹ The REGional INNovation (REGINN) project

regional co-operation. The result of this initiative was the establishment of the 'Management Academy' in co-operation with Vestfold University College.

4.3.2 Case description

The case selected for this study is the first programme at the Management Academy, which was entitled Managing Knowledge. It was a part-time programme, financed by participant fee, which lasted from September 2001 to June 2002. The 27 participants were a mixed group from 14 firms¹². Five were CEOs. Some of the 22 middle managers worked in human resources and/or budgeting, and some in production and technical tasks. Seven participants were female and 20 were male. The managers were however not equally distributed over these firms. Five managers represented their firm solely, 16 represented their firm as couples, whereas six represented the same firm. The managers represented firms located within 70 km, 14 of which were located in Horten.

From being theoretically inspired, the content and methods were tailored to the participants' expectations. Detailed planning was an ongoing process involving reflection between the main lecturer (myself) and an advisor. The programme consisted of eight seminars most of which were held during the daytime; one seminar entailed an overnight stay at a retreat. The seminars were held at various localities, and some included plant visits. At every seminar, firm presentations and network news were agenda items. The main lecturer was present at all seminars, facilitated the interventions and served

¹² 13 firms were electronics/ICT firms, one firm was the regional hospital (one participant)

as the contact person between the seminars. Reflection tasks were organized at every seminar. To illustrate the setting with an example:

After a lecture on learning arenas, the participants were asked to reflect on which learning arenas they had in their own firm and why they considered them to be learning arenas. They were first asked to reflect alone, then in small groups and finally in a plenary session.

To reflect on their real-life work practices together, participants need relationships with some level of trust. To build such relationships quickly can be problematic. Hence, with the purpose of building swift trust (Meyerson et al., 1996), at the first seminar, a planned ad-hoc intervention demanded that participants worked together in temporary groups on a project with a clearly defined target:

On very short notice (1 hour), participants were assigned the task of preparing lunch. Four temporary groups were formed and each was assigned one of the following tasks: preparing lunch, setting and decorating the table, entertaining during lunch, and evaluating the groups.

The intervention was a three-fold success: First, participants enjoyed a nice lunch with amusing entertainment. Second, because they dealt with a great amount of uncertainties generated by a complex system to perform a composite, interdependent task using specialized skills by relative strangers, swift trust was presumably created. Third, they 'broke the ice' and began

bonding. They still reminisce about this episode some four years later, and they have even launched new networking activities with similar interventions. As one participant put it, ‘It worked out well because it was a way of becoming acquainted that in a way didn’t necessarily depend on who you were. Consequently, you weren’t known according to your title or profession, but rather you were just you’¹³.

Attendance at the seminars was high, and all the participants completed their theses. Theses-writing was organized in inter-organizational groups, dealing with practical challenges within the firms, e.g. identifying core competence, aiming to better leadership and developing appraisal interview forms. Nearly all (26 out of 27) participants sat and passed a final examination with good results. An outline of the interventions in network reflection is given in table 4.1.

Table 4.1 Outline and description of interventions and activities in network reflection

(the figures from this particular case are given in brackets)

Network reflection - interventions and activities
Recruiting participants <ul style="list-style-type: none"> Recruiting participants from a cluster, practicing resembling professions, open invitation to participate
Seminars <ul style="list-style-type: none"> Participants meet face-to-face at several (8) seminars during several (9) months. Firm presentations, network news and joint meals at the seminars. Some (4) seminars including plant visits and one seminar (the 4th) with over night stay at a retreat
Lunch intervention <ul style="list-style-type: none"> A planned ad-hoc intervention at the first seminar, on a safe project with a clearly defined target; preparing lunch, in small temporary inter-organizational groups

¹³ All quotations are translated from Norwegian to English by the author

arranged by the lecturer
<p>Reflection tasks</p> <ul style="list-style-type: none"> • Reflection tasks at each seminar requiring reflection alone or collectively, in small groups and during class, on experiences and challenges within the firms, and theoretical frameworks • Reflection tasks conducted in small temporary inter-organizational groups – different for each seminar and arranged by the lecturer
<p>Thesis-groups</p> <ul style="list-style-type: none"> • Inter-organizational theses – dealing with practical challenges within the firms – as part of the exam, carried out in small inter-organizational groups arranged by the participants
<p>Content</p> <ul style="list-style-type: none"> • Provide participants with the same concepts, literature and lectures as mutual backdrops for communication, by participating in the same class • Tailor the content and study methods to the participants’ expectations, which were discussed and mapped out at the first seminar • E-mails to follow up, prepare and motivate for each seminar

4.4 Research questions

4.4.1 Does network reflection influence the development of regional co-operation and communities of practice?

During the programme, participants became acquainted with each other by interacting in reflection tasks, thesis-groups, the planned ad-hoc intervention and the informal sections of the programme. This interaction increased connectivity, i.e. ‘the number of connections in place among the agents in the network’ (Antonelli, 1996: 282) and bridged structured holes, i.e. the absence of ties between actors (Burt, 1992). The participants got to know their colleagues’ contexts rather well by sharing actual experiences from each other’s practices. According to Gustavsen (2001), by building such relationships participants often see platforms for future co-operation about new practices. By reflecting together on their own practices, they probably also discover that managers have a lot to learn from each other and

furthermore that they can teach each other in highly efficient ways out of range for university faculties (Mintzberg, 2004). This discovery may encourage the participants to continue co-operating after the programme.

‘Communities of practice are groups of people who share a concern, a set of problems, or a passion about a topic, and who deepen their knowledge and expertise in this area by interacting on an ongoing basis’(Wenger et al., 2002: 4). The shape and membership of CoP emerge in the course of activity; they sometimes incorporate people from outside, and may span organizations (Brown and Duguid, 2001). CoP have an organic, spontaneous and informal nature and are resistant to supervision (Wenger and Snyder, 2000). Although such communities are formed naturally (self-organization), it is possible to cultivate their emergence and development (Wenger and Snyder, 2000; Swan et al., 2002; Wenger et al., 2002).

As managers in the same industry, the participants perform many of the same tasks. In network reflection the participants reflect together; one goal of this reflection is to share the meaning of experiences (Mintzberg, 2004). Hence network reflection provides possibilities for the participants to discover that they are united by both action and meaning, which may encourage them to develop mutual activity systems. The participants, all Norwegians, lived in the same region, were managers in the same industry and members of the same network, so that from the outset, they shared regional, professional and industrial identity. During the programme they found themselves to be members of the same group whereby they shared challenges and experiences, and learned the same concepts. This may have developed the sense of a shared social identity that according to Lave and

Wenger (1991) is an important feature of CoP. Wenger et al. (2002) argue that CoP typically start as loose networks that coalesce into a community as members gradually build connections. When the sense of a shared domain develops, the need for more systematic interactions grows. In the early phase members must find enough common ground to feel connected and to appreciate the value of sharing insights and stories. ‘What energizes the potential community is the discovery that other people face similar problems, share a passion for the same topics, have data, tools, and approaches they can contribute, and have valuable insights they can learn from each other’ (Wenger et al., 2002: 71). This passion then needs to be translated into something instrumental in the making of a community. Through all organized and informal interactions that may stimulate participants to form a community, network reflection provides a suitable context for this important discovery phase.

4.4.2 If increases in regional co-operation and communities of practice could be identified, did these influence regional collective learning?

According to Polanyi (1966), new ideas are created in the minds of individuals, but Nonaka (1994: 15) argues that ‘interaction between individuals plays a critical role in developing these ideas’. Membership in CoP is voluntary and CoP organize themselves (Wenger and Snyder, 2000) by following an absolute self-determination, which according to Polanyi (1966: 91) ‘offers each of us the chance of creative originality’. Perhaps that is why members of CoP ‘share their experiences and knowledge in free-flowing, creative ways that foster new approaches to problems’ and promote the spread of best practises (Wenger and Snyder, 2000: 140). In CoP,

knowledge and new ideas may be spread among participants, crossing the boundaries of particular organizations (Powell et al., 1996; Wenger, 1998; Brown and Duguid, 2001). Sometimes people from the same organization do communicate too easily, ‘because together they may be blind to broader meanings. So there are benefits to a community of learning that involves people from different practices. Ideal, perhaps, is a combination of the two communities’ (Mintzberg, 2004: 255). Therefore NoP are seen as critical to innovation (Pinch and Henry, 1999; Brown and Duguid, 2001). In this light, CoP and NoP constitute a base of common or shared knowledge among individuals making up a productive system which allows participants to coordinate their actions in the resolution of the technological and organizational problems they confront. Because network reflection may stimulate participants to form such a community, it is reasonable to believe it to effect regional collective learning intermediately.

4.4.3 Does network reflection influence regional collective learning?

Regional collective learning is a regional capability, and an important source of this capability is shared tacit knowledge (Lawson and Lorenz, 1999; Maskell and Malmberg, 1999). In their argument, Lawson and Lorenz (1999) use Nonaka and Takeuchi’s (1995) idea that innovation should be understood as a collective process and a cycle involving interaction between tacit and articulated knowledge. I intend to start this section by expanding their argument, employing Polanyi’s (1966) theory on how tacit knowledge is shared and articulated to create innovation.

The universe is – according to Polanyi (1966) – filled with potentialities which evoke action, and which may be creatively released as innovations. To see a problem is to see what is hidden; to ‘undertake its pursuit is to see a range of potentialities, believed to be accessible. Such heuristic tension appears to be generated in an alert mind’ (Polanyi, 1966: 89). Wondering about and analyzing why things happen, as occurs in network reflection, is a way to establish this important mindset of alertness. Polanyi (1966) claims that it is by dwelling on things that we understand their meaning. Moreover there are ‘two terms of tacit knowing, the proximal which includes the particulars, and the distal, which is their comprehensive meaning’ (Polanyi, 1966: 34). We may not be able to explain our knowledge of the proximal part; we just rely on our awareness of it originating from the distal part. In our experience, we combine these two terms together in a logical interrelation, and it is from the effect of this experience that we deduce tacit knowledge. If we humans, with Descartes (1637), try to scrutinize too closely the particulars of complex matters, our understanding of the whole entity is destroyed (Polanyi, 1966). This understanding can be recovered by reintegrating the particulars. ‘It is important to note that this recovery never brings back the original meaning’, but ‘may improve on it’ (Polanyi, 1966: 19). On the other hand, the understanding may be irrecoverable. When we humans reflect on why things happen, we start with the meaning which we deduce from the experienced effect. Then we switch between scrutinizing some of the particulars (for example, by including stories from others) and recovery until we find a new comprehensive entity we think is an improvement. When we reflect alone, our own mind and alertness are the only limitations. To reflect together, from the outset we need to have in common some of this tacit knowledge of the particulars, the meaning or the

connections. Managers participating in network reflection certainly have that; but because they are individuals with unique experiences and thoughts, their tacit knowledge will not be quite identical. The differences in their tacit knowledge create the important potential for discovering new combinations in the recovery process, and these new combinations may improve on the process and thereby create new answers to problems.

Polanyi's (1966) and Koestler's (1964) works on creation of new ideas present both similarities and differences. Koestler (1964: 211) suggests that 'the moment of truth, the sudden emergence of a new insight, is an act of intuition' and thus a subconscious process inside of a 'prepared mind'. The new insight is, however, not created out of nothing, a new idea is always a new combination, synthesizing or uncovering of a persons' existing knowledge, experience, ideas or skills (Koestler, 1964). Koestler thus agrees with Polanyi that new ideas arise inside people as new combinations. Moreover, both scholars emphasize the value of spending time on the process, Polanyi being occupied with dwelling on things and Koestler with the valuable period of incubation. Polanyi's dwelling process seems, however, to be more conscious than Koestler's subconscious incubation, but concerning radical ideas Koestler argues that a process of rational thinking must proceed the subconscious process. Finally, Polanyi and Koestler differ significantly on their identification of the source of such creative processes. While Polanyi suggests that the universe is filled with potentialities which evoke action, Koestler proposes the more Platonian view that all ideas are stored in the person's mind, but at different levels of consciousness (Plato, 2001). Polanyi therefore includes input from others, e.g. the experience of another manager, which opens up for the value of interaction.

The interaction process is important, as pointed out by a number of authors (Lave and Wenger, 1991; Nonaka, 1994; Saxenian, 1994; Nonaka and Takeuchi, 1995; Keeble and Wilkinson, 1999; Lawson and Lorenz, 1999; Pinch and Henry, 1999; Brown and Duguid, 2000; Keeble, 2000; Nonaka et al., 2000), but it is crucial to remember that the creation of new ideas happens in the mind of individuals (Koestler, 1964; Polanyi, 1966). Hence the essential value of individual reflection (Schön, 1983). By focusing too much on interaction and co-operation, there is a tendency to underestimate the value of individual reflection. As agreed on by Minzberg (2004: 254), 'learning is not doing; it is reflecting on doing'. Interaction, therefore, is necessary, but not sufficient; to enhance learning and innovation we need a combination of interaction and reflection.

Regional collective learning – the process by which available information becomes useable knowledge – is a dynamic process of the cumulative creation of knowledge freely transferred among economic agents, whatever its origin, by interactive mechanisms based on shared rules, norms, organizations and procedures (Capello, 1999). Labour mobility, intensive innovative interactions with suppliers and customers, and local spin-off mechanisms are found to be the important spatial channels for making information available (Capello, 1999). Network reflection is another such channel; moreover, it influences the regional knowledge sharing. To illustrate my perspective I have developed – in figure 4.2 – a preliminary model.

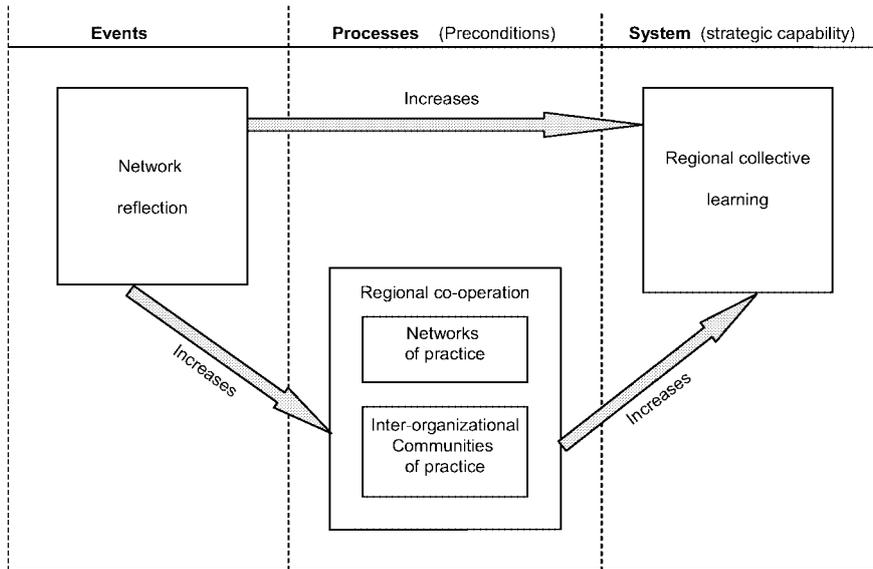


Figure 4.2 Preliminary conceptual model

4.5 Methods

This study is based on case study methodology (Yin, 1984; Eisenhardt, 1989), longitudinal data (Pettigrew, 1990) and some elements of action research (Whyte, 1991; Reason and Bradbury, 2001a). Yin (1984) and Eisenhardt (1989) agree that case is an appropriate research strategy to generate theory, but their use of theory in the design phase differ significantly. While Yin (1984: 28) argues that ‘theory development as part of the design phase is essential’, Eisenhardt (1989: 536) claims that ‘theory-building research is begun as close as possible to the ideal of no theory under consideration and no hypotheses to test’. By starting out with a hypothesis, elaborating research questions and a preliminary model from theory, the design phase of this paper follows Yin’s argument. Since I was

the main lecturer and facilitated most of the interventions myself, I brought together action and reflection, theory and practice in participation with others. These are, according to Reason and Bradbury (2001b), the features of action research. This study is a first step towards theorizing by summarizing the empirical richness of a single case. According to Siggelkow, 'inductive research strategy that lets theory emerge from the data can be a valuable starting point' (2007: 21). A single-case provides the opportunity for unusual research access allowing exploration in a specific population (Yin, 1984); it also provides opportunities to explore and richly describe the existence of a phenomenon (Siggelkow, 2007). Yin (1984) suggests, however, that multiple-case studies typically provide a stronger base for theory-building. Nevertheless, a single-case can be a very powerful example providing a more convincing argument about causal forces than broad empirical research (Flyvbjerg, 1991; Siggelkow, 2007).

Because of the explorative purpose of this paper, the objective here is not to investigate all the qualities of all the processes and outputs, but rather to illuminate some of them. The empirical part lasted 5 years and consisted of 732 hours of work planning and executing the programme-intervention, 391 hours of observation, participation in 44 meetings in Electronic Coast, one questionnaire, 42 telephone interviews and eight personal interviews. The informants were the programme participants and management groups in two of the participants' firms and at the University College.

Co-operation was assessed by counting ties, the bridged structural holes and the frequency of three kinds of contact: face-to-face, telephone, and e-mail. These social network data were collected through a roster rating

questionnaire (Wasserman and Faust, 1994). Each participant was presented with complete lists (rosters) of the participants, 'where ratings were made by choosing one of five possible categories' for each kind of frequency of contact with each participant (Wasserman and Faust, 1994: 48). Each participant was presented with three rosters, one for each point in time: the spring of 2001, the spring of 2003 and the autumn of 2004. Granovetter's (1973) classification system (often, occasionally, and rarely) was used to measure frequency, but the scale was more finely graded to detect several nuances in the frequency.

Ethical challenges may arise in the research process and by use of the results (Gilje and Grimen, 1993). Data collection was carried out by informed consent. All the qualitative interviews were fully transcribed, and all the transcriptions were approved by the informants. In reporting some official facts from the cluster, the firms are identified. In all other reporting of results, informants and firms were made anonymous, e.g. all participants are referred to as 'he' and findings that allow identification of a firm or participant are not used directly.

4.5.1 Analysis

Data were analysed by within-case analysis and were written up in detail for each site (Eisenhardt, 1989), using synergy effects in the data. According to Ring and Van De Ven (1994), the use of an event as the unit of observation permits researchers to focus simultaneously on both individual and organizational units of the analysis. In this study the unit of observation is the network reflection programme, and the units of analysis are relationships on both individual, firm and cluster level.

My experience and practical and theoretical knowledge have been important instruments to identify patterns in the data. When reading and analysing the transcribed interviews, I gathered answers to each question together. Furthermore, to discover results not listed in the interview guide, I identified different categories of quality, using a coding-like procedure (Glaser and Strauss, 1967). I also performed analysis during the interviews and formulated on-the-spot new questions in order to identify themes within the interviewees' stories. Further data from the theses written and tasks performed by the participants during the programme were used in the analysis; methods such as matching and imaginative reconstruction were utilized (McCracken, 1988).

4.5.2 Validity

Although this case may look successful, the findings may be subjected to criticism. The fact descriptions on Electronic Coast and the cluster are confirmed by several central persons in these systems. As the main lecturer performing the programme interventions, I played an important role in the programme. After the programme I recruited participants to network teams, was a member of the nominating committee, the coordinator of the network team Management Academy from 2003-2005, and I was partially involved in one new programme at the Management Academy in 2003. I was not, however, at any time involved in the CoP or in any other reported co-operation other than those mentioned above, although an action researcher from the University acted as a coordinator for one CoP. My wish to describe the programme as a success might have biased the results. In spite of this eventuality, the high rate of participation and completion of the programme,

the lasting weak ties and co-operation activities among former strangers speak for themselves.

This is a longitudinal study; therefore I am analysing, partly in real time, partly in retrospect, and mostly by interviewing people, the effects of a process that started five years ago. Is it possible to presume that we can remember what we did and felt that long ago? Truth is – according to Pettigrew (1990) – a function of time. Koselleck (1985) is more specific and argues that we do remember, but we might remember ‘too much’, i.e. our ‘original memories’ might have been affected by later expectations that have turned into new recollections which are different from our original memories.

4.6 Findings and discussion

In this section, the findings will be handled according to each research question before a more general discussion. The research questions influence the individual firm and the cluster level, but not to an equal extent. The first question concentrates on the individual and firm level, while the second and third questions emphasize above all the network level.

4.6.1 Does network reflection influence the development of regional co-operation and communities of practice?

The development of co-operation was assessed by measuring frequency of three kinds of contact – face-to-face, telephone, and e-mail –, ties and bridged structural holes at three times: spring 2001, spring 2003 and autumn 2004. Factor analysis on frequency loaded significantly on one factor at all three points in time. The reliability of the three kinds of contact showed a

Chronbach's Alpha at 0.88 in 2001, 0.81 in 2003 and 0.89 in 2004. This indicates that the same phenomenon, connectivity, has been measured. The mean values of connectivity, illustrated in figure 4.3, were 3.5 in 2001, 10.2 in 2003 and 8.1 in 2004.

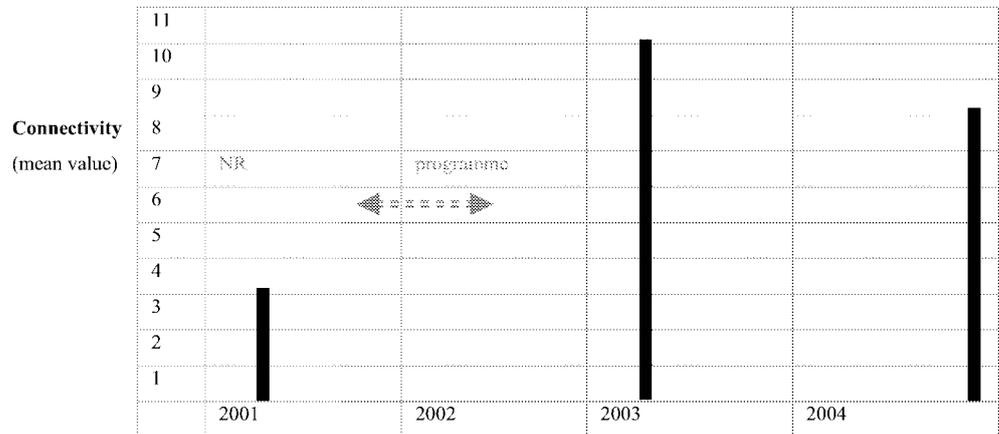


Figure 4.3 Development of Connectivity (n=28)

In 2003 nearly all participants displayed an increase of connectivity. Two participants, however, displayed, a decrease, one because of long-run illness and one because his firm decided to quit their Electronic Coast membership. A third participant showed no change in 2003, but displayed an increase in 2004. The decline from 2003 to 2004 can have at least two explanations. Firstly, four participants attended another programme together at the Management Academy in 2003, which nobody did in 2004. Secondly, starting inter-organizational co-operation is considered as a new routine and hence organizational learning. Levitt and March (1988) view organizational learning as a target-oriented processes that will be adapted in response to feedback about outcomes. Inter-organizational co-operation is a difficult,

frustrating and often misunderstood process (Inkpen, 1996) and the outcome of inter-organizational co-operation often have uncertain returns (Lawson and Lorenz, 1999). Outcomes or feedback about outcomes may therefore be missing. Hence, the target-orientation will likely result in some decrease in inter-organizational co-operation.

Tie strength (Granovetter, 1973) and structural holes (Burt, 1992) were measured to investigate more broadly the distribution of connectivity. Table 4.2 shows the changes.

Table 4.2 Number of strong and weak ties and bridged structural holes (n=28)

	Spring 2001	Spring 2003	Autumn 2004
Number of strong ties	3	3	4
Number of weak ties	45	139	97
Mean value of weak ties	1.6	5.0	3.5
Weak ties % change from spring 2001		209	116
Number of bridged structural holes		94	

Nine months after the programme ended, weak ties tripled. Then the number declined, but is still, 2 ½ year after the programme ended, more than double than prior to the programme. There is virtually no change in the number of strong ties. The large amount of bridged structural holes in the first period indicates that the increase in connectivity consists of mainly new relationships.

The next issue is to investigate whether communities of practice are influenced. This section begins with some quotations about the quality of increased regional co-operation: ‘When I have a problem, I know whom to call’; ‘I have become known to people outside the firm’; ‘I have obtained a phenomenally good network’; ‘It is about trust. Things are easier to do, shorter ways of decision-making’. To be more explicit, I wanted to investigate what happened when participants met. What did they do together? The co-operation among the participants resulted in definite projects and new, or influenced network teams.

There were several definite projects. Participants involved each other in inter-organizational technological development projects which developed and tested prototypes: A Bluetooth sensor for heart monitoring, an electrical wire puller and a remote meter reader. New acquaintances became mentors or discussion partners. Two participants started cooperating in order to take over a bankrupt firm. Many firms needed to adapt their quality systems to a new standard – ISO 9001 – from 2003, and one participant invited all the others to co-operate on this task. A number of joint education projects were started: some firms co-operated in training apprentices in order to address gaps in their respective training courses, and adult workers were inspired to accomplish their certificate of apprenticeship. Additional joint courses were organized in areas like printed circuit boards, crisis psychology and management training, and finally a new programme in project management was organized at the Management Academy in 2003. In these projects people were informally bound together by shared expertise. Although they did not work together, they were engaged in the same or very similar

practice; therefore, the useful contacts are considered to be networks of practice¹⁴.

The participants state that the network reflection programme influenced the network teams Avanse and Production. Human-resource managers from six firms¹⁵ and the public labour-market service co-operate in Avanse on a workforce swap, and problem-solving and learning in human resource. In the other network team, Production, production managers from seven firms¹⁶ discuss and co-operate, on problems relevant for all of them, including organizing, calculating prices and personnel matters. Avanse, on the other hand, existed before the programme, but was influenced by it; the group recruited a new member and the agenda was extended to solving human resource problems together. Production started after the programme, partly because the firms' production managers wished to continue to co-operate. Both teams have personal membership and everyone is assumed to contribute actively. They never take minutes and have agreed to keep everything confidential. In these close inter-organizational teams – by use of reflection, knowledge sharing and advisory roles – they discuss and solve real-life cases. Moreover, 'the Management Academy' has developed to a brand inside Electronic Coast, and the participants are proud of having been a part of the process. A sense of a shared social identity, which is an important feature of CoP (Lave and Wenger, 1991), has therefore developed among the participants. Avanse and Production are, four years after the

¹⁴ Most of the firms participating in these NoPs are located in Horten. Three firms are located in the neighbour municipality, one firm at 30 km, and the last one at 50 km south of Horten

¹⁵ All these firms are located in Horten

¹⁶ Six of these firms are located in Horten, the seventh is located 50 km southward from Horten

programme ended, strong and stable communities presenting a high level of trust, participation and learning. Participants are informally bound together by shared expertise and passion for joint tasks. They are groups of people – with an organic nature – that share a concern and a set of problems, deepen their knowledge and foster new approaches to problems. They work together on a joint workforce swap and various real-life case-based learning activities, solve problems and promote the spread of best practice. Hence both teams are considered to be communities of practice.

During the programme, the participants discovered that the firms were not competitors on the product market, but rather on a different one: The market for competent-labour. This discovery resulted in the appearance of the human-resource-system, as an extension of Avanse. The paradox of the discovery of competition leading to co-operation is also acknowledged elsewhere, e.g. in Silicon Valley (Saxenian, 1994).

New or energized network teams and several definite projects arose from the network reflection programme. I consider these inter-organizational communities to be examples of emerging CoP and NoP. However, because of their regional context and inter-organizational features, the communities seem to be something between CoP and NoP, which I will term regional communities of practice.

The answer to the first research question is that network reflection influence the development of regional co-operation and communities of practice in this case. Influence on development of regional co-operation is made probable by increased connectivity, increased number of weak ties and

bridged structural holes. Influence on development of CoP is confirmed by emerging NoP and CoP, both termed as regional communities of practice.

4.6.2 If increases in regional co-operation and communities of practice could be identified, did these influence regional collective learning?

Indeed, there were increases in both co-operation and in development of regional CoP, but did these influence regional collective learning? Co-operation in definite projects, such as using each other as mentors and organizing courses together, represent inter-organizational productive systems which allow co-ordinated actions of technological and organizational problems. The firms need skilled workers, and because each firm operates in narrow technological niches, gaps in training apprentices were a problem. In this respect, using participants' new knowledge on regional firms and acquaintances to organize circulation of trainee places constitutes a co-ordinated action to a common problem. Moreover, by the new ways of inspiring employees to accomplish their education, the firms have co-ordinated their actions to organizational problems. Finally, by developing the prototypes together, the firms have co-ordinated their responses to technological challenges. Therefore, the definite co-operation projects seem to have influenced regional collective learning.

The CoP also influenced regional collective learning. In the electronics industry, large variations in production volume are normal; consequently, a fairly unique internal system for swapping workers between the firms has been established in Avanse. This productive system, co-ordinating a common organizational problem, affords the firms the following

competitive advantages: savings from avoiding temporary redundancies and layoffs in low production periods; savings from reducing turnover costs for recruitment and training; faster production increases and thus faster deliveries; increased worker safety; reduced uncertainty and thereby easier recruitment. In human resource, the other Avanse activity, two participants illustrate the benefits by saying ‘We have reached a point where we can discuss difficult personal issues’ and ‘You get very honest feedback’. The discovery of being competitors on the competent-labour market has inspired one firm practicing shift work to take extra care of its workers. Using their most experienced shift workers’ knowledge, they have produced a handbook on how to handle irregular working and sleeping times. In the wake of their co-operation in Production, three of the participating firms have reorganized their production division, from a foreman-based to a team-based structure. This reorganizing has resulted in, for instance, increased capability of delivering on time. Moreover, real-life cases are discussed and solved in Avanse and Production. This is of great interest because learning from cases is a complex and valuable learning process (Gustavsen et al., 2001: 245). The members report finding these groups very useful because of great learning returns, or as two of them said: ‘You actually get something in return for showing up’ (Avanse) and ‘We share experiences and guide each other in a way, and we manage to learn a little from each other’ (Production). Therefore, a base of shared knowledge among individuals, allowing them to co-ordinate their actions and solve their problems, is further developed in these CoP.

The answer to the second research question is that increases in regional co-operation and regional communities of practice seem to have influenced

regional collective learning, due to the co-ordinated solving of some technological and several organizational problems.

4.6.3 Does network reflection influence regional collective learning?

Increased access to resources and time-saving are important findings. Three participants report examples: ‘When I have a problem, I know whom to call’; ‘It is about trust. Things are easier to do, decision-making takes shorter time’; ‘When I get in contact and ask for something, I am prioritized’. When people become connected, like in network reflection, information about ‘who knows what’ and ‘who knows what to do’ may be accessible. Lundvall (1996) denotes such know-who¹⁷ knowledge as becoming increasingly important in the learning economy. The increased know-who competence thus influences the productive system to co-ordinate actions, by making it working better and faster.

Reflecting seems to be a common feature of several of the regional communities, i.e. Avanse, Production and mentoring. Therefore, elements of the network reflection method appear to be partly adopted by the participants. These collective reflections are very important sites for the accumulation and the creation of knowledge, and represent a kind of reflective practice (Schön, 1983). Because reflection is a prerequisite for learning (Polanyi, 1966; Schön, 1987; Brown and Duguid, 1991), it increases knowledge creation in the productive system of regional collective learning.

¹⁷ The concept of know-who knowledge was first launched by G. Ryle (1949)

By participating in the same class, the participants have learned the same concepts, rely on the same literature and lectures as mutual backdrops for communication, and may have developed some elements of common language. Because it makes translating external information possible to the firm, common language is another precondition to regional collective learning (Lawson and Lorenz, 1999).

Directly after the programme ended, the Electronic Coast board and the only active team started to work on establishing Electronic Coast as an association. They succeeded, and in the spring of 2003 Electronic Coast was established as an association with several of the former programme participants as active members, including the chairman of the board. Since 2003 a network manager¹⁸ has effectively taken the leadership, the web-site is updated and electronic news-letters are produced every month. In the autumn of 2007 eight network teams¹⁹ are registered as active, four of them building on relationships established at the programme. The influence of the programme on the network activity is illustrated by the following quotation²⁰ from the president of the University College, member of Electronic Coasts' board from 2003 to 2006 and one of the initiators of the Electronic Coast project in 1998:

¹⁸ Working part-time, 50%

¹⁹ Materials management & Logistics, Product-design, the Management Academy, Production, Encapsulation technology, Competence, Team-coordinator group (Electronic-Coast, 2007) and Avanse (those underlined are building on relationships from the programme)

²⁰ This quotation was reported in an interview with another researcher who identified learning arenas in the cluster (in 2004)

The first programme at the Management Academy appears now [in 2004] to be the crucial element in several of the teams that are now emerging inside these networks. It was the right people who were there, and they have continued to work on, use, and expand the programme. In this respect, the programme has been very important. It is not essential to involve a lot of people.

The increased connectivity and community building after the network reflection programme was mostly developed by the participants by contacting each other. As one participant said, 'We did homework together and handed in assignments together, and became very close. You stay in touch with those with whom you had the closest contact'. Thus all co-operation and teams have grown organically from the inside, in contrast to the situation in 2001 when a project financed by the government tried to develop Electronic Coast from the outside. This is worth-noticing because, according to Gustavsen et al. (2001) and Brown and Duguid (1991), the most innovative networks and communities are those that grow organically, and hence are more natural systems (Checkland, 1999). Thus Electronic Coast is a more natural productive system with increased innovative capacity.

The Management Academy and the network reflection method themselves represent new productive systems of shared knowledge with the purpose of co-ordinating actions. The cluster has, however, not succeeded in utilizing these systems to any great extent. It is still problematic to recruit applicants to the Management Academy, and the method of network reflection is not fully repeated.

In 2002-2003 the rate of industry closures was high in Norway, and there was a certain sense of crisis. This crisis was expected to strike the cluster, a threat which the cluster met by initiating a project together, called AKOM. In the spring of 2003 the chairman of Horten proposed to start a joint project for unemployed workers from the electronics industry in order to keep know-how in the region, stimulate entrepreneurship, and supply the workers with new skills. Only two months after the chairman's proposal, the AKOM project was in business, financed as a Dutch treat by the actors – the electronics industry, Horten municipality, Vestfold County, the public labour-market service and Vestfold University College. These actors, representing different organization cultures and systems for decision-making, worked together in a fast and effective way. Due to improved economic trends and reduced need, AKOM was terminated in the autumn of 2004. In their evaluation, both the workers and the actors involved judged AKOM to have been successful. This project – partly built on relationships and experiences from the network reflection programme – demonstrated that shared knowledge created swift systems to coordinate actions aimed at confronting common problems. Therefore network reflection seems to have influenced regional collective learning.

Instead of being stricken by the crisis in 2002-2003, the cluster showed signs of a weak upturn in the following years. Between 2002 and 2005 the number of electronics workplaces in Horten increased by 25%, while similar industry elsewhere in Norway lost 20% of their workplaces (Onsager,

2005). Some of the firms were sold to multinational companies²¹. One important reason why at least one of these companies kept their plant in the peripheral and high-cost country of Norway, was the firm's membership in the regional knowledge system described in this paper²². Moreover some small start-ups emerged, and 8 new firms²³ were established in Horten. The cluster is now, because of considerable local co-operation among the firms, considered as a well-functioning regional cluster (Onsager, 2005). In 2006 the cluster, the University College and Electronic Coast were recognised as the Norwegian Centre of Expertise (NCE) – Microsystems, a prestigious fund-rewarding classification assigned to vigorous Norwegian clusters. In the autumn of 2007 nearly all the firms are in the process of recruiting more staff, the three largest firms²⁴ are world-leading within their niches, some of the new firms are growing fast and the cluster seems to be undoubtedly robust.

The answer to the third research question is that network reflection has influenced regional collective learning by way of increased access to resources, time saving, augmented reflection activities, elements of common language, considerably increased activity in Electronic Coast, and the establishment of Electronic Coast as an association and a more natural system. Finally, shared knowledge is employed in the creation of swift systems to coordinate actions aimed at confronting common problems.

²¹ Because of their inclusion into large multinational companies, these are not SMEs any more

²² Information from group interview with the firm's management group, January 19th 2005

²³ Two developing and manufacturing firms, Ignis ASA and Medisteam, and six developing firms with outsourced production

²⁴ Infineon Technologies SensoNor AS, Kongsberg Maritime AS and GE Vingmed Ultrasound AS

4.6.4 Discussion

Table 4.3 provides an overview of the quality of the activities and some indications on regional collective learning.

Table 4.3 Qualities and output of network reflection and increased regional connectivity

Quality / Process	Output / Indications of Regional collective learning
<p><i>Communities of Practice</i></p> <ul style="list-style-type: none"> - Avanse - Production 	<p>Inter-organizational productive system</p> <ul style="list-style-type: none"> • Swapping workers • Shared knowledge and co-ordinated actions to solve human resource problems <p>Inter-organizational productive system</p> <ul style="list-style-type: none"> • Shared knowledge and co-ordinated actions to solve technological and organizational problems <ul style="list-style-type: none"> ○ Re-organized production divisions
<p><i>Networks of practice</i></p> <ul style="list-style-type: none"> - Development of prototypes - New discussion partner or mentor - Co-operating intaking over bankrupt firm - Quality management group - Training apprentices - Joint education projects - Planning and organizing different courses together 	<ul style="list-style-type: none"> • Coordinated actions to meet technological challenges • Shared knowledge among individuals to solve organizational problems • Inter-organizational productive system • Co-ordinated actions to solve organizational problems • Skilled workers • Educated employees
<p><i>Network reflection</i></p> <ul style="list-style-type: none"> - Reflection alone and inter-organizationally, on challenges within the firms. Frequent and collaborative communication sharing expertise and tacit knowledge - Increased know-who competence - Building of trusting relationships 	<p>Firms</p> <ul style="list-style-type: none"> • Access to resources and time-saving • Handbook for shift workers • Reflective practice <p>Electronic Coast</p> <ul style="list-style-type: none"> • Survival of the Electronic Coast network • Establishing the Electronic Coast Association • Electronic Coast as a more natural system • Network teams increased from 2 to 8 in 2001-

<ul style="list-style-type: none"> - Development of elements of common language - Increased knowledge about other firms in the cluster - Increased inter-organizational co-operation - Discovery of being competitors at the competent-labour market - Discovery of common problems, and the benefit of inter-organizational co-operation to solve them 	<p style="margin-left: 20px;">2007</p> <ul style="list-style-type: none"> • Influenced 4 network teams directly • The Management Academy <ul style="list-style-type: none"> ○ Network reflection <p style="margin-left: 20px;">Cluster</p> <ul style="list-style-type: none"> • Common project for unemployed workers aimed at confronting an expected crisis (AKOM) • The industry crisis in 2002-2003 did not strike • Weak upturn and robust cluster • No firms acquired by foreign owners
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The findings indicate that network reflection seems to have a capacity to increase regional co-operation and to influence the development of regional communities of practice, and both directly and intermediately to influence regional collective learning. The evidence of a ‘high-learning’ regional milieu is likely to be a high rate of spin-offs, firm product and service innovation (Keeble, 2000). These rates do, however, not appear to be high in this cluster. ‘There is a considerable evidence that development of successful local networks and linkages, and of consequent collective learning capacity, is time- and ‘critical mass’-dependent’ (Keeble, 2000: 216). Time-dependent implicates that such capacity needs long time, often decades, to develop (Keeble, 2000). Critical mass implicates that the amount of linkages needs to reach a sufficiently high, albeit unknown, level before the effect appears. It is reasonable to believe that the influence of increased regional collective learning in recent years has affected the clusters’ robustness and increased innovations to some extent. More time and network linkages are, however, still needed to release a ‘high-learning’ regional milieu.

Keeble (2000) explains the increased importance of regional co-operation to high-technology SMEs in the globalized world by their need for research networks. Consequently, it is crucial that research networks co-ordinate their actions in solving technological and organizational problems. IMST and NCE – Microsystems constitute research networks on technological problems for the participating micro-technology firms. Because many of the firms are research-intensive on developing technologies themselves (Isaksen, 1999), inter-firm co-operation may also constitute technological research networks. Since organizational problems are equally important to regional collective learning as technological ones, there is a need for organizational research networks.

Participating in the new communities changed the firms' networking activity. Two of the participants' firms merged during the program. Five of the remaining 13 firms were active network members before the course started. One of them became non-active afterwards because they quit their Electronic Coast membership. Participants from six of the non-active firms before the programme participated actively in regional CoP 2 ½ year after the programme ended, therefore the density of the knowledge network (Giuliani, 2007) increased.

In high-cost countries, like Norway, 'the ability to engage in interactive learning processes within localised industrial systems is the main option to sustain prosperity' (Maskell et al., 1998: 70). Interactive learning processes definitely happen in regional CoP. Thus, the need for more interventions and activities aimed at cultivating regional CoP, leading to the amount of linkages necessary to reach a system of critical mass, is indeed great.

According to Gustavsen et al. (2001: 253), 'If innovation is our interest we cannot stay content with 'interpreting' the actors in terms of what they bring with them, we need to put a main emphasis on what happens when they meet'. The latter issue is emphasized in this study, which has tried to describe events such as network reflection interventions and processes such as regional CoP at the micro level.

Brown and Duguid (2001) argue that NoP may inhibit the flow of knowledge. There is a risk that ideas and information that can be disadvantageous for the network members may be resisted or even stopped, and that lock-in effect (Grabher, 1993) may take place. I also see a danger that the workforce swap may be a pretext for doing nothing and therefore inhibit the innovative power in crisis, well-known as creative destruction (Schumpeter, 1942).

It is necessary to discuss alternative explanations to the empirical findings. First of all, it could be argued that the choice of programme method is not very important with respect to the results. Traditional programme methods mostly consist of lectures and thesis-groups, and the traditional role of the lecturer is teaching and advising. However, the method of network reflection in this case does make a difference because, as I have shown, network reflection is a theoretically well-founded, deliberate system of interventions, consisting of activities connecting people, building relationships and facilitations of knowledge sharing. Secondly, other events may explain the presented outcomes. Other programmes at the Management Academy, for instance, may have exerted some influence. Only one more

programme, however, was accomplished in 2003, then the programme activity subsided until 2006. Moreover, the 2003 programme utilized but a few elements of network reflection. The emergence of Institute for MicroSystemTechnology (IMST) at the University College in close co-operation with the micro-technology firms may have influenced the cluster. IMST was established in 2003, and in the autumn of 2007 32 researchers are registered as active. The co-operation between 14 micro-technology firms, the University College and Electronic Coast to achieve the status as NCE – Microsystems may also have played a role, although IMST and NCE represent a kind of co-operation aimed at technological improvement, not at cluster development, and definitely not at regional development. Thirdly, the participants' statements might be biased, prejudiced, partial, influenced and/or subjective. Truth is a function of time and the short euphoric period that characterized the time right after the end of the programme has long since vanished. On the basis of rigorous and longitudinal research methods, it is reasonable to believe that I have measured the lasting effects. The present paper also has the strength of a single-case, which can be a powerful example providing convincing arguments about causal forces (Flyvbjerg, 1991; Siggelkow, 2007) and capacities (Bhaskar, 1978).

4.7 Concluding remarks

This case study of a network reflection intervention and its longitudinal effects on forming regional co-operation in a Norwegian cluster association of high-technological SMEs has found that network reflection increased the co-operation considerably. In addition to inter-organizational communities of practice, the development of networks of practice was found to occur. Moreover – because of the regional context and inter-organizational feature

– these communities seem to be something between communities of practice and networks of practice, which I have termed regional communities of practice. The increases in regional co-operation and regional communities of practice appear to have influenced regional collective learning, by way of co-ordinated solving of some technological and several organizational problems. Network reflection seems to have influenced regional collective learning by ways of increased access to resources, time saving, augmented reflection activities, elements of common language, considerably increased activity in Electronic Coast, and the establishment of Electronic Coast as an association and a more natural system. Finally, shared knowledge is employed in the creation of swift systems to coordinate actions aimed at confronting common problems. On the basis of these findings, I have developed – in figure 4.4 – a revised conceptual and empirical model. Because systems like regional collective learning have the capacity to influence events, the arrows in the model have to point both ways, constituting a reinforcing system.

Network reflection also seems to have a capacity to increase the knowledge linkages and the density of a knowledge network. This study does, however, not measure the firms' knowledge base, and it is therefore not possible to determine if these increases are due to the size of the knowledge base of the new-linked firms, as Giuliani (2007) argues.

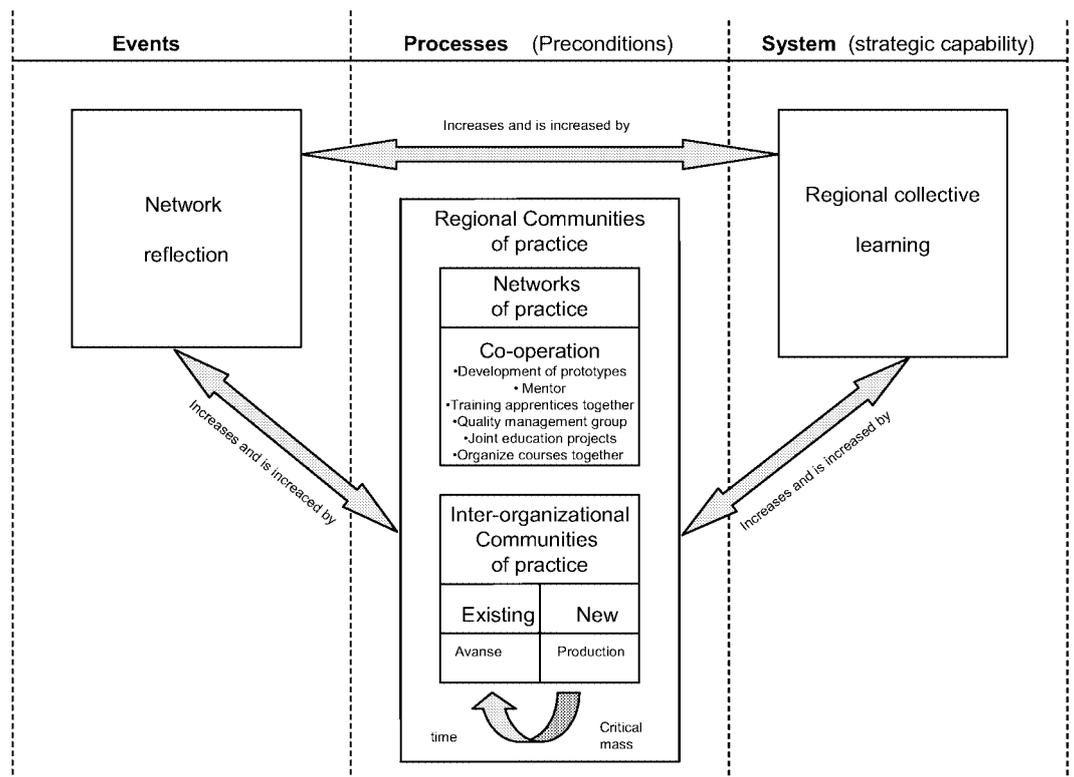


Figure 4.4 Revised conceptual and empirical model

This study is generalizable to theoretical propositions. Because of the explorative purpose, however, the objective is not to investigate all the qualities of all the processes and outputs, but rather to illuminate some of them. As the paper does not enumerate frequencies, statistical generalizations can not be provided. Nevertheless, by starting off with theories whose domain is enlarged by means of a case, this study provides analytical generalizations (Yin, 1984). Network reflection is conceptualized by theoretical inspiration of concepts from knowledge creation,

organizational learning, trust, action research and management education. The study extends to the regional level concepts developed by Lave and Wenger (1991), Brown and Duguid (2000), Nonaka (1994), Levitt and March (1988), Polanyi (1966) and Mintzberg (2004) and analyses the development of regional collective learning. This paper challenges communities, cluster and knowledge creation theory by focusing on the need for reflection. Finally, by providing a process focus at the micro level, it addresses the lack of empirical examination on how to develop inter-organizational communities of practice and co-operation to enhance regional collective learning.

Since regional communities of practice influence regional collective learning, firms, cluster associations, universities and regional governments need to be more proactive and systematic about cultivating them. Propris (2002) asserts that innovation policy promotes inter-firm linkages, and since cultivating regional communities of practice is one way to achieve this aim, cultivating regional communities of practice ought to be included in innovation policy. Since network reflection seems to have a capacity to increase regional co-operation, regional communities of practice, regional collective learning, knowledge linkages and the density of a knowledge network, implementing such intervention into practice or policy may prove useful. In this respect, the findings have practical implications for policy makers, clusters, firms and universities in general, and especially for regions with high-technological SMEs.

The findings and exploratory analysis need to be followed up, and the model needs stricter testing. The paper indicates that increased regional collective

learning leads to economic development and increased competitiveness. Indeed, this economic impact calls for a more comprehensive examination. Because trust is essential for innovative collaboration (Keeble, 2000), it is important to explore the development of trust in this case. The new role of the university, facilitating interventions triggering people-based informal links and knowledge-sharing, raises many questions, also of an epistemological nature, which need to be addressed and followed up. This study shows some capacities of network reflection. The reason why these capacities were realized in this single case may be due to particular features, e.g. the situation in Electronic Coast or the participants' personality. Therefore it would be valuable to utilize the method in a different setting. Network reflection, on the other hand, is not yet a fully developed concept; hence further conceptualizing is necessary and auspicious in the future.

5. Paper 2 - Developing Regional Communities of Practice – The Role of the Regional University

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5.1 Introduction

Regional co-operation is an important condition for innovation, and this paper explores one way to develop such co-operation. The current debate on developing regional systems to enhance innovation includes interest in such co-operation concepts as regional innovation systems (Lundvall and Johnson, 1992), clusters (Porter, 1998a) and triple helix (Etzkowitz and Leydesdorff, 1997). However, some critics argue that these concepts are too vague to be of any real guidance in enhancing innovation in a regional context (e.g. in Miettinen, 2002). Within this debate the role of the regional university is both emphasized and challenged, but is still unclear. Hence the research question dealt with in this paper is: How can regional forms of co-operation that enhance innovation be developed, and how can the regional university assist in this development? To answer this question requires a discussion both of aspects related to mechanisms and processes leading to innovation in a regional context, and the role of the university.

Communities of practice (CoP) play a critical role in the debates on innovation (Swan et al., 2002); they represent processes and a more narrow focus. Network reflection is a way of conducting inter-organizational executive courses, and may be a mechanism – implemented by the regional university – that triggers the development of regional CoPs which in turn may lead to innovation. Hence this paper focuses on network reflection and CoPs. Network reflection is a new concept, developed in this project.

This paper contributes to several debates. The debates on co-operation concepts such as regional innovation systems, clusters, and triple helix emphasize the regional university's role; regional universities are challenged to institute forms of co-operation that energize networking (Brulin, 2001). This paper discusses one way to meet this challenge. It also contributes to the debates on how to stimulate development of inter-organizational CoPs which have rarely been examined empirically (Swan et al., 2002). Besides filling this empirical gap, it enlarges these CoP debates by introducing the role of the regional university as a new element. Finally it contributes in the debates on management education. This paper contributes to these debates through a case study of the longitudinal effects of network reflection set in the context of a regional network of the electronics industry.

The purpose of this paper is to explore and imply possible effects, not to test hypotheses. To strengthen the findings, both qualitative and quantitative methods are utilized; however, because of the explorative purpose, qualitative analyses – interviews, observations and interventions – are most emphasized. My claim is that – although it is difficult to govern the

development of CoPs – network reflection may be a mechanism that triggers the development of regional processes and communities which may enhance innovation.

5.2 Theory and research model

The main concepts underlying this study are defined as follows. *Innovation* broadly defined is “Any idea, practice or material artefact perceived to be new by the relevant unit of adoption” (Zaltman et al., 1973:10). What is perceived as new can be products, services, production methods, markets, suppliers, and organizational methods (Johannessen et al., 2000). Hence the focus is not merely on products. The capability to innovate successfully appears to be strongly conditioned by the accumulation of specific internal and external knowledge (Antonelli, 1996). Innovative activities cannot, however, be reduced to a simple process of information acquisition (Levinthal and March, 1993) and transfer of knowledge. Social interaction is essential in the early phases of knowledge creation (Nonaka, 1994), and therefore crucial to the innovation process. Innovation may be considered as a process of percolation, i.e. as the outcome of receptivity and connectivity (Antonelli, 1996). Receptivity measures the capacity to absorb information and *Connectivity* represents social interaction and “measures the number of connections in place among the agents in the network” (Antonelli, 1996:282).

A *community of practice* (CoP) is: “An activity system about which participants share understandings concerning what they are doing and what that means in their lives and for their community. Thus they are united in both action and in the meaning that that action has, both for themselves, and

for the larger collective” (Lave and Wenger, 1991: 98). The shape and membership of CoPs emerge in the course of activity; they sometimes incorporate people from outside, and may span organizations (Brown and Duguid, 2001). CoPs have an organic, spontaneous, and informal nature and are resistant to supervision. Although such communities form naturally (self-organization), it is possible to cultivate their emergence and development (Wenger et al., 2002).

Network reflection is a way of conducting inter-organizational, part-time, customized executive courses. It is a new concept composed of *network* for inter-organizational network activities and *reflection* for Mintzberg’s experienced reflection concept. Experienced reflection is “wondering, probing, analyzing, synthesizing and connecting” about why things happen and how situations are both similar and different from other situations (Mintzberg, 2004:254). This requires struggling with theoretical models and experience during the executive courses; people need to be curious, alert and engaged. The participants need to reflect alone, collectively in small groups and during class. “It is critical that this reflection alone be allowed to happen on the manager’s own terms” (Mintzberg, 2004:255). Hence the cases must be the participants’ very own. The *network* part of the concept is different from experienced reflection; it consists of several network actions, e.g. inter-organizational thesis groups working on projects in the enterprises and writing theses together. Moreover, it involves seminars at which ad hoc inter-organizational groups, created by the main lecturer, work with reflection tasks. Furthermore, these seminars involve enterprise presentations, plant visits and network news. Network reflection served as a mechanism for increasing processes such as connectivity and the emergence

of CoPs after the network reflection course ended, and may thereby have influenced innovation.

During the course, participants became acquainted by interacting in reflection tasks, thesis groups, a lunch intervention and the informal part of the program. The participants get to know their colleagues' contexts rather well by sharing actual experiences from each others practices. This knowledge may be utilized in making new contacts with co-participants later, when this knowledge is useful. By reflecting together on their own practices, they probably discovered that managers have a lot to learn from each other (Mintzberg, 2004). This discovery may encourage the participants to contact each other after the course. Hence the first proposition (pr1): *Did network reflection increase connectivity over time?*

As managers in the same industry they perform many of the same tasks. In network reflection the participants reflect together; one goal of this reflection is to share the meaning of experiences (Mintzberg, 2004). Hence network reflection provides possibilities for the participants to discover that they are united by both action and meaning, which may encourage them to develop mutual activity systems. During the course they were members of the same group whereby they shared challenges and experiences, and learned the same concepts. This may have developed in them the sense of a shared social identity that according to Lave & Wenger (1991) is an important feature of CoPs. CoPs typically start as loose networks that coalesce into a community as members build connections. When the sense of a shared domain develops, the need grows for more systematic interactions. Members must find in the early phase enough common ground

to feel connected and to see the value of sharing insights and stories (Wenger et al., 2002). I claim that network reflection, through all organized and informal interactions, provides a suitable context for establishing this common ground that may energize participants to form a community. Hence the second proposition (pr2): *Does network reflection influence the development of inter-organizational CoPs over time?*

Polanyi (1966) argues that new ideas are created in the minds of individuals, but according to Nonaka (1994:15) “interaction between individuals plays a critical role in developing these ideas”. When different kinds of knowledge are connected in new ways in human processes, one gets new combinations, which form the core of innovation. Membership in CoPs is voluntary and CoPs organize themselves (Wenger and Snyder, 2000) in accordance with absolute self-determination which according to Polanyi (1966:91) “Offers each of us the chance of creative originality”. Perhaps that is why members of CoPs “share their experiences and knowledge in free-flowing, creative ways that foster new approaches to problems” and promote the spread of best practices (Wenger and Snyder, 2000:140). Brown & Duguid (1991) view learning as the bridge between working and innovating, and argue that developing CoPs are significant sites of innovation. *Networks of Practice* (NoP) is a sub-concept of CoP. The relations among NoPs’ members are significantly looser than relations within CoPs. NoPs’ members don’t necessarily work together, but they are engaged in the same or very similar practice, and share a great deal of insight and implicit understanding (Brown and Duguid, 2000). NoPs shape conditions where new ideas can circulate, but they circulate through similar practice, not through collaborative, coordinated practice and direct communication as in a CoP. In CoPs,

knowledge and new ideas may be spread among participants, crossing the boundaries of particular organizations (Brown and Duguid, 2001). Sometimes people from the same organization do communicate “too easy, because together they may be blind to meanings. So there are benefits to a community of *learning* that involves people from different practices. Ideal, perhaps, is a combination of the two communities” (Mintzberg, 2004:255). Hence the third proposition (pr3): *If increases in connectivity and development of CoPs could be identified, did these enhance innovation?*

To illustrate my perspective I have developed – in Figure 5.1 – a preliminary model.

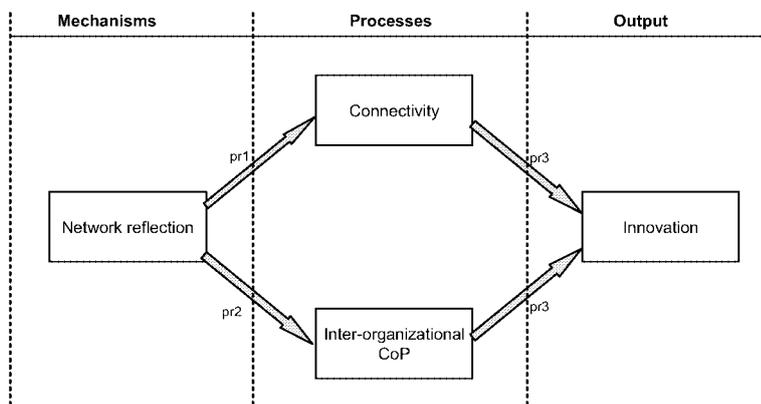


Figure 5.1 A preliminary conceptual model

5.3 Case description

The context of the case study was the Electronic Coast (EC), an association in the Vestfold region of Norway committed to arena and network building with the aim of promoting growth and innovation in the region’s electronics-based enterprises. The around 95 enterprises, most of which are

sub-suppliers, are classified as SMEs; in total they employ about 2,500 people. This is a modern, high-tech and research-intensive industry that has an export rate of approximately 90%, and competes in the global market. In 2001 the enterprise representatives in EC wanted to establish a common management course to improve management practices and increase networking. The result of this initiative was the establishment of the “Management Academy” in co-operation with Vestfold University College.

The case selected for this study is the first course at the Management Academy, which was entitled Managing Knowledge. It was a part-time course (15 ECTS) which lasted from September 2001 to June 2002. The 27 participants – 7 women and 20 men – were a mixed group from 15 enterprises. The course’s objective was to support increased knowledge creation in the enterprises. The content and study methods were tailored to the participants’ expectations. Detailed planning was an ongoing process involving reflection between the main lecturer (myself) and an advisor. The course consisted of eight seminars most of which were held during the daytime; one seminar involved an overnight stay at a retreat. At every seminar, enterprise presentations and network news were agenda items.

The reflection tasks were organized in inter-organizational groups which were different for each seminar; hence, during the course all the participants had an opportunity to interact with each other. Moreover they had been reflecting and discussing experiences with colleagues from different enterprises; all participants had the same concepts and lectures as a mutual backdrop. Participants – organized in inter-organizational thesis groups –

wrote a thesis dealing with practical challenges within the enterprises. For example, one group consisted of participants from four enterprises and their task was to identify the core competence in one of the enterprises. In the reflection session, they acknowledged that they benefited from co-operation with outsiders in seeing the problem from new angles. They also reported that participants in their group had a great deal of openness, trust and spirit.

In their final evaluation of the course the participants gave high marks to the course's relevance to their own work situations and to its emphasis on network building and self-development. The attendance at the seminars was high, all the participants completed their theses and nearly all of them (26 of 27) took and passed a final examination with good results.

5.4 Methods

The present study is a longitudinal case study involving triangulation of methods – interventions, features of ethnography, and some quantitative methods – but mainly focusing on qualitative methods. The empirical part lasted 5 years and consisted of 841 hours of work on two big interventions, 391 hours of observation, participation in 44 meetings, 42 telephone interviews and 8 personal interviews.

The empirical study consisted of five phases: *Phase 1*, involving 732 hours of fieldwork, began in February 2001 with the planning and execution of a big intervention, which was followed by the network reflection course which took place from September 2001 to June 2002. *Phase 2*, involving 391 hours of fieldwork, consisted of network participation and observations

of network activity. I was the coordinator of one network team from June 2002 to December 2005 and participated in 7–11 network meetings yearly. In *Phase 3*, involving 109 hours of fieldwork, I performed another big intervention which consisted of my being engaged in AKOM²⁵ from August 2003 to June 2004. *Phase 4*, consisting of three parts, was carried out between October 2004 and January 2005: *a*) Connectivity was measured by participants' responses to a questionnaire in telephone interviews of all the participants and the main teacher *b*) The quality of increased connectivity was measured by participants' responses in open-ended transcribed telephone interviews with those participants who had increased connectivity; *c*) The quality of network co-operation was measured by participants' responses in personal open-ended transcribed interviews of a stratified sample of three groups of enterprise and university managers. Recording interviews in Phase 4a involved filling out a questionnaire; recording in Phases 4b and c involved taking handwritten notes and transcribing them within 24 hours. *Phase 5* consisted of long interviews (McCracken, 1988) of a stratified sample of five participants which were performed in January and February 2006. To make contrasts in the respondent pool, the interviewees were chosen according to their level of connectivity, executive position, education, gender, enterprise and occupation. The interviews lasted between 1 and 2 hours, were performed by an interview guide, sound-recorded and fully transcribed.

Connectivity was assessed by frequency of three kinds of contact: face-to-face, telephone, and e-mail. The scale used to measure the frequency was based on Granovetter's (1973) classification system (often, occasionally,

²⁵ A project for unoccupied labour

and rare), but was more finely graded to catch several nuances in the frequency. The 6 points on the scale were: 0 (no contact at all), 1 (once yearly or less), 2 (between once and four times yearly), 3 (between four times and twelve times yearly), 4 (between once a month and twice a week), and 5 (at least twice weekly). Frequency was measured at three times: spring 2001, spring 2003 and autumn 2004.

Analysis: My experience, practical and theoretical knowledge and imagination have been important instruments to identify patterns in the data. When reading and analysing the transcribed interviews, I sorted out different categories of quality, using a coding-like procedure. Then I analysed the output and kept qualities leading to innovation only, hence removing trust, interpersonal knowledge, friendship and motivation from further analysis. I also performed analysis during the interviews, using all my knowledge and experience from the field to assess the answers and, on the basis of that assessment, to formulate on-the-spot new questions in order to identify themes within the interviewees' stories.

Validity: This case may look successful, but there can be criticisms of the findings. I found some indications that the participants' enthusiasm for the course might have had something to do with the novelty of the process; indeed, I think their enthusiasm was important at several stages, and may have influenced the results. As the main lecturer, I played an important role in the course and in some other networking activities. I recruited participants to network teams, and hence influenced some of the connectivity. I was also involved in AKOM and in one new course at the Management Academy.

But I was not at any time involved in AVANSE²⁶, PMT²⁷ or in any other ‘useful contacts’ than those mentioned above. My wish to describe the course as a success might have biased the results. Despite the above, I argue that the lasting increased connectivity and the continuation of the CoPs speak for themselves.

5.5 Findings and discussion

I will now present and discuss the findings, and develop a revised model.

I start with focus on the first proposition: *Did network reflection increase connectivity over time?* Factor analysis loaded significantly on one factor at all three points in time. The reliability of the three types of contact showed a Chronbach’s Alpha >0.8, which indicates that the same phenomenon, connectivity, is measured. The mean values of connectivity were 3.5 in spring 2001, 10.2 in spring 2003 and 8.1 in autumn 2004. During the nine months after the network reflection course ended, connectivity increased 196%. Then it declined somewhat (21%), but is still, 2 ½ year after the course ended, 135% higher than before the course. The increase in connectivity was not evenly distributed, but was rather mainly caused by 15 of the participants. Eight participants displayed almost no change in connectivity whereas five displayed a decrease. The distribution seems to be random according to education and position, but not according to gender and enterprise. Connectivity increased for all the females and for 31% of males, which may indicate a gender phenomenon. Finally, connectivity decreased for all participants from two enterprises. My findings indicate that

²⁶ A Human-Resource co-operation team

²⁷ Production-Manager-Team

this might have been caused by lack of absorptive capacity. Because of the increased connectivity, the answer to the first proposition is definitely affirmative.

Did network reflection influence the development of inter-organizational CoPs over time? To investigate this second proposition I wished to explore the nature of increased inter-organizational connectivity, i.e. how it was used. What happens when participants meet? What do they do together? The participants argue that the network reflection course made a difference in particularly two network teams, AVANSE and Production-Manager-Team (PMT). These are close inter-organizational teams where they – by use of reflection, knowledge sharing and advisory roles – discuss and solve real-life cases. This is of great interest because learning from cases is a complex and valuable process (Gustavsen et al., 2001:245). Both teams have personal membership and everyone is assumed to contribute actively, and are, 4 years after the course ended, strong and stable communities with a high level of trust and participation. They never take minutes—*ever*—and have agreed to keep everything confidential. The members report finding them very useful because of great learning returns, or as one of them said, “You actually get something back for showing up.”

In *AVANSE* six enterprises and the public labour-market service co-operate, and the aim and scope are workforce swap and professional co-operation in human resource. *AVANSE* started before the course, but the changes after the course started were several: One new enterprise member – characterized as “an important contributor” by two of the other members – was recruited at the course. The professional HR co-operation started afterwards, and

comments about the important changes included the following: “I would never have known them in the same way had it not been for the thesis group”; “It would have taken considerably more time for me to become so close to them, if I had not participated in the course.” In the electronics industry, large variations in production volume are normal. Hence they have established a fairly unique internal system for swapping workers between the enterprises, with the following benefits: savings from avoiding temporary redundancies and layoffs in low production periods; savings from reducing turnover costs for recruitment and training; faster production increases and thus faster deliveries, which give the enterprises a competitive advantage; increased worker safety; reduced uncertainty and thereby easier recruitment.

In *Production-Manager-Team* production managers from six enterprises discuss and co-operate on problems relevant for all of them, including organizing, calculating prices and personnel matters. Two of the production managers describe the discussions and results this way: “We share experiences and guide each other in a way, and we manage to learn a little from each other”; “Last time we had a case from one the enterprises where they had laid off the production manager and replaced him with a planner. We discussed many questions. The planner questioned many things I had to reflect upon.” Due to the co-operation three of the participating enterprises have reorganized their production division, from a foreman-based to a team-based structure. PMT started after the course; it arose, in part, because the enterprises’ production managers that participated in the course wished to co-operate. The course made a difference because “It was important that

those of us involved knew each other in some way and I don't think that PMT would have been what it is had it not been for that course".

Participants in both the AVANSE and PMT teams are informally bound together by shared expertise and passion for joint tasks. They share their experiences and knowledge and foster new approaches to problems and have an organic nature. They work together on a joint workforce swap and various real-life case-based learning activities, solve problems and promote the spread of best practice. Hence both teams are considered to be CoPs.

AKOM: In the spring of 2003 there was a period of acute depression in the industry. Only two months after the idea was launched, AKOM – a joint project for unemployed workers in order to keep know-how in the region, stimulate entrepreneurship, and supply the workers with new skills – was in business. It was a joint project between EC, the municipality, the county, the public labour-market service and the College, partly built on relationships from the network reflection course. In the evaluation both the workers and the organisations involved judged AKOM to have been successful. People were united in both action and meaning for the larger collective and solved problems associated with unemployment in a creative way that fostered new approaches. Hence, even though AKOM was not completely informal, I consider it to be a CoP.

Several *useful contacts* among the participants resulted in definite projects. Participants from two enterprises were involved in technological development projects which developed and tested prototypes: A Bluetooth sensor for heart monitoring and an electric cable layer. Two participants

started cooperating in order to take over a bankrupt enterprise and several others co-operated on development of a remote meter reader. New acquaintances became mentors or discussion partners. Several joint education projects were started: Adult women were inspired to accomplish their certificate of apprenticeship and several enterprises co-operated in training apprentices in order to address gaps in their respective training courses. Additional joint courses were organized in areas like PCB (printed circuit boards), crisis psychology and management training, and finally a new course in project management was organized at the Management Academy. In these useful contacts people were informally bound together by shared expertise. Although they didn't work together, they were engaged in the same or very similar practice; therefore, the useful contacts are considered to be NoPs.

New or energized network teams and several useful contacts arose from the network reflection course. I consider several of these new inter-organizational communities to be examples of emerging CoPs and NoPs; hence, the answer to the second proposition (Did network reflection influence the development of inter-organizational CoPs over time?) is affirmative for this case. However, because of their regional context and interorganizational feature, the communities seem to be something between CoP and NoP, which I term regional CoP.

Now to answer the third proposition: *If increases in connectivity and development of CoPs could be identified, did these enhance innovation?* Indeed, there were increases in both connectivity and in development of regional CoPs. Did these enhance innovation? Indeed they did: AVANSE

and PMT, and co-operation such as using each other as mentors and organizing courses together, represent *new* ways of organizing. The co-operation in PMT has resulted in *new* organizational methods for electronics production. The prototypes represent *new* products. Workforce swap and AKOM show the ability to respond together to mutual challenges and represent *new* services to employees. Finally *new* joint activities, qualifying projects and courses are organized. Therefore, according to my definition, these new developments are indeed all innovations. I consider the Management Academy and network reflection as both new organizational methods and new methods of production because they bring something new to the system; furthermore, they are mechanisms for triggering processes leading to innovation. Therefore, the answer to the third proposition is that increases in connectivity and in development of *regional* CoPs both enhance innovation.

Most of the increased connectivity and community building after the network reflection course was developed by the participants' contacting each other. This is important because, the most innovative networks and communities are those that grow organically and hence are more natural systems (Brown and Duguid, 1991; Gustavsen et al., 2001). Brown & Duguid (2001) argue however that NoPs may inhibit the flow of knowledge. There is a risk that ideas and information that can be disadvantageous for the network members may be resisted or even stopped, and that group thinking may appear.

Because of the empirical findings shown in Figure 5.2 I have developed a revised model.

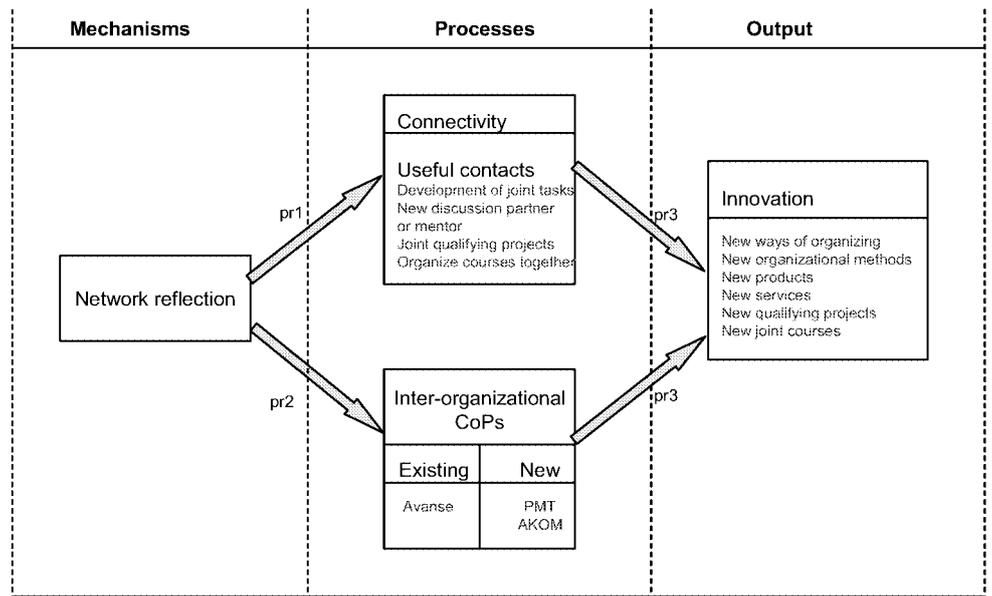


Figure 5.2 Revised conceptual and empirical model

According to Gustavsen et al. (2001:253), “If innovation is our interest we cannot stay content with ‘interpreting’ the actors in terms of what they bring with them, we need to put a main emphasis on what happens when they meet”. In this study I have emphasized the latter issue. Gustavsen et al. (2001:245) argue, “Perhaps with some degree of exaggeration, but not all that much, one could say that innovation is connectedness”. That – I argue – depends on the quality of the connectedness, and I therefore recommend a combination of individual and collective reflection.

5.6 Concluding remarks

The purpose of this paper is to explore how regional forms of co-operation can be developed to enhance innovation. To achieve this purpose, a case

study – combining qualitative and quantitative methods – of the longitudinal effects of network reflection was performed, in the context of a regional cluster of electronic enterprises. A preliminary conceptual model and three propositions are developed and discussed. The answers to propositions one and two – (1) Did network reflection increase connectivity over time? (2) Did network reflection influence the development of inter-organizational CoPs over time? – are affirmative. In addition to inter-organizational CoPs, the development of networks of practice (NoPs) was found to occur. Moreover – because of the regional context and inter-organizational feature – these seem to be something between CoPs and NoPs, which I have termed *regional CoPs*. The answer to proposition three – (3) If increases in connectivity and in development of CoPs could be identified, did these enhance innovation? – is also affirmative, because of innovations such as new organizational methods, new production methods, new products and new services. The development of forms of regional co-operation that enhance innovation occurs due to increases in connectivity and in development of communities, and through increased innovation as a result of both the number of and the content of these connections. A revised conceptual model is deduced from the empirical results.

This paper contributes in several debates. By examining network reflection in a context of a cluster and triple helix, the paper contributes in debates about these and in the debates about regional innovation systems. I argue that network reflection may be a concept that gives rise to forms of co-operation that in turn energizes networking. It also contributes in the debates on how to stimulate development of inter-organizational CoPs. It does this by filling the lack of empirical examination and by introducing the regional

university as a new element. Finally the paper contributes to the debates on management education by its investigation of a secondary effect – developing forms of co-operation which enhance innovation. Although this paper is not a traditional evaluation of education, it contributes to these debates through its focus on the secondary effect and its empirical examination of experienced reflection.

Because of how CoPs influence innovation, organizations need to be more proactive and systematic about developing and integrating [regional] CoPs into their strategies (Wenger et al., 2002). Although it is difficult to govern the development of CoPs and other inter-organizational processes that enhance innovation – because of their organic nature – the network reflection mechanism can definitely be governed. Hence these findings have practical implications for policy makers, networks, enterprises and universities.

My claim is that – although it is difficult to govern the development of CoPs – network reflection may be a mechanism that triggers the development of regional processes and communities which may enhance innovation. The findings and exploratory analysis need to be followed up and the model needs stricter testing. In the analysis I removed qualities such as trust, interpersonal knowledge, friendship and motivation. Although these were not found to affect innovation directly, they are seen as important conditions for developing and maintaining CoPs and connectivity, and therefore need to be followed up. However, network reflection is not a fully developed concept; therefore, further conceptualizing is necessary.

6. Paper 3 - Towards a regional innovation system? The role of a regional university

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6.0 Abstract

This is a study of development of a network towards an innovation system in the context of a cluster in mature electronics industry, and how the regional university can contribute as a catalyst in this process. Innovation is acknowledged as one of the most important factors on value creation. Promotion of innovation can be seen as the promotion of clustering and networking because innovation is more and more seen as the product of the co-ordinated efforts of many people distributed in different organisations, private as well as public. Hence a lot of effort and resources have been made to try to create and govern network and innovation systems, but they rarely succeed. A regional university may contribute in developing a network towards an innovation system by organizing tailored inter-organizational courses, on the condition of a pedagogy based on network reflections. In this study of the long run effects of such a course I find a significant increased networking, some innovations and the further development of an innovation system. Network Reflections may thus be a concept by which

universities can contribute as catalysts to institute forms of collaboration that energize networking, innovation, and the development towards innovation systems.

Key-words

Regional innovation systems; network; innovation; connectedness; ties; experienced reflections; network reflections

6.1 Introduction

The introduction of the notion ‘regional innovation systems’ (Lundvall and Johnson, 1992; Cooke, 1998) in the early 1990s was a response to the challenges facing economic growth in Europe, because of globalization and the decreased importance of the national state. The concept combines the acknowledgement of local embedded knowledge as a vital source of innovative activity, and the idea that innovation is firmly linked to networks. Rather than taking place in a single spot, where a few bright actors are able to break out of the mainstream of thoughts and actions, innovation is more and more seen as the product of co-ordinated efforts of many people distributed in different organisations, private as well as public. From this perspective, the promotion of innovation can be seen as the promotion of networking and regional innovation systems.

There is a substantial and rapidly growing literature about how innovative networks and regional innovation systems work (for an overview, see Hoang and Antoncic, 2003; Cooke, in press; Doloreux and Parto, in press). One should expect this literature to encompass broad discussion on how to *create* appropriate forms of co-operation, but such discussions are, however,

relatively rare. The purpose of this paper is to raise and discuss this issue, how to *create* innovative regional networks.

With Zaltman, Duncan & Holbek (1973:10), I define innovation in a broad way as “any idea, practice or material artefact perceived to be new by the relevant unit of adoption”. What is new can be new products, new services, new methods of production, new markets, new sources of supply, and new organizational methods (Johannessen et al., 2000). Hence my focus is not merely on products and technology. The concept ‘regional innovation systems’ is heavily disputed (e.g. Cooke, in press; Doloreux and Parto, in press), and there is a broad discussion on how to define it, where two main bodies of research, systems of innovation and regional science, influence the discussion. There seems however to be an agreement, that a regional innovation system involves co-operation in innovation activity between firms and knowledge creating and diffusing organizations, such as universities, colleges, training organizations, R&D institutes, technology transfer agencies, business associations, and finance institutions, and the innovation-supportive culture that enables both firms and systems to evolve over time (Asheim and Herstad, 2002; Doloreux and Parto, in press).

The empirical point of departure is the development of a “Management Academy” launched to promote innovation, improve management practices and increase network activity within a regional network of enterprises and their partners in the public support apparatus. The network is called “Electronic Coast”, and consists of around 30 enterprises within the electronics industry, Vestfold University College, the municipality of Horten, and the county of Vestfold, all in Norway. When the “Management

Academy” was started, the purpose was not to create a network from scratch, but to improve and enhance competencies and connectedness within an existing network structure. The need for improved co-operation was linked to the assumption that improved co-operation would promote innovation within the participating enterprises. The “Management Academy” consists of tailored research-based courses developed and organized as a network activity, where the enterprises and the College collaborate. The core method in these tailored courses is ‘network reflections’, a pedagogic method of experienced reflections (Mintzberg, 2004), with relatively short theoretical presentations and lectures, followed by tasks to reflect and discuss the students’ practice and experience. This is a method that enables the participants to share and create local explicit and *tacit* knowledge, and which is combined with an inter-organizational network factor. Two questions arise. (1) *Did Network Reflections succeed in increasing network relationships within Electronic Coast?* (2) *If increases in network relationships could be identified, did these have any bearing on innovation?*

My *main claim* is that, although it is difficult to govern the creation of a regional innovation system, a regional university may contribute in developing an existing network into a regional innovation system, by organizing tailored inter-organizational courses in collaboration with the network, based on a pedagogic of network reflections. This occurs through increased connectedness among the participants, and through increased innovation as a result of both the number of, and the content of, these connections.

6.2 Electronic Coast and the Management Academy

The electronics industry in Vestfold today consists of around 95 enterprises, encompassing some 2.500 workplaces (Idås, 2000). Its development started with one enterprise in 1964, and its growth during the first 30 years was dominated by spin-offs. Over the last 10 years there have been some modest ups and downs, but close to zero growth in the number of enterprises and employees. Some enterprises have gone bankrupt, but nearly all have re-emerged in a slimmer form. There have also been a few spin-offs. In recent years some small new start-up enterprises have emerged, and one new enterprise has been established (Photonix in 1999).

The enterprises are mostly sub-suppliers, the rate of export is around 90%, and competition is strong and global. These firms represent a modern high-technology research-intensive industry. Up to 20% of the business is research initiated, and the academic level of the engineers is high, several having Masters and PhD degrees. The products need a long, complex, expensive and demanding process of development. Many of the enterprises are influenced by electronics components becoming smaller and smaller, into micro-technology and nano-technology. The technical competence of the employees is good. All the enterprises are classified as SMEs, with the number of employees varying from 2 to 250.

From the outset, various forms of relationships existed between the enterprises. The network called “Electronic Coast” grew out of these relationships, 38 organizations currently participate; in addition to the

enterprises and public organizations we find the largest regional business bank and a regional culture centre.

The name Electronic Coast is inspired by Silicon Valley, “Electronic” because the kind of enterprises, and “Coast” because it is geographically a coast region. The Electronic Coast (EC) concept dates back to the days of the Horten College of engineering early in the 1980s, and was, after a sleeping period, re-established as a REGINN project financed by The Research Council of Norway in 1998. This EC-project was committed to arena- and network building, with the aim of promoting growth and innovation in electronic- and ICT-based companies in Vestfold. Secretarial competence was hired from a regional business centre owned by the County. A professional web site was set up, coloured newsletters printed and distributed by post-mail, and EC-pubs were organized as a free meeting place for the employees in the membership companies. The pubs had a formal programme with short presentations and talks, and an informal part for social mingling. From my point of view, the network activity in 2000 was almost symbolic, a nice surface, but nearly empty inside with only one active team, consisting of representatives from 5 enterprises and the College. The project period ended officially in 2001. The EC-project was in serious trouble: no more money from the Research Council, no secretary help, no newsletters, a web site out of date and the EC-pubs had come to an end because of lack of interest.

In 2000 the enterprise representatives in the only active team wanted to establish a common management course for the enterprises, in order to

increase both the competence and the networking. The result of this initiative was the establishment of the “Management Academy” in cooperation with Vestfold University College in 2001. The academy was organized as a project, with the team member from the College as a head of the project. It is easy to assert that the firms and College collaborate, but such assertion can be more or less symbolic. To illustrate the level of collaboration, I will tell a story from the process of developing the first education programme, the one that became the case in this paper:

At the first planning meeting the enterprises had a lot of suggestions and requests about the content, organizing and study form, and they had a constructive exchange of views. They also requested several public figures to teach. The title of the course was decided to be “Managing Knowledge”. Some weeks later they met again and the head of the project (HP) had arranged all the inputs and calculated the fee, and introduced the results. The enterprises (E) approved most of it, but found the fee of 14 500.- NOK/student too high. The following dialogue happened:

HP: “What is the maximum fee you will pay for this course?”

E: “10 000,- NOK“

HP: “Then we have to reduce the number of public figures and the hours of supervising.”

E: “Please remove the public figures and try to keep the hours of supervising as many as possible, and recalculate.”

The fee became 9 900,- NOK - and the course a success - without public figures.

To recruit students, information and application forms were post-mailed to the CEO of all the enterprises in the network, and e-mailed to everybody on the network's e-mail list. There was a need for 25 students to start the course, and 4 weeks before start up 15 applications were received. The HP was advised to call the CEO's at every enterprise without applications, promote the course and tell them which enterprises that were going to participate. 2 weeks later the number of applications was 27, and the decision made to start the course.

The acknowledgement of the first course at the Management Academy, as a kind of changing point in the network, has inspired this research project.

6.3 The Network Reflection course

The 27 students represented 15 electronics and ICT enterprises and the regional hospital. 5 students were top managers and 22 middle managers. 13 of the middle managers had a job focusing on production and technical tasks, and 9 on human resources and/or budgeting. 19 of the students had a technical education, mostly engineering, 9 of these in combination with managerial education, and 8 had a managerial education only. 7 of the students were women and 20 men.

The pedagogic method involved a kind of experienced reflections (Mintzberg, 2004), with relatively short theoretical presentations and

lectures, followed by tasks to reflect and discuss the students' practice and experience in relation to the theories presented. According to Mintzberg (2004:254) experienced reflections are "wondering, probing, analyzing, synthesizing and connecting" about *why* things happened and *how* the situation was similar and different from other situations. This requires struggling with theoretical models and experience, and people need to be curious, alert and engaged – "there has to be a vibrancy in the classroom", with personal and involved educators. The participants need to reflect alone and collectively in small groups and in class, and "it is critical that this reflection alone be allowed to happen on the manager's own terms" (2004:255). The method also enables the participants to share and create local explicit and *tacit* knowledge.

The present case study was the first course at the Management Academy, it was part time (15 ECTS), lasted from September 2001 to June 2002, and the subject was Managing Knowledge. The learning objective was how to organize and support increased learning and knowledge creating in the enterprises. The topics: The concept of knowledge, learning on individual, group and organizational level, tacit and explicit knowledge, learning psychology, human motivation, organizational structure, organizational culture, creativity and innovations, core competence, intellectual capital and the manager as a supervisor. The content and study methods were, beside the topics, adjusted to the students' expectations. These expectations were investigated at the first seminar. The students were asked to reflect on their expectations first individually, then two by two, and finally in a plenary session.

The 8 seminars were mainly during the daytime, and one seminar with over night stay. The locality varied, and some of the seminars were at plants, including plant visits. At every seminar two fixed items, enterprise presentations and network-news were on the programme. I assume this, together with the plant visits and inter-organizational task- and thesis groups, to increase the student's knowledge about each others jobs, enterprises and the feeling of being a member of the network-family. In advance of each seminar, the students received an e-mail with the lecture-note, literature advices and a detailed program to the next seminar. They were expected to meet prepared having minimum read the notes, which they mostly did. The task activities at every seminar were organized in teams, and the teams reorganized at each session. Hence during the course all the students had collaborated and interacted in teams with all the others. In addition they had been reflecting and discussing each other's practices with colleagues from different enterprises, and with the same concepts and lectures as a mutual 'backcloth'. I will give two examples:

At the first seminar the students were given a practical task: To make the lunch. One group had to go to the kitchen and prepare the food, another group to lay and decorate the table, a third group to entertain us during the meal, and inform us by the history of the place. This lunch project was a success in two ways: It resulted in a nice and amusing meal, and the "ice" between the students melted. Still four years later I experience stories referring to this particular happening.

Some seminars later the students were asked to reflect on their own learning process, first individually, then in small groups and at last in a plenary session. Which thoughts do you have? What have you started to use in your job? They shared their thoughts and experiences and were surprisingly honest.

In the thesis, they had to deal with practical challenges in the enterprises, and the groups consisted of participants from 2-4 different organizations. E.g. one group consisted of the CEO and sales manager in one enterprise, and three participants from different other enterprises. Their topic was identification of core competence in the enterprise of the CEO. In the reflection part of their thesis they acknowledged the benefit of collaboration with outsiders helping them to open their own blindness. They also report on great deal of openness, confidence and spirit. Another group consisted of people from two enterprises, and their topic was to develop mutual forms for appraisal interviews applying the theory of human motivation. All the participants appeared to discover a lot of common tasks outside the formal educational process. They also found it useful to visit each other's businesses.

This kind of pedagogical method of experienced reflections combined with the inter-organizational network factor, which also includes enterprise presentations and network news, I will denote as a new concept '*network reflections*'.

After 5 seminars, the participants were asked in a questionnaire “which of the expectations are most important to you now?” Those scoring highest were self- development, network building, and relevance to their own work situations, with the latter being the best met expectation. Just after the end of the course, the participants were asked in a questionnaire at which level the expectations were met on a scale from 1 to 5, 1 meaning to a very low degree and 5 to a very high degree. The number of respondents was 17 (63 % response rate). The results show that friendly seminars (4.4), network building (4.2), self-development (4.0), new impulses (3.9), and relationships to their own work situations (3.8) scored highest (mean values in brackets).

My interpretation of the high scores in the evaluations on relevance to their own work situations, network building, and self-development, is that the course succeeded in practising network reflections. The attendance at the seminars was high, and all the participants completed their theses. The final examination was a four-day home examination, 26 of the 27 participants participated in and passed the examination, with good results.

6.4 Did Network Reflections improve on network relationships?

The first research question is ‘*did network reflections succeed in improving on network relationships within Electronic Coast?*’ This was investigated by observations and collecting data and from the participants. In addition to the 27 participants data were collected from the main teacher and head of the project (the same person), the total number of respondents was thereby 28. Network relationships were analysed by measuring connectedness and ties

at three points in time: 1) spring 2001, some months before the course started, 2) spring 2003, approximately 9 months after the course ended, 3) autumn 2004, approximately 2 ½ year after the course ended.

Connectedness

Connectedness were considered by measuring frequency of three kinds of contact: face-to-face, telephone, and e-mail. Data was collected by structured telephone interviews in October 2004. The frequency was measured on a scale involving Granovetter's (1973) classification into often, occasionally, and rare, but the scale was more finely graded to catch several nuances in the frequency of contact. Contact was measured on a scale from 0-5: 0) no contact at all, 1) once a year or less, 2) between once a year and four times a year, 3) between four times a year and once a month, 4) between once a month and twice a week and 5) at least twice a week. The response rate was 100%.

The reliability of the three kinds of contact measured at the three points in time showed a Chronbach's Alpha of 0.88 in spring 2001, 0.81 in 2003 and 0.89 in autumn 2004. Factor analysis at the three points loaded significantly on one factor. It can be argued that a quantitative measure of face-to-face contact, telephone contact, and e-mail contact is not a suitable measure for connectedness. You can meet someone face-to-face without interaction, and when you have the e-mail address it is easy to send an e-mail to someone. But you do not pick up the phone and call someone if it is not for the purpose of interaction, and especially not when you have the possibility to send an e-mail simply to give a message or information. The high reliability and significant factor analysis strongly indicate that I am measuring the

same phenomenon, which I denote as connectedness. The mean values of connectedness, illustrated in figure 6.1, were 3.5 in spring 2001, 10.2 in spring 2003 and 8.1 in autumn 2004.

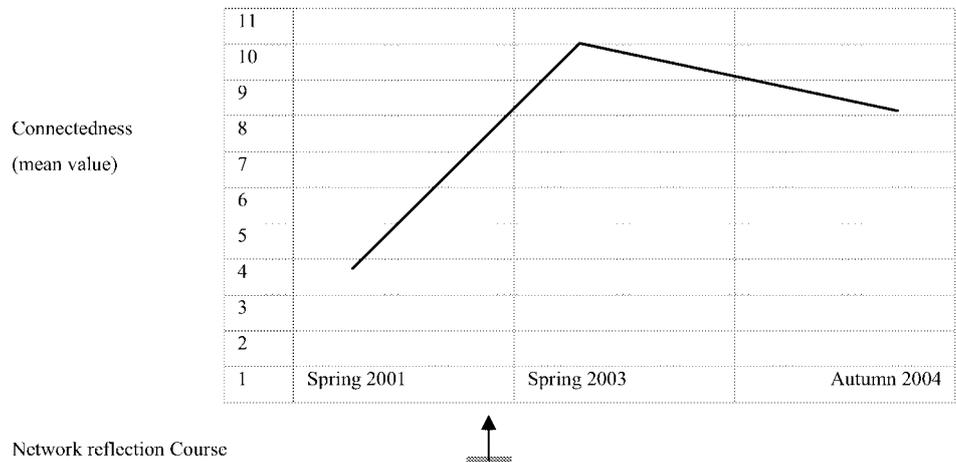


Figure 6.1 Developing of Connectedness (n=28)

The increase in connectedness from before to 9 months after the course ended was 196%. Then the connectedness declined somewhat (21%), but was still, 2 ½ year after the course ended, 135% higher than before the course started. This is in accordance with my assumptions that the connectedness would increase considerably straight after the course, but would decline somewhat when the enthusiasm of novelty decreased. I am, however, surprised that the decline was so little, and the level of connectedness so high, so long after the course. My interpretation is that lasting connectedness is useful connectedness.

Analysis of the data shows that the increase in connectedness was not evenly distributed, but mainly caused by 15 of the respondents. For 8

respondents connectedness was almost unchanged, and 5 respondents displayed a decrease in all kinds of contact.

Ties

Granovetter (1973:1365) refers to a tie as a “local bridge of degree n ” if n represents the shortest path between two points (other than itself) and $n > 2$. “The strength of a tie is a (probably linear) combination of the amount of time, the emotional intensity, the intimacy (mutual confining), and the reciprocal services which characterize the tie” (Granovetter, 1973:1361). A given tie is strong, weak or absent (Granovetter, 1973). The mark of strong ties is connections with high intensity of emotional closeness and frequent communication (Granovetter, 1973; Burt, 1992). Granovetter (1973) defines the content of weak ties as distant and infrequent relationships that are efficient for accessing novel information. As a measure for tie strength Granovetter (1973) uses frequency of contact, and divides the frequency into the categories often, occasionally, and rarely. Often (strong tie) is measured as contact at least twice a week, occasionally (weak tie) less than twice a week but more than once a year, and rarely (absent tie) once a year or less. The change in number of ties, is presented in Table 6.1.

Table 6.1 Number of strong and weak ties (n=28)

	Spring 2001	Spring 2003	Autumn 2004
Number of strong ties	3	3	4
Number of weak ties	45	139	97
Mean value of weak ties	1.6	5.0	3.5
Weak ties % change from spring 2001		209	116

The results show that the effect of network reflection on strong ties is almost none in this case. The number of weak ties shows a tripling 9 months after the course ended, then 2½ years after the course, the number had declined, but is still more than double than before the course.

Network relationships

The results of the investigation into the network reflection's effect on network relationships, at the first course at the Management Academy, show that both connectedness and the number of weak ties were greatly enhanced. The answer to the first research question: did network reflection succeed in improving on network relationships within Electronic Coast? Is thus yes for this study. The percentage decline in weak ties was bigger than in connectedness, which means that the level of connectedness increased relatively for the connected actors.

6.5 Benefits of increased network relationships?

Since the answer to the first research question was definitely in the affirmative, I wished to discover more about how the increased inter-organizational connectedness and number of ties were used. Connectedness and maintenance of ties are undoubtedly time-consuming, so their content and potential benefits are of interest to us. What do they do together? Hence the second research question: *'if an increase in network relationships could be identified, did this have any bearing on innovation?'*

As mentioned above, the increase in contact was mainly attributable to 15 of the 28 respondents. These 15 were therefore the target group of this part of the investigation, and they were contacted for a new telephone interview in

December 2004. One was not available. The interviews this time were quite open-ended, and the opening question was: *“Last time we talked together you told me that your contact with the other participants had increased. How do you think you have benefited from this contact?”*

When reading and analysing the answers, different categories of benefit were sorted out and counted, and the answers classified into 10 categories, as shown in Table 6.2. The categories, however, somewhat overlapped. They were also at many levels, for instance with respect to knowledge: from whom the knowledge was learned, how the knowledge was utilized, and its usefulness. This may be the price to pay for open questioning. The advantage lies, however, in richer answers. It may be misleading to count the different categories of statements, because it could lead us to believe that the numbers express all the activity in the categories, which they do not. The question: “how do you think you have benefited from this contact?” is a very open question, and was the first in a telephone interview when the respondents were at work and surely engaged with other matters. The only warning given was an e-mail 1-2 weeks before the interview.

Table 6.2 Categories of benefit (n=14)

Category of benefit	Number of respondents
Increased interpersonal knowledge (they knew more people and their expertise)	13
Useful job contacts	10
Learning from cases and each other / networks of practice	7
New discussion partners or mentors	4
Development of joint tasks (inter-organizational)	4
Increased trust	4
Energizing / motivating	4
Plan or organize course together	4
'Mutual' workforce	3
Personal / social friendship	2

In the discussion below I use some quotations translated to English by the author.

The distribution of categories among the informants varied from 1 to 6, with the majority scoring on 3 to 5 categories. Nearly all the respondents reported that their *interpersonal knowledge* had increased. Some of the respondents quoted: "I have obtained a phenomenally good network thanks to Electronic Coast". "When I have a problem, I know whom to call". "The benefit for me is that I have become known by people outside the enterprise". Lundvall and Johnson (1994) denote such knowledge as 'know-who' knowledge and assert this kind of knowledge as increasingly important in the learning economy, because it is so important for innovation. Most of the respondents also stated that the *contacts made were useful in their jobs*. The kinds of benefit that enter into this category are: cooperation with apprentices, learning to use a computer system, sharing of experiences, making use of

others' expertise, working better, consciousness raising, reflection on work situations, and hiring lecturers.

Learning from cases. Half of the respondents reported the establishment of close inter-organizational teams where they discussed and solved real-life cases by use of reflections, knowledge sharing and advisory roles. I interpret this as the emergence of networks of practice. In such communities people do not necessarily work together, but are engaged in the same or very similar practices, and therefore share a great deal of insight and implicit understanding (Brown and Duguid, 2000). This category is also of great interest because learning from cases is a far more complex process than a choice between copying and rejecting (Gustavsen et al., 2001:245).

Others report that they use their new acquaintances *as mentors or discussion partners*:

“I found a very good ‘chemistry’ with a fellow student who I did not know before the course, I sometimes use her as a mentor”. “Nn has functioned as a kind of personal consultant for me during frustrated times. I find it liberating to have somebody outside the electronics industry, really lovely”.

Development of joint tasks is another category of benefit, and reported here are three new development tasks between different enterprises, one new commission for the University College, and mutual projects to inspire adult women to accomplish the qualifying examination. *Trust*, which is deemed to be an important condition for innovation (Lundvall, 1996; Krogh et al.,

2000), is reported with confidentiality, and some quotes such as: “We have deep and honest talks”. “I believe it has raised trust between us” and finally, “It is again about trust. Things are easier to do, shorter ways of decision-making”.

The next category, *energizing and motivating*, is also very interesting. Respondents linked energy and motivation to their job situations. If you are motivated in an energized way, you are probably intrinsically motivated (Deci and Ryan, 1985). According to the theory of self-determination it is reasonable to believe that intrinsic motivation has a positive impact on individual learning (Deci, 1996; Gausdal, 2001), and creativity (Amabile, 1983; Ganesan and Weitz, 1996; Gausdal, 2001); both variables that may be conducive to innovation. Several of the reported benefits imply new ways or areas in which to utilize the respondents’ knowledge. Their know-how is more in demand, which may increase their feelings of competency. Since feeling of competency has a positive impact on intrinsic motivation (Deci, 1996; Gausdal, 2001), this may be the reason why the respondents find the network relationships energizing and motivating. Since ‘knowing more people and their expertise’ was the benefit most mentioned, I can assume that a great many of the contacts among the earlier students were about using each other’s competencies. This probably increases their feelings of competency, which again has a positive impact on intrinsic motivation. Hence I think this creates a positive circle.

The next category is *planning or organizing* courses together, which subsequently leads to more inter-organizational connectedness. The category ‘*mutual*’ *workforce* will be presented in the next section. The least

frequent category was personal or *social friendship*. I should emphasize that this was the least frequent category, which may be interpreted as a sign of the respondents emphasizing job benefits in their connectedness and relationships, not personal or social interest.

I have attempted to present and interpret the open answers to the questions concerning the respondents' views on the benefits from increased contact, but the second research question has still not been answered. I will return to this in the discussion section.

6.6 The managers' judgements

To supplement the findings, a third set of data was collected. This time the target group was a stratified sample of the students' managers, represented by the Vice-CEO of the largest enterprise, the CEO and the HR manager in a smaller enterprise, and the President and Dean at the College. The three interviews were all performed in January 2005. The interviews were open, without an interview guide, and the main question was: "*What do you think are the main results and benefits from the collaboration between the enterprises and between the enterprises and the College?*" The answers are organized into the six categories shown in Table 6.3.

Table 6.3 Reported results and benefits of the collaboration from selected top managers and my consideration of the connection with the NR course

Results and benefits	Connection with the Network Reflection course
Joint management programmes	Strong
Swift action collaborative competence (AKOM)	Medium
'Mutual' workforce	Medium
Competence network	Medium
Adapted education and research	Weak
Global competition culture	Weak

Joint management programmes. Through the Management Academy the enterprises have worked out joint educational programmes. The collaboration has brought new knowledge to both the enterprises and the College. If each enterprise had chosen to operate on its own, initiatives of this kind would not have been possible. For the College to relate to enterprises in the way accomplished with the electronics industry, the enterprises encompassing the industry need, however, to act together.

Swift action collaborative competence (AKOM). In the spring of 2003 there was a period of acute depression in the industry, among other things due to September 11th and the space travel accident in USA. The French company Alcatel decided to close down its enterprise in Vestfold, the rate of industry closures was high in Norway, and a sense of crisis existed. Then the

chairman in Horten proposed to start a common project for unoccupied labour from the electronics industry. To contribute in keeping know-how in the region, stimulate entrepreneurship, and supply the group with new skills. Only two months after the chairman's proposal, the AKOM project was established and in business with a budget of 1.8 million NOK. The project was a joint project between the industry, represented by the EC association, Horten municipality, Vestfold County, the public labour market service and Vestfold University College. Thus different organizations, private and public, representing all three parts in a triple helix (Etzkowitz and Leydesdorff, 1997) were working together in a fast and effective way. In the evaluation, the project was judged to be successful by both users and the organisations involved. The project also attracted attention from top national politicians. Owing to rising economic trends and reduced need, the project ceased in the autumn of 2004. This story shows that the actors in this region, after several years of collaboration, have acquired a collaborative ability and trust that gives a swift action capability when necessary.

'Mutual' workforce. In this industry, large variations in production volume are normal. Eight enterprises that collaborate in "AVANSE" have established an internal system for non-profit hired-out labour among the enterprises. This means they avoid temporary redundancy and dismissal of labour in low production periods, and in the opposite situations they can obtain competent labour quickly. The enterprises save a considerable amount of money because they avoid temporary redundancy and dismissal of labour in low production periods, and turnover costs in employment and training. The enterprises are able to increase production faster and are thus capable of delivering their products more quickly, which gives them a

competitive advantage. The workers safety is increased and this collaboration also strengthens the enterprises' ability to reduce uncertainty, and thereby increase their ability to recruit, and prevents know-how disappearing from the industry and the region.

Competence network. A strong regional competence network is created through all these projects. Beside the benefit of increased interpersonal knowledge, this network is of vital importance to the existence of some of the enterprises. Many have foreign owners that put so much emphasis on this matter that the enterprises would be closed down without such a network.

Adapted education and research. Vestfold University College has, as a result of strong pressure from the enterprises, established the first and only engineering education in Norway for a bachelor's and master's degree in micro-technology. In recent years, focused research on applied micro-technology has been undertaken the College, in close collaboration with the enterprises. The main result has been considerably increased competence in micro-technology in the region – which is unique in Norway. Further several of the College's researches in the area of regional development are producing innovation research on the regional electronics industry. The co-operation has definitely influenced the regional college to be more research oriented.

Global culture of competition. Most of the enterprises have a 90% export share and extremely demanding customers. They generally operate, at the same time, in narrow niches in the market. From a narrow niche it is often

difficult to overview the broader trends in markets and technologies. Exchange of experience makes it easier for each participant to gain a broader perspective. The result is a culture of global competition, which gives the enterprises increased competitive advantage in their most important markets.

The specific connections between these forms of network benefits and the network reflection course vary from close with the mutual management courses, to medium and weak. The network team AVANSE that organizes the mutual workforce, was enlarged from 5 to 8 enterprises and energized after the course. The AKOM project that demonstrated the swift action collaborative competence was partly built on relationships and experiences from the network reflection course. Hence I claim that the competence network was energized and strengthened. A quotation from the president of the College, who also is a member of EC's board, emphasises these assertions:

“The first course at the Management Academy appears now to be the crucial element in several of the teams that emerge inside these networks. It was the right people who were there and they have continued to work on, use, and expand the course. Thus the course has been very important. It is not essential to involve a lot of people.”

6.7 Discussion

The Electronic Coast *project* period ended officially in 2001. I assume the feeling of success with the Management Academy inspired the committee to

prolong the Electronic Coast project in 2002. Efforts to continue the work of the EC within the framework of an *association* were crowned with success in June 2003. Many of the central persons who made this effort were students from the Management Academy. At the moment (autumn 2005) the situation for Electronic Coast is a professional general office, 7 active teams and a team manager group, up-dated and frequently visited web-site and monthly EC-news distributed by e-mail. State of affairs for the Management Academy is: Two courses, “Managing Knowledge” and “Management in Projects” have been developed and undertaken. In the spring of 2005 a new activity, “Top Leadership Forum”, was started up, and a new educational programme “Commercialization” in the planning stage.

The answer to the first research question, *did Network Reflections succeed in improving on network relationships within Electronic Coast?* Is ‘yes’ for the case investigated. I argue that network reflections can be a concept ‘that institutes forms of collaboration that energize networking’, which Brulin (2001) challenged universities to create.

Among other factors, the empirical findings show that increased contact has resulted in environments where the participants are ‘learning from cases and each other’. Gustavsen, Finne and Oscarsson (2001:245) argue that learning from cases is a far more complex process than a choice between copying and rejecting. In addition the issue of local learning environments emerges as a key one, because people need to learn, not to be informed. In these environments they ought to exchange experiences to enrich the available ideas and impulses (2001:245), which they certainly did in this case. I think networks of practice have emerged. Brown and Duguid (2000; 2001) assert

that such communities shapes conditions where new ideas can circulate, but they circulate on the back of similar practice, not through collaborative, coordinated practice and direct communication as in a community of practice. They further argue that new ideas will travel along networks of practice until they find a better home and the possibility to be used. Networks of practice constitute an important element, because they trigger processes that might lead to the formation of a regional innovation system.

The tailored network reflections course took place over a period of 9 months. But since then, most of the increased connectedness has been stimulated by the students themselves by contacting each other and creating or enlarging learning environments and networks of practice (some of the environments are, however, energized by action researchers from the College). This is important because, according to Gustavsen, Finne and Oscarsson (2001) and Brown and Duguid (1991), the most fruitful networks and communities are those that grow organically. A quotation from one of the interviews explains how this connectedness has grown in an excellent way:

The chemistry between people is more important than their jobs. We did homework together and delivered assignments together, and became very close. You continue the contact with those with who you were in the most contact. Many had the same job as me.

I interpret this and the emergence of networks of practice as an evolution of informal institutions such as norms, habits, attitudes, and experience-based knowledge, which stimulate the important issues in regional innovation

systems, exchange of information, ideas and know-how between the institutions (Asheim and Isaksen, 1997). This is in great contrast to the point of departure, with Electronic Coast as a top-down mechanically created 'network' financed from public authorities, with a nice surface, but nearly empty content of networking. A more or less symbolic network in serious trouble. I assume that the important difference in networking and innovation is caused by this first network system being a contrived association while the latter Electronic Coast, after the effects of the tailored Network Reflections course, is more grown organically and hence a more natural system (Checkland, 1999).

The link between specific network-promoting activities and innovation encompasses a number of issues that constitute major challenges. Networking as it emerges from the investigation of Electronic Coast first and foremost pertains to knowledge and insight of a more general kind, and to the ability to do things together that would be beyond the potential of the individual enterprise. If we take 'innovation' in a narrow sense, as new products, or new twists to old products, the relationship to innovation is clearly indirect. My definition of innovation is however a broad definition which also includes e.g. new methods of production and new organizational methods. Although the enterprises belong to the same industry classification, they serve different market niches. Within the industry at large research plays a vital role. However the research has less to do with developing basically new ideas than with making ideas into specific products and processes. Joint development of 'basic ideas' and the like is not an issue, and the need for specific forms of co-operation in product and process development is probably rather limited. Insofar as the notion of a

'regional innovation system' is to be applied to the Electronic Coast co-operation, we can speak about innovations within such areas as are indicated above: These include the joint use of a regional institution for education, research and development, the ability to respond together to labour market and other challenges, and the ability to launch efforts that would go beyond the capacity of each enterprise. Because we consider the Management Academy and the network reflection courses as new organizational methods and new methods of production, they also represent innovations. Hence the Management Academy is considered both an innovation as it brings something new to the system, and as a mechanism for triggering processes leading the development of a regional innovation system.

There is a dispute within the academic community related to the effect of tie-strength on innovation. According to Granovetter (1973) weak ties have a positive impact on innovation, and strong ties have a negative impact. Reagans and McEvily (2003) argue that the positive effect of knowledge conversion provided by a strong tie, increases up to a point, and then flattens out. Modern researchers (e.g. Uzzi, 1997; Hansen, 1999; , 2002) seem to agree that, because of environmental uncertainty and complex knowledge, small networks characterized by strong ties tend to be more valuable for organizations than large networks with weak ties. The empirical findings in this case show that the effect of network reflection on strong ties is almost none and the effect of building new weak ties is high, but if the development with decreased number of weak ties and increased connectedness continue, strong ties may emerge.

While it can be argued that I can not be sure if the results may become different without using the pedagogy of network reflection, the method consists of a lot of interactions and reflections among the participants, and network building scored the second best at both course evaluations. The method enables the participants to share and create local explicit and *tacit* knowledge, thus cultivates the valuable local knowledge and may give access to localized tacit knowledge spillovers. Tacit knowledge is vital in knowledge creation (Nonaka et al., 2000) and hence innovation and may enable discovery by bringing explicit knowledge “into the ‘unknown’ creative space where cognition is tacit but interactive with reality and methodology” (Cooke, in press:5).

The second research question was: If an increase in network relationships could be identified, did it have any bearing on innovation? Because the empirical findings and the discussion above indicate that the present EC-system ‘involve co-operation in innovation activity between firms and knowledge creating organizations such as colleges and business associations’, the answer to this question is that *I find it reasonable to assume that the tailored network reflection course has contributed to the creation not only of specific innovations, but also to the further development towards a regional innovation system.*

Gustavsen, Finne and Oscarsson (2001:267) argue that innovation demands co-operation – a coalition between actors, and the core element in creating a coalition is to create relationships, or connectedness, and further “*the evolution of the coalition is a part of the innovation process itself*”. According to Gustavsen, Finne and Oscarsson (2001:253): “If innovation is

our interest we cannot stay content with ‘interpreting’ the actors in terms of what they bring with them, we need to put the main emphasis on what happens when they meet”. In this study I have been putting an emphasis on the latter issue.

6.8 Concluding remarks

My *claim* is that, although it is difficult to govern the creation of a regional innovation system, a regional university may contribute in developing an existing network towards a regional innovation system by organizing tailored inter-organizational courses in collaboration with the network. An important condition in such courses may be network reflections, a pedagogic method based on experienced reflections (Mintzberg, 2004), with relatively short theoretical presentations followed by tasks to reflect and discuss the participants’ practice and experience in relation to the theories presented, combined with inter-organizational network collaboration. The method enables the participants to share and create local explicit and tacit knowledge. ‘Network reflections’ is a new concept, developed and introduced in this project.

This development of a network towards a regional innovation system occurs through increased connectedness among the participants and through increased innovation as a result of both the number of, and the content of these connections. I think this happens because the participants form different enterprises by many kinds of mutual reflections, tasks and experiences create new applied knowledge together, learn to know each other, each others knowledge, enterprises and work challenges. Because, by being students in the same class for some months, they belong to the same

group, have the same challenges with literature, teachers, thesis and exams. This may enhance the development of social capital (Coleman, 1990) which encourages increased networking when the course is ended. I plan to follow up with investigations of how network reflections may create social capital and trust, and with a paper that conceptualize and discuss network reflections further. It would also be interesting to examine innovation-supportive culture in Electronic Coast.

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7. Paper 4 - Creating Interpersonal Trust by Network Reflection

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7.0 Abstract

Some theorists, e.g. Granovetter (1985), claim that trust cannot be intentionally created. Other theorists argue that creation of trust can be intentionally supported. This empirical paper explores the extent to which an intentionally executed mechanism may trigger trust creating processes. In 2001 a management educational method – network reflection – was developed in a network of Norwegian electronics firms. After the programme ended the participants, who were mostly strangers to each other, increased their co-operation considerably, and describe their relationships as confident, informed by an open atmosphere in which they learn and share. With the purpose of finding the cause of this enduring trust effect, this inductive, process based and longitudinal case study investigates how management education can contribute to the creation of interpersonal trust in networks. The primary objective of this paper is to explore the extent to which network reflection has the capacity to increase interpersonal trust in networks, and to develop a framework of trust-creating social mechanisms and processes in networks.

Key Words: interpersonal trust; network; trusted weak ties; trust-creating social mechanisms; trust-creating processes; management education; experienced reflection; network reflection.

7.1 Introduction

Some theorists, e.g. Granovetter (1985), claim that trust cannot be intentionally created. Other theorists argue that creation of trust can be intentionally supported. This empirical paper explores the extent to which an intentionally executed mechanism may trigger trust creating processes. More specifically, if the social mechanism network reflection has the capacity to increase interpersonal trust in networks. To illustrate a conceptual model is developed in figure 7.1.

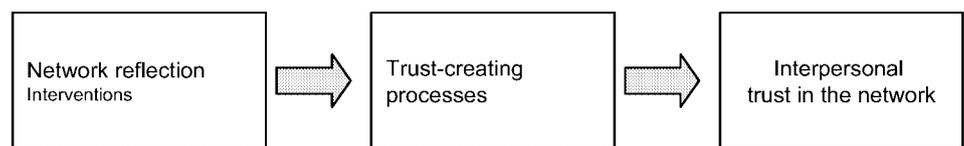


Figure 7.1 Conceptual model of trust-building social mechanisms and processes in networks

The theoretical and empirical findings will be utilized to examine this model, and the paper develops a framework of trust-creating social mechanisms and processes in networks.

This longitudinal case study started in 2001 when a network of Norwegian electronics firms challenged their regional university college to develop a management education programme. To meet this challenge, the university

developed²⁸ an educational method, which is here denoted as network reflection. The participants – 27 managers from 14 firms, who were mostly strangers to each other – increased their co-operation considerably both during the programme and later on. They describe their relationship during the programme as including and safe, characterized by an open atmosphere and the feeling of mutual improvement. They started to co-operate on e.g. developing products, using each other as mentors and inter-organizational communities of practice, and the co-operation is enduring. The relationships among participants *after* the programme are described as confident, informed by an open atmosphere in which they learn and share, thus enduring trust seems to have been created. With the purpose of finding the cause of this effect, this inductive case study follows these managers for five years, investigating the research question: How can management education contribute to the creation of interpersonal trust in networks?

In networks, trust seems to be important in several ways. Trust is considered to be essential in innovative networks involving creation and diffusion of knowledge (Lorenz, 1992; Newell and Swan, 2000). Trust is crucial for reducing complexity (Luhmann, 1979), it enriches the firm's opportunities and access to resources (Uzzi, 1997), it influences knowledge sharing (Mooradian et al., 2006) and is essential for innovative collaboration (Keeble, 2000). Interpersonal trust is vital in knowledge creation because it is crucial in sharing tacit knowledge (Nonaka et al., 2000). When trust runs low, people become more occupied with explicit provable knowledge

²⁸ This development was inspired by theories of knowledge creation (Polanyi, 1966; Nonaka et al., 2000), conferences (Gustavsen and Engelstad, 1986) and cluster (Porter, 1998a)

(Krogh, 1998). In order to share tacit knowledge, individuals must rely on others, listen and react to their ideas (Krogh et al., 2000: 45). In knowledge sharing, trust is reciprocal; trust is important in both sharing and absorbing knowledge (Krogh, 1998). In spite of its importance, it seems that the level of trust is decreasing in Western societies (Putnam, 2001; Case and Selvester, 2002). Understanding social mechanisms and processes that create interpersonal trust in networks is therefore of fundamental importance.

Management education is here introduced as a social mechanism for creating trust in networks. In order to create trust people must be connected. In networks, someone must engage in connecting people. This paper considers whether universities may play this procuress role, and how. To try to interpret what has happened, network reflection – the way the programme was conducted by the university – is explored here. Network reflection is deduced from Mintzberg's (2004) experienced *reflection* concept in management education. An important feature of experienced reflection is reflection on practice which Schön (1983) sees as the main characteristic of professional creativity. Moreover experienced reflection consists of facilitating several interventions and network activities, and combines lectures, reflections and interactions. The *network* part of Network reflection includes in addition network activities like inter-organizational interventions, firm presentations and plant visits. *Interpersonal trust* is 'the willingness of a party to be vulnerable to the actions of another party' (Mayer et al., 1995: 712). To explore the research question on how management education can contribute to the creation of interpersonal trust

in networks, the paper develops a framework of trust-creating social mechanisms and processes in networks.

This paper contributes to several debates. Although trust is considered as an important factor in the literature on innovation, network and communities, studies of development of trust at inter-organizational levels are scarce (Sydow, 1998: 35). Besides filling this gap, a new combination of the debates on management education and those on development of trust in networks is suggested. Finally the paper develops a new framework of trust creating processes in networks.

The discussion is organized in the following manner. In the next sections network reflection and the case are described before the trust creating processes are elaborated. Then, the trust creating processes are connected to network reflection activities, before the methods and findings are described and discussed. In the closing section a revised conceptual model is developed before the concluding remarks.

7.2 Network reflection

Network reflection is a method for inter-organizational, part-time management education, composed of a *network* for inter-organizational network activities and *reflection* for Mintzberg's (2004) experienced reflection. *Experienced reflection* is a method for management education that, in addition to short lectures, seminars and theses, includes reflection tasks. During these tasks the participants reflect – on their practice – alone, collectively in small groups and during class. The reflection process consists of 'wondering, probing, analyzing, synthesizing and connecting' applied to

why things happen the way they do (Mintzberg, 2004: 254). It requires struggling with theoretical models and experience during the programme; participants need to be curious, alert and engaged. 'It is critical that this reflection alone be allowed to happen on the manager's [i.e. participant's] own terms' (Mintzberg, 2004: 255). Hence the cases must be the participants' very own. This method of utilizing participants' actual experiences in conjunction with organized reflections and inter-organizational tasks enables the participants to create and share local explicit and tacit knowledge. Because the participants are practitioners, and their experiences and actions are essential in the interventions, reflection-in-action is very likely to occur. According to Schön (1987: 28), when we reflect-in-action 'we may, in the process, restructure strategies of action, understandings of phenomena, or ways of framing problems'. The facilitating role is to prepare the right context (Schön, 1987), thus the pedagogy is facilitating (Mintzberg and Gosling, 2006). The *network* part of the concept is different from experienced reflection; it consists of several network interventions: Recruiting participants from a cluster; a planned ad-hoc lunch intervention at the first seminar; seminars involving firm presentations, plant visits and network news; inter-organizational theses dealing with challenges within the firms; tailoring the content and study methods to the participants expectations, and providing participants with the same concepts, literature and lectures as mutual backdrops for communication.

The reflection tasks has features of conferences (Gustavsen and Engelstad, 1986). 'The conferences function as meeting places; where participants are making points; in discourse; in groups; with short reports in the plenary;

drawing on their experience; in fluid and shifting relationships to others' (Gustavsen, 2001: 21). The facilitator helps to organize the event, and takes care 'to present comments and points in such a way that they emerge as natural elements in ongoing conversations', but do not summarize or analyse the outcome of the tasks (Gustavsen, 2001: 21). The interventions constitute a plurality of relationship building events. Such events may, according to Gustavsen (2001), be a main constructing activity that result in 'an improved capacity for developing ideas, pursuing them into action and generally creating a rich landscape of different institutions, organizations and activities that can enter into fruitful and complementary relationships to each other' (Gustavsen, 2001: 22). Network reflection therefore constitutes relationship building events.

7.3 Context and case description

The context is a cluster association of Norwegian high-technological SMEs, the Electronic Coast, which is committed to arena and network building with the aim of promoting growth and innovation in the region's electronics-based firms. The electronics industry in Vestfold consists of around 100 firms, encompassing some 2 500 workplaces (Idås, 2000). The electronics firms are mostly classified as SMEs; most of which are sub-suppliers. This is a high-technological, research- and export-intensive cluster, competitive in the global market. In 2001 Electronic Coast suggested a common management programme, which resulted in the 'Management Academy' in co-operation with Vestfold University College. The case selected for this study is the first programme at the Management Academy, which was entitled Managing Knowledge. It was a part-time programme (15 ECTS), financed by participant fee, which lasted from

September 2001 to June 2002. The programme's objective was to support increased knowledge creation in the firms, and increased networking. The content and study methods were tailored to the participants' expectations. Detailed planning was an ongoing process involving reflections between the main lecturer (myself) and an advisor. The programme consisted of eight seminars, most of which were held during daytime; one seminar involved an overnight stay at a retreat. The seminars were held at various localities, and some included plant visits. At every seminar, firm presentations and network news were agenda items. The main lecturer was present at all seminars, facilitated interventions and was the contact person between the seminars. The way of conducting the programme interventions was developed practically during the programme, and was conceptualized and developed theoretically – as network reflection – in this paper.

The 27 participants were a mixed group from 14 firms. Five were CEOs. Some of the 22 middle managers worked in human resources and/or budgeting, and some in production and technical tasks. Seven participants were female and 20 were male, all Norwegians.

Reflection tasks were organized in temporary inter-organizational groups which were different for each seminar. To illustrate:

After a lecture on learning arenas, the participants were asked to reflect on which learning arenas they had in their own firm and why they considered them to be learning arenas. They were first asked to

reflect alone, then in small groups and finally to share their view in a plenary session.

In order to reflect on their real-life work practices together, participants need relationships involving some level of trust. To build such relationships quickly, however, can be problematic. Hence, at the first seminar conducted as part of this case study, an ad-hoc intervention demanded that participants work together on a low-risk project with a clearly defined target:

On very short notice (1 hour), participants were assigned the task of preparing lunch. Four temporary groups were formed and each was assigned one of the following tasks: preparing lunch, setting and decorating the table, entertaining during lunch, and evaluating the groups.

Attendance at the seminars was high, and all the participants completed their theses. Dissertation-writing was organized in temporary inter-organizational groups, dealing with practical challenges within the firms. Nearly all (26 out of 27) participants sat and passed a final examination with good results.

7.4 Trust-creating processes

Every encounter with another person has some bearing on trust. In order to enhance trust, consistent behaviour is important (Zucker, 1986; Krogh, 1998); trust may, however, break down after repeated abuse (Uzzi, 1997). Creation of trust is normally a slow process (Zucker, 1986), but *swift trust* may develop over short, intense periods of interaction in temporary groups

(Meyerson et al., 1996). Swift trust is ‘a unique form of collective perception and relating that is capable of managing issues of vulnerability, uncertainty, risk and expectations’ (Meyerson et al., 1996: 167). Abrams et al. (2003) launched ten intra-organizational ‘trust-builders’ as behaviors that promote interpersonal trust. The term ‘trust-builder’ and the content of the ten behaviors could be relevant to networks, but since ‘builder’ evokes associations to construction, development and shaping, there is a need for a more precise term. Because the content of the trust-builders consists mostly of processes, I will name them ‘trust-creating processes’.

Five trust-creating processes are going to be developed and discussed below. Whereas some of Abrams et al.’s (2003) trust-builders are possible for the management to arrange for their employees and therefore selected as relevant, the remaining trust-builders²⁹ apply to the managers’ own behaviour, which is not relevant in this study. The relevant trust-builders are: “Ensure frequent and rich communication”; “Engage in collaborative communication”; “Create personal connections”; “Establish and ensure shared vision and language”; “Give away something of value” (Abrams et al., 2003). Because “Ensure frequent and rich communication”, “Engage in collaborative communication” and “Create personal connections” deal with different aspects of communication, I merge these three into the trust-creating process ‘Communication’. “Establish and ensure shared vision and language” is connected with direction, and is therefore termed ‘direction’. “Give away something of value” is termed ‘valuable gifts’. All these trust-creating processes presuppose that people are connected, which is

²⁹ Act with discretion; Be consistent between word and deed; Ensure that decisions are fair and transparent; Hold people accountable for trust; Disclose your expertise and limitations.

infrequently the case at the network level. Hence the trust-creating process ‘connections’ is developed. Finally, because swift trust may develop over short, intense periods of interaction in temporary systems, the trust-creating process ‘temporary groups’ is developed. The five trust-creating processes are connections, communication, direction, temporary groups and valuable gifts.

Connections

When people become connected, information about ‘who knows what’ and ‘who knows what to do’ may be accessible. Lundvall (1996) denotes such *know-who*³⁰ knowledge as an increasingly important factor in the learning economy. ‘Know-who is socially embedded knowledge which cannot easily be transferred through formal channels of information. Neither can it be sold in the market without losing some of its intrinsic functions’ (Lundvall, 1996: 6). To initiate collaboration, low-risk activities are proposed (Das and Teng, 1998). Connections may be facilitated actively by knowledge activists (Krogh et al., 2000) or by someone playing the procurer role by interviewing people and then connecting them (Wenger et al., 2002).

Communication

Communication consists of three sub-processes.

Ensure frequent and rich communication. Abrams et al. (2003) argue that frequent close interactions may lead people to care about each other and to better understand each other’s expertise. Frequent communication provides opportunity to develop a shared vision and language, and increases

³⁰ The concept of know-who knowledge was first launched by G. Ryle (1949).

exchange of information to assess each other's abilities, intentions and behavior. Hence it 'increase[s] trust in one another's competence' (Abrams et al., 2003: 68). The quality of the interaction is also important. Abrams et al. (2003) emphasize the value of face-to-face contact, making interactions meaningful and memorable, and the development of close relationships. How close and frequent the contact ought to be is under debate. Hansen (1999) suggests close relationships – strong ties – to be powerful to knowledge sharing. Strong ties, however, are resource-demanding to sustain and may result in a lock-in effect which prevents absorption of new information (Grabher, 1993). Levin and Cross (2004) maintain that the most useful knowledge of all emerges from *trusted weak ties* – people who do not know each other very well, but who trust each other to be competent and benevolent. The most efficient relationships seem therefore to be trusted weak ties.

Engage in collaborative communication. Collaborative communication – which requires a combination of sharing, inquiring and listening – increases interpersonal trust (Abrams et al., 2003). Abrams et al. (2003: 68) assert that 'knowledge sources willing to tolerate the process of inquiry and provide latitude to those who approach them are viewed as more trustworthy'. The participants need to be involved and active. This is supported by working together with people to improve jointly on their ideas, avoiding too critical judgment of new ideas, and avoiding to demanding people to give complete solutions when they try to solve a problem (Abrams et al., 2003).

Create personal connections. Abrams et al. (2003) emphasize that non-work connections help people to be related to each other on more than an

instrumental basis, and let people seem more ‘real’, and hence safer, which reduces vulnerability. They argue that the discovery of common background – e.g. education and family status, and common values and predispositions – e.g. their management philosophies, contributes to the building up of such connections. Krogh (1998) claims that social events play a key role in stimulating trusting relations, and suggests events ranging from informal chats around the water cooler to holiday parties, emphasizing the value of performing such events off-site. Finally, the best context for creating personal connections is small groups (Krogh et al., 2000).

Direction

Shared vision and language seem to increase trust in networks (Tsai and Ghoshal, 1998; Argyres, 1999; Abrams et al., 2003). It is easier for people with similar goals and mentality to form closer bonds and understand each other’s expertise and communications. Because language differences represent a basic barrier to communication, they affect both the richness and the collectiveness of communication (Wenger et al., 2002). Shared vision and language are supported by: setting common goals early on; utilizing opportunities to create common terminology and ways of thinking; being aware of misunderstandings due to different jargons and thoughts (Abrams et al., 2003).

Temporary groups

Meyerson et al. (1996: 181) claim that ‘trust does appear in temporary systems, but does so in a different set of antecedents than investigators usually examine’. They juxtapose this swift trust to the long-term trust that exists in e.g. familial communities. ‘Swift trust is a pragmatic strategy for

dealing with uncertainties generated by a complex system concocted to perform a complex, interdependent task using the specialized skills of relative strangers' (Meyerson et al., 1996: 192). Meyerson et al. (1996) assert swift trust to be a less interpersonal form of trust, because it is more about doing than relating. I argue with Zucker (1986), however, that doing things together develops process-based trust. Moreover, because swift trust indeed comes into existence among people, it is at the interpersonal level. Meyerson et al. (1996: 183) emphasize that projects where each party is dependent on the other create vulnerability, uncertainty and risk, and 'the trust necessary to act in the face of vulnerability will be there quickly'. Hence swift trust seems to be 'the willingness of a party to be vulnerable', which according to the definition is interpersonal trust.

Valuable gifts

Someone who receives trust and good faith usually wishes to be trusting, loyal and generous in return. Social exchange is distinguished from strictly economic exchange by the unspecified obligations inherent in it, and the trust both required for and promoted by it (Blau, 1986). Behaviors that support giving away something of value are: Take risks in sharing your expertise and tacit or experimental knowledge; give people access to a limited or sensitive resource when appropriate; be willing to let others access your personal network contacts (Abrams et al., 2003). By sharing tacit and experimental knowledge with somebody, you also show the willingness to be vulnerable, in accordance with the definition of interpersonal trust.

7.5 Interventions, activities and trust-creating processes

Several interventions and activities of network reflection are supposed to influence trust. The interventions – recruiting participants; seminars; lunch intervention; reflections tasks; thesis-groups and exam; social arrangements; content – and their activities constitute the trust-creating social mechanisms of network reflection. The interventions and their activities are conceptualised in table 7.1.

Table 7.1 Outline and description of trust-creating interventions and activities in network reflection

(figures from this particular case are given in brackets)

Network reflection interventions and activities
<p>Recruiting participants</p> <ul style="list-style-type: none"> • Inter-organizational programme with relatively open invitation (to participate) • Recruiting participants from a cluster network with people from the same industry and the same region, practicing some of the same profession
<p>Seminars</p> <ul style="list-style-type: none"> • Participants meet face-to-face at several (8) seminars during several (9) months • Seminars held at various localities, some including plant visits
<p>Lunch intervention</p> <ul style="list-style-type: none"> • A planned ad-hoc intervention at the first seminar, on a safe project with clearly defined target: preparing lunch • Lunch intervention organized in small temporary inter-organizational groups arranged by the main teacher • Lunch intervention requiring participants to work together on non-work topics/issues and sharing non-work competence and creative ideas
<p>Reflection tasks</p> <ul style="list-style-type: none"> • Reflection tasks at each seminar requiring sharing, reflections and discussions of experience and challenges within the firms, and theoretical frameworks • Reflection tasks organized in small temporary inter-organizational groups – different for each seminar – arranged by the main teacher • Reflection tasks that demanded reflection alone and collectively, in small groups and during class, at a given point in time
<p>Thesis-groups & exam</p> <ul style="list-style-type: none"> • Inter-organizational theses – dealing with practical challenges within the firms – as part of the exam • Thesis work organized in small temporary inter-organizational groups arranged by the participants

<ul style="list-style-type: none"> • Individual home exam
Social arrangements <ul style="list-style-type: none"> • Social mingling during informal moments, e.g. breaks and plant visits • Joint meals at seminars • One seminar (the 3rd) with overnight stay at a retreat
Content <ul style="list-style-type: none"> • Tailoring the content and study methods to the participants' expectations, which are discussed and mapped out at the first seminar • Giving participants the same concepts, literature and lectures as mutual backdrops for communication, by participating in the same class • Firm presentations and network news • E-mails to follow up, prepare and motivate for each seminar

The network reflection activities influence one or more trust-creating processes. These connections are presented in table 7.2.

Table 7.2 Connecting trust-creating processes with network reflection activities

Trust-creating process	Network reflection activity
Connection	<ul style="list-style-type: none"> • Inter-organizational programme with relatively open invitation to participate • Participants meet face-to-face at several seminars during several months • Reflection tasks organized in small temporary inter-organizational groups – different for each seminar – arranged by the main teacher • Lunch intervention organized in small temporary inter-organizational groups arranged by the main teacher • Thesis work organized in small temporary inter-organizational groups arranged by the participants
Communication	<ul style="list-style-type: none"> • Participants meet face-to-face at several seminars during several months • Seminars held at various localities, some including plant visits • Lunch intervention organized in small temporary inter-organizational groups arranged by the main teacher • Lunch intervention requiring participants to work together on non-work topics/issues and sharing non-work competence and

	<p>creative ideas</p> <ul style="list-style-type: none"> • Reflection tasks organized in small temporary inter-organizational groups – different for each seminar – arranged by the main teacher • Reflection tasks at each seminar requiring reflections and discussions of experience and challenges within the firms, and theoretical frameworks • Inter-organizational theses – dealing with practical challenges within the firms – as part of the exam • Thesis work organized in small temporary inter-organizational groups arranged by the participants • Social mingling at informal moments , e.g. breaks and plant visits • Joint meals at seminars • One seminar (the 3rd) with overnight stay at a retreat
Direction	<ul style="list-style-type: none"> • Tailoring the content and study methods to the participants' expectations, which are discussed and mapped out at the first seminar • Giving participants the same concepts, literature and lectures as mutual backdrops for communication, by participating in the same class • Firm presentations and network news • E-mails to follow up, prepare and motivate for each seminar • Recruiting participants from a cluster network with people from the same industry and the same region, practicing some of the same profession
Temporary groups	<ul style="list-style-type: none"> • A planned ad-hoc intervention at the first seminar, on a safe project with clearly defined target: preparing lunch • Reflection tasks that demanded reflection alone and collectively, in small groups and during class, at a given point in time • Inter-organizational theses – dealing with practical challenges within the firms – as part of the exam
Valuable gifts	<ul style="list-style-type: none"> • Reflection tasks at each seminar requiring sharing, reflections and discussions of experience and challenges within the firms, and theoretical frameworks • Lunch intervention requiring participants to work together on non-work topics/issues and sharing non-work competence and creative ideas • Individual home exam

By conceptualising network reflection into interventions and activities, and by connecting the activities to the trust-creating processes, the trust-creating social mechanisms of network reflection are explained.

7.6 Research methods

This study is based on case study methodology (Yin, 1984; Eisenhardt, 1989), longitudinal data (Pettigrew, 1990) and some elements of action research (Whyte, 1991; Reason and Bradbury, 2001a). Yin (1984) and Eisenhardt (1989) agree that case is an appropriate research strategy to generate theory, but their use of theory in the design phase, differ significantly. While Yin (1984: 28) argues that ‘theory development as part of the design phase is essential’, Eisenhardt (1989: 536) claims that ‘theory-building research is begun as close as possible to the ideal of no theory under consideration and no hypotheses to test’. By starting out with a research questions and trust creating processes deduced from theory, the design phase of this paper follows Yin’s argument. Since I was the main lecturer and facilitated most of the interventions myself, I brought together action and reflection, theory and practice in participation with others. These are, according to Reason and Bradbury (2001b), the features of action research. This study is a first step towards theorizing by summarizing the empirical richness of a single case. According to Siggelkow, ‘inductive research strategy that lets theory emerge from the data can be a valuable starting point’ (2007: 21). A single-case provides the opportunity for unusual research access allowing exploration in a specific population (Yin, 1984); it also provides opportunities to explore and richly describe the existence of a phenomenon (Siggelkow, 2007). Yin (1984) suggests, however, that multiple-case studies typically provide a stronger base for theory-building. Nevertheless, a single-case can be a very powerful example providing a more convincing argument about causal forces than broad empirical research (Flyvbjerg, 1991; Siggelkow, 2007).

A longitudinal study which involves interventions, a roster rating questionnaire (Wasserman and Faust, 1994) and qualitative long interviews (McCracken, 1988) has been conducted. The empirical part lasted five years – from 2001 to 2006 – and consisted of planning and executing the programme-intervention (732 hours), observation and participation in 44 network-meetings, and finally 42 telephone interviews, three personal group interviews and five personal long interviews (McCracken, 1988). All the interviews were recorded and fully transcribed. The informants were the programme participants and the management groups in two of the participants' firms and at the University College. To create some contrasts in the respondent pool, the interviewees for the long interviews were chosen according to their combination of weak ties, executive position, education, gender and firm.

Ethical challenges may arise in the research process and in the use of the results (Gilje and Grimen, 1993). Data collection was executed by informed consent, and all transcribed interviews were approved by the informants. In reporting the results, informants and firms were made anonymous.

Data were analysed by means of within-case analysis and were written up in detail for each site (Eisenhardt, 1989) using synergy effects in the data. Because the purpose is to explore and suggest possible effects, the main focus is on the interpretation. The long interviews form the main basis of the interpretation of the social, trust-creating processes given below. Experience from the programme, along with practical and theoretical knowledge, were important instruments to identify patterns in the data. Analyses were performed during the interviews e.g. to formulate on-the-spot new questions

in order to identify themes within the interviewees' stories. Further data from the theses written and tasks performed by the participants during the programme were also used in the analysis.

7.7 Findings and discussion

When the programme started the participants had established only 3 strong ties and 45 out of 675 possible inter-organizational weak ties, which constituted 6,7%.

Relationships during the programme

During the programme participants interacted with each other in many different ways: at seminars, through the lunch intervention, reflection tasks, social arrangements, and through thesis-groups and exam.

The first *seminar* started carefully by brief presentations of participants and lecturers, discussion of participants expectations to the programme and a short lecture. Then, after two hours, the *lunch-intervention* was enacted, and as some participants explained³¹:

It worked out well because it was a way of becoming acquainted that did not necessarily depend on who you were in a sense. Consequently, you were not known according to your title or profession, but rather you were just you.

³¹ All quotations are translated from Norwegian to English by the author

I remember the first seminar very well, it was very including, indeed we got to know each other very well – even at the very first meeting – in such a way that you were looking forward to the next seminar.

The lunch-intervention seems to be important to start the trust-creating process. Nearly all the respondents mentioned – during the long interviews 4 ½ years later – the importance of the lunch interventions to start building relationships. Moreover, they have launched new networking activities with similar interventions. The participants were divided into small temporary groups, started to communicate on non-work topics/issues, worked face-to-face, and experienced common success on a memorable low-risk project. Because they dealt with a great amount of uncertainties generated by a complex system in order to perform a complex, interdependent task using specialized skills of relative strangers, swift trust was probably created. One lunch-intervention group of complete strangers decided at the second seminar to write their thesis together, which I interpret as a sign of the trust-building effect of the lunch-intervention.

The *reflection tasks* at each seminar constitute the core of network reflection. The reflection tasks required the participants to reflect together on their real-life work practices and to share their experiences and suggestions for doing things differently, which they certainly did. In working with these tasks, participants utilized each other's experiences and concepts, methods and new programme-knowledge. One story from each group was to be related in class at a given point of time, which happened on every occasion. Some stories were about successes and some about failures, and the participants were surprisingly open. Because the groups were re-

arranged at each seminar, and they were expected to delivery on short notice, these were temporary groups. Some of the groups discussed non-work issues, e.g. the behaviour of young students after an episode at the University. In the reflection tasks, participants were wondering, probing, analyzing, synthesizing and connecting – in small groups with relative strangers – about why things happen and how certain situations are both similar and different from other situations. By working and communicating this way, connection and communication were established among the participants. Because of small groups, off-site location and some non-work discussions, personal connections were allowed to be developed. By sharing and creating local tacit experience and knowledge in temporary groups, they gave each other valuable gifts, developed swift trust and demonstrated that some interpersonal trust already existed.

The *social arrangements* contributed to trust-creating. During breaks and joint meals a lot of social interactions took place among the participants. As one participant said, 'We sat during the break eating sandwiches, and just continued the conversation'. The participation in joint meals at the seminars was usually high. Because of the various localities, the meals took place at different places during the programme. The seminar with overnight stay at a retreat is pointed out as an important element of the process of developing relationships. As some participants explained:

The fact that we were spending the night there, that we ate a good dinner and had that talk afterwards, also contributed to the building of connections.

Our group kept together all evening and half way through the night, we sat in the bar until we were thrown out.

These social interactions off-site are important experiences to build personal connections.

The seminars included three plant visits with guided tours. Several discussions in ad-hoc groups were created by the participants during the tours, often inspired by practical arrangements experienced on the factory-floor, in the reception area or in the management wing. Intense discussions on practical or organizational issues inspired from the visit were carried out during the following joint meal. As one participant commented, 'The concrete exchange of experiences was the most useful of all'. Hence plant visits enhanced the frequency, the richness and the collaborativeness of communication.

The social arrangements were quite informal with a low level of facilitation, e.g. no groups arrangement. The first plant visit and the overnight seminar started after the two first seminars, with relatively high level of facilitating groups and tasks, hence the first swift and conditional trust (Jones and George, 1998) were already created. At a later Management Academy programme, the overnight stay was scheduled to be the first seminar, but then almost no participants wanted to stay for dinner and spend the night. To get people connecting and mingling by themselves, some level of trust seems to be needed.

The exam consisted of a written thesis and a take-home exam. Participants – arranged into inter-organizational *thesis-groups* created by themselves – wrote theses dealing with practical challenges within the firms. For example, one group consisted of the CEO and sales manager from one firm, and one participant from each of three other firms. Their task was to identify the core competence in the CEO's firm. In the reflection session, they acknowledged that they benefited from co-operation with outsiders in seeing the problem from new angles. They also reported that participants in their group had a great deal of openness, trust and spirit. In another thesis-group a section leader invited the group to help him with his leadership. He diagnosed his section to suffer from stress and frustration problems, probably because of inappropriate and inefficient ways of working. The section leader found the process and the concluding advises very useful. The thesis-groups found it useful to meet at each other's plants, and sometimes they discussed non-work issues. During the fourday *take-home exam* participants helped each other, which was allowed by the exam protocol. Hence, by inviting each other to collaborate in solving confidential challenges within each other's firms, and helping to solve them, the participants gave each other valuable gifts. Moreover, by helping each other during the take-home exam, they shared limited resources like attention, time and knowledge. Therefore, during the process of writing up their thesis and the take-home exam the participants exchanged valuable gifts and demonstrated that mutual trust existed.

Descriptions of features of the relationships among participants *during* the programme were – in the long interviews – also given as answers to contrast

questions. The questions and answers – illustrated by the informants’ main descriptions and some quotations – are reported in table 7.3.

Table 7.3 Contrast questions – features of relationships among participants during the programme (n=5)

Contrast question	Answers/quotations
Open or closed atmosphere?	All informants: Open atmosphere <i>I felt it was open, very open, without any particular limitation in the debates, you really felt some trust.</i>
Competition or ‘improving each other’?	All informants: Improving each other <i>I did not experience any competition at all, and I did not experience any demonstrations of prestige either, like ‘I know this, I am a boss’.</i>
Safe or unsafe?	All informants: Safe <i>Unsafe in the beginning, then safer and safer after a while.</i>
Did the others seem excluding or including?	All informants: Including <i>Relatively including. I got to know 7 or 8 people very well, at any rate they were really including, and not at all reserved.</i>

As shown in table 7.3, the relationships among participants during the programme are described as including and safe, characterized by an open atmosphere and a feeling of ‘improving each other’.

Several episodes demonstrated trust and network building. Participants who applied new methods from the programme on problem solving in the firm shared their stories with each other and sometimes also in class. Two

quotations illustrate the interpersonal trust developed during the programme:

I experienced that we relatively quickly became one united group, and one BIG united group. Also it became quickly inter-organizational.

I think that knowing each other also as persons influences the way in which we talk to each other. Everybody was really willing to share what they were working on and the challenges they were facing. We talked about what we were good at and what we were not good at. People were quite honest about it, which makes you think of them in a totally different way.

Trust was indeed created during the programme. The question is whether this was conditional trust, or constituted a preliminary stage of the more enduring unconditional trust. Unconditional trust is valuable because it leads to more effective co-operative behavior (Jones and George, 1998). Further development of trust after the programme ended was therefore investigated.

Relationships after the programme ended

Nine months after the programme ended, weak ties tripled (from 45 to 139). Then the number declined, but 2 ½ year after the programme ended was still more than double than before the programme (97). Strong ties persisted nearly unchanged.

Several new inter-organizational contacts among the participants resulted in definite projects. Participants started co-operating on the development of several technological prototypes: A Bluetooth sensor for heart monitoring, an electrical wire puller and a remote meter reader. One participant offered the other a new job to build up a new daughter company, and others co-operated in order to take over a bankrupt firm. As one of them said, 'It worked out very well, good cooperation and clear rules. You get quite a different confidence to each other and feel committed to be completely open.' Another participant invited all the others to a new network-team in order to co-operate on developing ISO 9001 quality management systems. Several joint education projects were started: Adult women were inspired to accomplish their certificate of apprenticeship and several firms co-operated in training apprentices in order to address gaps in their respective training programmes. Additional joint courses were organized in areas like printed circuit boards, crisis psychology and management training, and a new programme in project management was organized at the Management Academy. New acquaintances became mentors or discussion partners, as one of them reported: 'I have found a very good chemistry with a co-participant whom I didn't know before the programme. Sometimes I use him as a mentor'.

The participants argue that the network reflection programme made a difference in Avanse and Production. These are close inter-organizational teams where they – by use of reflection, knowledge sharing and advisory roles – discuss and solve real-life cases. In Avanse participants co-operate professionally on a workforce swap and on human-resource issues. To handle the large variations in production volume in this industry they have

established a fairly unique internal system for swapping workers between the firms. Avanse started before the programme, but the changes after the programme ended were several: One new firm member was recruited at the programme. The human-resource co-operation started afterwards, and one comment about the important changes included the following: 'It would have taken considerably longer for me to get this close to them, if I had not participated in the programme'. Production started after the programme; it arose, in part, because the production managers wished to continue to co-operate. The programme did not only influence building connections, but also the further development of Production over time. As one participant explained, 'It was important that those of us involved knew each other in some way, and I don't think that Production would have become what it is had it not been for that programme'.

In Avanse and Production they discuss real-life cases, and as one participant said: 'You get very honest feedback, and there is an exchange of views and a sharing of experiences which is very healthy'. A high level of trust is essential for the success of this co-operation, as illustrated by the following comment by one of the participants: 'It has developed because we have been together as a group for several years; and therefore the level of trust has become higher and higher among us—likewise honesty and sharing. Consequently, we have reached a point where we can discuss difficult personal issues'. Both teams have personal membership and everyone is assumed to contribute actively. Four years after the programme ended, these teams are still strong and stable communities with a high level of trust and participation, which I consider as inter-organizational communities of practice (Wenger, 1998). Because of great learning returns, the members

find those communities very useful, and, as one of them commented: 'You actually get something in return for showing up'.

Except from one very active informant, surprisingly few offered others their personal network contacts, which may be a sign of lock-in effect, or that the level of trust still is too low.

Descriptions of the features of the relationships among participants *after* the programme were also partly given as answers to contrast questions, which are illustrated in table 7.4. One of the informants had no contact with the other participants and is therefore excluded from the table, except for the question on 'reputation of other participants' firms'.

Table 7.4 Contrast questions – features of relationships among participants after the programme (n=4-5)

Contrast question	Answers/quotations
Open or closed atmosphere?	All four informants: Open atmosphere
Confidence or distrust?	All four informants: Confidence <i>I feel confidence and trust them.</i> <i>Confident, but I am sceptical if someone tries to take advantage of me.</i>
Did you learn and share, or did you experience some competition?	All four informants: Learn and share <i>We talk to each other in another way now. Everybody is really willing to share information about what they are doing and the challenges they are facing.</i>
Is the other participants' reputation better or worse?	Three informants: better. One informant: unchanged <i>I have gradually developed more trust for those I have been in contact with, and I would claim that both time and the arena have contributed to this.</i> <i>I would rather call it respect, for respect for others did increase a lot, and so did understanding and sympathy.</i>
Is the reputation of the other participants' firms better or worse?	Four informants: somewhat better. One informant: unchanged <i>Nothing more than I know a bit better what they do.</i> <i>Generally positive to all firms.</i>

As shown in table 7.4, all the informants describe the features of the relationships among participants *after* the programme as confident, informed by an open atmosphere in which they learn and share. The reputation has improved at the interpersonal level, but the inter-organizational reputation is only slightly better.

All the inter-organizational co-operation, such as developing new prototypes, considering taking over a bankrupt firm, offering each other new entrepreneurial manager jobs, developing quality systems and using each other as mentors, demand high levels of trust. The inter-organizational communities of practice also imply high levels of interpersonal trust. Because these data are collected nearly four years after the programme ended, they indicate that the trust is enduring. Furthermore, the trust seems to lead to effective co-operative behavior, which according to Jones and George (1998) indicates that unconditional trust is created. Moreover, because of the combination of increased trust and increased number of weak ties, trusted weak ties seem to have been established.

It could be argued that network reflection boils down to social learning or just some deliberate actions, taken by the regional university, to form or support regional networking. But network reflection is actually something more than that. It is in fact a major intervention, consisting of several smaller undertakings, e.g. lunch projects, reflection tasks, temporary groups, plant visits, overnight stays, joint meals and theses, in other words it is a complex *system* of interventions. According to this system, the participants are placed in new and uncertain situations, where surprises occur and their routines are questioned. The main role of the lecturer in network reflection is that of an active facilitator, implementing interventions and connecting people, playing a procuress role (Wenger et al., 2002) or a kind of knowledge activist (Krogh et al., 2000). Also important is to facilitate participants reflecting alone (Schön, 1987) and collectively (Mintzberg and Gosling, 2006). The combination of the lecturer as a facilitator and all the single activities make network reflection a system of interventions.

These findings of increased trust and the success of a management education programme are in contrast with some earlier findings (e.g. Currie, 1999; Case and Selvester, 2002). Case and Selvester (2002) argue that classroom trust nowadays is generally found to decrease, and indicate the introduction of programme fees and cosmopolitan classrooms as the cause of trust reduction. The network reflection programme, however, was fully funded from programme fee, but the differences may be explained by the classroom with a culturally homogenous setting, which from the outset gave some characteristic-based trust. The most important difference between the network reflection case and Currie's (1999) failure-case of a management education programme seems to be the former's sensitivity to context, e.g. by tailoring the programme to the participants' expectations, and the use of reflection tasks and thesis-groups. Moreover, open recruitment and no hidden agenda of 'unlocking' participants are significant. Important success factors seem to be the nature of the group of participants and tailoring the programme to the participants' expectations.

Although several scholars indicate that some increased cooperation tends to emerge as an unintended consequence of management education (e.g. Johannisson, 2000; Tillmar, 2006), creation of high levels of trust, like in this case, is not reported. Common management education programs include some aspects of the trust-creating processes, connections and directions. Management education does not, however, usually contain many of the interventions and activities that constitute network reflection. It is therefore reasonable to conclude that the high level of trust in this case is brought about by network reflection and its influence on the trust creating processes:

connections, communication, direction, temporary groups and valuable gifts.

The findings may be subjected to criticism. As the main lecturer performing the programme interventions, I played an important role in the programme. My own wish to describe the programme as a success might have biased the results. The participants' statements might be biased, prejudiced, partial, influenced and/or subjective. Truth is, however, a function of time (Pettigrew, 1990) and the short euphoric period that characterized the time right after the end of the programme has long since vanished. Moreover the high rate of participation and completion of the programme, the lasting weak ties and co-operation activities among former strangers speak for themselves. On the basis of rigorous and longitudinal research methods, it is reasonable to believe that I have measured the lasting effects.

As one participant said:

Meeting people at a programme is great. When else do you meet people in a setting where you can be open and honest? When you meet people in a sales situation, you seldom develop trust. Attending a programme together, because of the objective setting, is indeed an excellent way to bestow and obtain trust.

7.8 Concluding remarks

How can management education contribute to the creation of interpersonal trust in networks? A longitudinal and inductive case study followed 27 managers from 14 firms – who were mostly strangers to each other – who

started a management education programme together. During the programme they reflected on their real-life work practices and shared experiences and suggestions for doing things different in small temporary groups. Moreover they participated in plant visits, social arrangements and together wrote theses dealing with practical and confidential challenges within the firms. They describe their relationships during the programme as including and safe, characterized by an open atmosphere and the feeling of mutual improvement. After the programme ended they started to co-operate on e.g. developing products, quality management systems, and inter-organizational communities of practice. Since such cooperation requires trust, enduring trust seems to have been created. The number of weak ties among the participants increased considerably and three years after the programme ended the managers describe their relationships as one of confidence, informed by an open atmosphere in which they learn and share. Therefore it is reasonable to conclude that the educational method *network reflection* may be a social mechanism that develops trusted weak ties and enduring interpersonal trust in networks.

On the basis of the empirical findings, a revised conceptual model is developed, which is illustrated in figure 7.2.

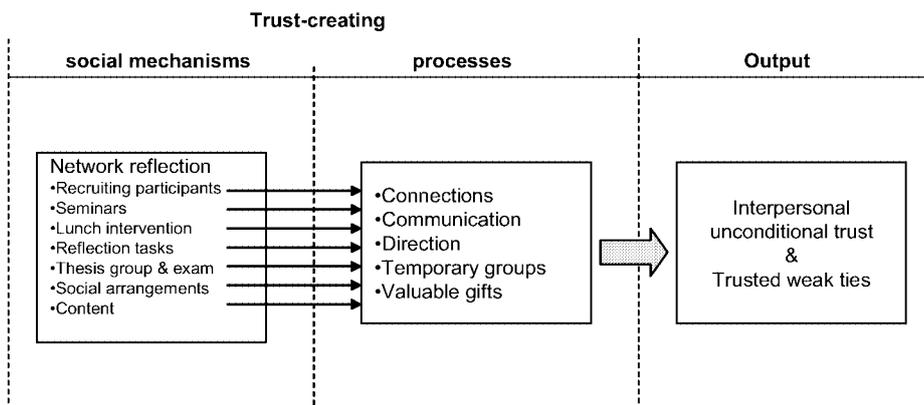


Figure 7.2 Revised conceptual model of trust-building social mechanisms and processes in networks

This paper fills a gap because longitudinal, process-based studies of development of trust in networks are scarce. Moreover, by combining the debates on and management education and development of trust in networks, a new framework of trust-creating social mechanisms and processes in networks is developed.

This study has also practical implications. Trust represents a relational feature of connections which is critical for innovation. Moreover, trust is a crucial factor which reduces complexity and enriches the firms' opportunities and access to resources, and influences knowledge sharing. In spite of its importance, the level of trust seems to be decreasing in Western societies. Hence social mechanisms and processes that create interpersonal trust in networks are important. These findings have therefore practical implications for managers, policy makers, networks and universities.

Of course, the study has limitations that should be acknowledged, and the findings need to be followed up. The model needs stricter testing, and the effect of network reflection on trust needs further investigation. Focusing on developing trust in networks as a secondary effect of management education raises many questions, e.g. of epistemological character, which also need to be followed up. However, network reflection is still not a fully developed concept; therefore, further conceptualizing is necessary.

8. Conclusions and implications

The overall research question in this thesis is: How can regional forms of co-operation that enhance innovation be developed, and how can the regional university assist in this development? The sub-questions are: 1) Does network reflection influence the development of regional co-operation and communities of practice? 2) Does network reflection influence regional collective learning and innovation? 3) How can management education contribute to the creation of interpersonal trust in networks? This case study of a network reflection intervention and its longitudinal effects on forming regional co-operation in a Norwegian cluster association of high-technological SMEs contributes to answer these questions by conducting a process focus at the micro level, and by conceptualizing network reflection.

8.1 Contribution of the dissertation

This longitudinal case study follows the managers that participated in the network reflection programme, the cluster association and the cluster from 2001 to 2007 in order to study the co-operation effects of the programme and develop new theoretical and methodological contributions.

8.1.2 Theoretical contributions

The work contributes to the development of new concepts and definitions. *Network reflection* is a pedagogical method for inter-organizational, part-time management education, which was developed practically during the programme and is conceptualized theoretically in this work. Communities

and networks of practice are extended to the regional level and termed *regional communities of practice*. Finally, the dissertation provides a definition of *regional*.

The work develops *five trust-creating processes: connections, communication, direction, temporary groups and valuable gifts*. In order to create trust, people must be connected. To initiate collaboration, low-risk activities are proposed (Das and Teng, 1998). Communication consists of three sub-processes: Ensure frequent and rich communication, engage in collaborative communication and create personal connections. Shared vision and language constitute direction. Swift trust may develop over short, intense periods of interaction in temporary groups (Meyerson et al., 1996). Finally, you give people valuable gifts when you take risks in sharing your expertise and tacit or experimental knowledge, when you give people access to a limited or sensitive resource or are willing to let others access your personal network contacts (Abrams et al., 2003). By conceptualising network reflection into interventions and activities, and by connecting the activities to the trust-creating processes, the trust-creating social mechanisms of network reflection are explained.

Network reflection seems to hold several capacities. It influences the development of regional co-operation and communities of practice. The development of regional co-operation is influenced by increased connectivity, increased number of weak ties and bridged structural holes. Because Electronic Coast has developed from a business network in 2000 towards a knowledge and innovation network in 2007, and the relationships created during the programme seems to have influenced this development,

network reflection holds a capacity to contribute to the development of knowledge and innovation networks. Network reflection also has a capacity to increase regional collective learning and innovation, and seems to influence a development from reflection *on* action – during the programme – to reflection *in* action after the programme. This shift from reflection on action to reflection in action constitutes a particularly important locus of learning (Nicolini et al., 2004). Furthermore, because the co-operation involves some innovation activity between firms and knowledge creating organizations, the Electronic Coast network seems to have developed somewhat towards a regional innovation system. Finally, network reflection seems to have a capacity to develop natural regional systems of innovation. Hence network reflection seems to have a capacity to develop a network towards systems such as regional innovation systems and clusters.

The study extends several individual and organizational theories to the regional level and develops concepts for regional co-operation. It does this by combining developing these theories and concepts. The theories extended to the regional level are those of communities of practice (Lave and Wenger, 1991; Wenger, 1998) knowledge creation (Koestler, 1964; Polanyi, 1966; Nonaka, 1994; Nonaka and Takeuchi, 1995), organizational learning (Levitt and March, 1988), and management education (Mintzberg, 2004). The developed concepts for regional co-operation are cluster (Porter, 1990; Saxenian, 1994; Porter, 1998a), regional innovation systems (Lundvall and Johnson, 1992; Cooke, 1998) and regional collective learning (Lawson and Lorenz, 1999; Keeble, 2000).

This work contributes to theory in several other ways. It searches for other patterns in the flow of knowledge between university and business than only R&D collaboration; it contributes to network theory by focusing on one way to create motion in network development and thereby utilize its opportunities and avoid its pitfalls; moreover, network reflection is one way to institute a form of co-operation that energizes networking, which regional universities are challenged to perform. Network reflection represents some internal transformations inside universities and at the same time it has a trans-institutional impact; therefore employing the method represents a step towards the entrepreneurial university. The distribution of lasting increased connectivity seems to be random according to education and position, but not according to gender. The increased connectivity was lasting for all the females and for 31% of the males, which may indicate a gender phenomenon. Levitt and March (1988) view organizational learning as a target-oriented process that will be adapted in response to feedback about outcomes. Inter-organizational co-operation is a difficult, frustrating and often misunderstood process (Inkpen, 1996) and the outcome of inter-organizational co-operation often have uncertain returns (Lawson and Lorenz, 1999). If outcomes or feedback about outcomes are missing, the co-operation will decrease. Because all the females in this case continued the increased connectivity, females seem to be more likely to utilize the possibilities and resources in inter-organizational relationships. The work search for new patterns in university and business co-operation, contributes to network theory and indicates that females seem to be more likely to utilize inter-organizational relationships.

In the light of these contributions and results, the answer to the sub-questions is that network reflection has a capacity to increase regional cooperation and influence the development of regional communities of practice. Moreover that network reflection has a capacity to increase regional collective learning and innovation. Finally, that network reflection is a system of relationship-building interventions and a social mechanism that influences trust-creating processes. These processes seem to have a capacity to create enduring interpersonal trust and trusted weak ties in networks.

8.1.3 Methodological contributions

The purpose of this work is to raise and discuss how to *develop* innovative regional networks. A network is a system, and to develop a system, relationships must be changed (Weick, 1979). To discuss how to develop such systems, the action research part of this work consists of enacting a large-scale intervention to change relationships. Several scholars (e.g. Freeman, 1991; Hoang and Antoncic, 2003) ask for more longitudinal, qualitative, process- and outcome oriented research on networks. Moreover, studies of regional systems of innovation “could throw a great deal of light on the persistence (or otherwise) of geographically circumscribed networks and the reason for their rise (and decline)”, and “purely quantitative analysis is inadequate here” (Freeman, 1991: 512). Therefore, in this work a longitudinal, mostly qualitative and inductive process-oriented case study has been conducted. By combining action research and more distanced quantitative social network analysis with qualitative research methods in a longitudinal study to investigate the results, this work provides

methodological contributions on how to study the development of regional systems of innovation.

By suggesting that the actor concept is both explicit and implicit in systems thinking, and that the actors' acceptance of social systems as systems is crucial for their existence and functioning, the work contributes to systems thinking.

Although this study is theoretically founded on theory developing, in virtue of its focusing on subjectifying processes at the micro level it represents a practical turn.

8.2 Discussion of key findings

To develop and launch a new concept, as this work does by network reflection, is a risky project that triggers a lot of resistance from the research community. I have met some critical comments on the concept when presenting it at doctoral seminars and at research conferences, but most of all I have met critical editors and reviewers. These critiques are, however, utilized in the conceptualizing work, and have contributed considerably to its improvement. The critiques therefore represent a valuable resource. If this dissertation had been written as a monography, the steps of conceptualization would have been more inaccessible for the research community in general, and far off from critical editors and reviewers in particular. Hence, developing the concept by writing papers and working to get them published has strengthened the work. By investigating the concept from different theoretical perspectives, all the four papers of this dissertation give important contributions to the conceptualizing process. Because

longitudinal studies consider variations in the variables over time (Elster, 2007), the longitudinal feature of the study also strengthens the work. The concept is founded on an existing concept – experienced reflection – and not developed from scratch, which somewhat reduces the risk. Moreover, the fact that some of the papers have been accepted for publication is a sign that the concept, although as yet not fully developed, has been accepted by the research community. Stages and factors that are likely to have contributed to such acceptance are the use of the competence embedded in experienced researchers' critiques, the development of the concept by investigating it from different perspectives in a longitudinal process, founding it on an existing concept, and finally the publication of papers. As such, network reflection constitutes an innovation, which augments the value of the contribution of the dissertation.

The network reflection concept addresses the role of universities and research in the community, one of the most current research political questions of our time. This work launches a new role for the universities, namely playing the role as a facilitator implementing several interventions into the business community, and thus be a more entrepreneurial university. This new role, constituting features of action research, is not meant to exclude the universities existing roles, rather supplementing them. It also involves some epistemological questions. The vision of Vestfold University College is, for instance, to be the regional centre of knowledge. What does it mean to be a knowledge-centre when knowledge creation depends on a combination of interaction and individual reflection? One of the most important industries in this region is the high-technological SMEs mentioned in this work, and for innovation in this kind of industry both

people-based informal links and knowledge sharing among peers and research-networks are important (Keeble, 2000). Is it possible to argue being a knowledge-centre if explicit knowledge, in the form of teaching and written research, is the only kind of knowledge the university provides? To be such a knowledge-centre the university also needs to co-operate with the region in technical research-networks, as it does in NCE. Moreover, it needs to provide organizational research-networks, to be a facilitator in connecting people, and to arrange relation-building interventions to influence the development of informal people-based links. Facilitating interventions in the business community constitutes relationship-building events among the facilitator from the university and the participants from the business sector. These relationships contribute to ‘opening the door’ between the university and the business community, which can constitute the foundation of co-operation in for instance research-networks later. Furthermore, these relationships may allow and utilize the two-way flow of influence between the university and the increasingly knowledge based society, which Etzkowitz et al. (2000) emphasize.

While action research is criticised to be too practical and too loosely connected to theory, traditional quantitative and qualitative research is criticised to be too distanced to be useful to practitioners. By combining these two perspectives, this work seeks to exploit the strengths of both. Moreover, the methodological contributions represent a practical turn.

The findings point to developing the network towards a *regional innovation system*. Although the network reflection programme itself and some interactions with the regional university emerge from the findings, the main

focus remains on the interactions among the firms. Furthermore, the innovation-supportive culture is not investigated directly. Because interactions with only one knowledge-creating organization have arisen from network reflection, and cultural investigation is scarce, the evidence for the development towards a regional innovation system can be assessed as somewhat weak. R&D consultancies are, however, absent in the region, and the only R&D institution is the regional university. The findings show, moreover, that the development and the accomplishment of the network reflection programme changed central Electronic Coast actors' opinion about the regional university. These actors participated either themselves, or dispatched their middle managers to the network reflection programme. When the idea of a management education programme came up, these actors did not trust the competence of the regional university. The regional university was criticized openly in network meetings and accused not to meet the firms' demands and not maintaining what it promised. As evidence for this skepticism, the challenge to develop the management education programme was first assigned to a private business school with a department in the region. Electronic Coast worked out a requirement specification, and some months later the business school returned a curriculum, marketing folders and registration forms. This programme was, however, cancelled because of the insufficient number of applicants – only four³². Then the regional university received the challenge and started to develop the curriculum *through a joint process with the network*. The actors' skepticism to the regional university still surfaced for instance by their request for several public figures to employ in the teaching. To reduce the fee, the actors deviated from this request later in the process, and accepted to use

³² These applicants were additionally from the same firm

mostly teachers from the regional university. These teachers received very positive feedback in the participants' evaluations, and the findings of this study show an improved reputation of, and highly increased co-operation with, the regional university. Therefore the network developed towards a regional innovation system.

The usefulness of the map of location of firms, in paper 1, needs to be discussed. The map provides an overview of all electronics firms in Vestfold, the programme participants' firms and CoP members' firms. A map is a very strong evidence, but has limitations with regards to explaining time and dynamics. Therefore I am not sure how appropriate the map is: because of the longitudinal perspective, and the dynamics in such a network, it is almost impossible to capture the 'right picture'. Moreover, several of the participants have moved to new firms, some in other municipalities and some outside the region. To illustrate this point, I will give one example:

One participant (X) worked in a firm (1) in municipality A when the programme started. This firm was merged into another firm (2) in the neighbor municipality (B) and moved there during the programme. One year later participant X started to work in a firm (3) outside the region (municipality C), and some years later his old firm (2) went bankrupt. This firm (2) was then taken over by another firm (4) in a third municipality (D). But one year later the former owner and entrepreneur of firm 2 restarted a firm (5) in municipality B with partly the old name of firm 2. One of participant X's colleagues (Y) from firm 2 in municipality B – who also participated the program – now works in a new firm (6) in municipality E. In the map, the

location of the participants' firms was pinpointed according to the situation in the autumn of 2001, before the programme started. Hence X's firm 1 was located in municipality A and Y's firm 2 in municipality B. The location of firms participating in CoP, however, is dated autumn 2004, three years later. Because Y has been active in one CoP after the programme ended, I classify his current firm (firm 6 in municipality E) as actively participating in one CoP.

This example of two participants who worked in the same firm when the programme ended comprises six firms and location in five different municipalities during the six-year period of this study. The example illustrates the difficulties with location of such dynamics in a map, and the timing difference. Because of the explorative purpose of this work, the objective is not to investigate all the qualities of all the processes and outputs, but rather to illuminate some of them. The map may contribute to let the readers believe that this is the whole picture of e.g. CoP, which is not the case here. In the autumn of 2007, eight teams are active in the Electronic Coast, and only two of these are investigated. Finally, a relatively dense business environment does not necessarily lend itself to co-operation and interaction (Maskell et al., 1998: 94). The location of the firms on the map shows the business network, and the location of CoP shows some valuable parts of the knowledge network. The map therefore adds some value to the work, but must not be taken too literally.

Other variables may explain the presented outcomes. First, it could be argued that the objective of the programme – to increase co-operation – may have biased the results. This objective was expressed by the Electronic

Coast team that decided to develop the common management education programme, and only three members from this team participated at the programme. Because this co-operation objective was unknown to most of the 27 participants, it may not have influenced the results. Secondly, the professional content of the programme, entitled Managing Knowledge, may have influenced the results. The professional content consisted, among other factors, of knowledge creation, learning on different levels – individual, group and organizational level – conversation management and knowledge management, so the participants probably learned the importance of interaction to create new knowledge. Moreover, they learned something about networking, and as one of them said in an interview “during the programme we learned about different phases in building networks, and I have been aware that it takes some time”. Therefore the professional content may have influenced the results. Thirdly, other programmes at the Management Academy may have exerted some influence on connectivity and community building. Only one more programme, however, was accomplished in 2003 (employing but a few elements of network reflection), then the programme activity subsided until 2006. Fourthly, the emergence of Institute for MicroSystemTechnology (IMST) at the University College in close co-operation with the micro-technology firms may have influenced the cluster. IMST was established in 2003, and in the autumn of 2007 32 researchers have been registered as active. The co-operation between 14 micro-technology firms, the University College and Electronic Coast to achieve the status as NCE – Microsystems may also have played a role, although IMST and NCE represent a kind of co-operation aimed at technological improvement, not at cluster development, and definitely not at regional development. Furthermore, the participants’ statements might be

biased, prejudiced, partial, influenced and/or subjective. Truth is a function of time, and the short euphoric period that characterized the time right after the end of the programme has long since vanished.

Although network reflection seems to yield many positive results, it is still problematic to recruit applicants to the Management Academy, and the method of network reflection is not fully repeated. This is due to several circumstances: Firstly, the method of networks reflection was only somewhat repeated to some extent on the Management Academy programme in 2003. This was due to unfortunate circumstances that caused the main lecturer to change three times during the programme, because of two incidents of long-run illness in two different persons. The discontinuation caused big competence problems – especially on networks reflection – and relationship building, and decreased the reputation of the Academy. Secondly, the results of this work are not yet heavily marketed towards the firms. The message is not easy to communicate or sell to practitioners, and the firms do not seem to be very interested, since their focus is mostly directed towards technical innovation. For instance, when Electronic Coast arranged a seminar to present some of the results in September 2007, no firm representatives showed up. Thirdly, the results are not very visible to each firm. The participants from each firm took part in the programme solely or in couples with only one exception, so the influence of each single firm is not very remarkable. Moreover, the results have emerged over time, which makes them more difficult to recognize. The results are also ‘soft’, which does not seem to be acknowledged as very valuable in this ‘engineering culture’. Forthly and finally, it can be a result of one of the network pitfalls to weaken participants engagement because of

all its opportunities (Frednes, 2001). Because Vestfold Regional University recently has developed to a very active network partner, there is a danger that the university dominates the regional innovation system, which may cause asymmetric knowledge problems (Cooke, 2007). Because such problems, according to Cooke (2007), are features of unsuccessful regional innovation systems, this problem does not seem to be of great importance in this case. It can therefore be concluded that the problem of repeating the network reflection method and recruiting participants to the Management Academy was probably caused by unfortunate circumstances, such as the lack of marketing of the positive results, and the 'soft' nature of the results, making them not very visible to each firm.

It could further be argued that the choice of programme method is not important with respect to the results. Traditional programme methods mostly consist of lectures and thesis-groups, and the traditional role of the lecturer is teaching and advising. However, the method of network reflection in this case does make a difference because, as I have shown, network reflection is a theoretically well-founded, deliberate *system* of interventions, consisting of activities that connect people, build trusting relationships and facilitate knowledge sharing. Furthermore, network reflection provides an arena for managers for sharing experiences and getting attention. According to Carnegie (1938) people have a strong motivation to do this and to receive appreciation. In the conference part of network reflection, the participants need to listen to each other's stories, and to be a good listener is a way to win friends (Carnegie, 1938). The feeling of appreciation probably increases when they experience that their competence is requested outside the firm. A similar project shows corresponding results.

In a vast organizational development project in U.K., Nicolini et al. (2004) found that one result of organizing reflecting groups among middle managers in regional health services, was the development of organizational innovation in the form of new procedures for patient transfer. This happened because the participants started working together – outside the project – to solve common problems. In this way they found that reflecting groups connected the participants in a way that resulted in increased innovative regional co-operation. The programme method therefore seems to be important.

The conclusion is that the development of a new concept is risky, but has been approved, and that this work challenges important research political questions. Moreover, in this case, network reflection contributed to developing the network towards a regional innovation system and towards a more natural system. The professional content may have influenced the results, and the programme method network reflection seems to be important. On the basis of rigorous and longitudinal research methods, it is reasonable to believe that the lasting effects have been measured. The present work also has the strength of a single-case, which can be a powerful example providing convincing arguments about causal forces (Flyvbjerg, 1991; Siggelkow, 2007) and capacities (Bhaskar, 1978).

8.3 Limitations

Of course, the study has limitations that should be acknowledged, and the findings need to be followed up. The model needs stricter testing, and the effect of network reflection needs further investigation. The reason why the capacities of network reflection to increase regional collective learning,

innovation and trust were realized in this single case may be due to particular features, e.g. the professional content of the programme, the situation in Electronic Coast or the participants' personality. The literature (e.g. Meyerson et al., 1996; Wenger et al., 2002; Abrams et al., 2003) also indicates that the facilitators' competence, features and personality play a role in the creation of relationships. Hence, it would be valuable to utilize the method in a different professional content and/or a different setting, and with another facilitator. The objective of this work, because of the explorative purpose, is not to investigate all the qualities of all the processes and outputs, but rather to illuminate some of them. Because the work does not enumerate frequencies, statistical generalizations can not be provided.

One important weakness of case studies is the possibility to present only those findings that support the conceptual argument (Siggelkow, 2007). I have tried to avoid this pitfall in several ways: Informants with both increased and decreased connectivity were selected for the long interviews; Before the interviews I told the informants not to reward my work on the programme, since what I wanted from them was the truth about what they were doing together, and nothing else; During the interviews I tried to ask neutral research questions; I have presented findings that are negative for the argument, e.g. that it is still problematic to recruit applicants to the Management Academy, and that the method of network reflection has not been not fully repeated; I have informed the readers about several other networking activities that may have influenced the effects. To pay such serious attention to alternative explanations and why these are unlikely to hold, is, according to Siggelkow (2007) very important to strengthen the arguments of case studies.

8.4 Practical implications

The findings have practical implications for several institutions. The importance of regional-cooperation to firms' competitiveness has paradoxically increased during augmented globalization because it makes the value of embedded tacit knowledge more crucial (Maskell and Malmberg, 1999). High-technology SMEs need constant knowledge development because they operate in a market with rapid technological changes and the increasing competition force them to organize effectively. Furthermore, they are often too small to conduct vast research projects themselves and need to perform open innovation. Regional co-operation in the form of people-based informal links, knowledge sharing and research networks are thus extra important to such firms (Keeble, 2000). High-technological milieus seem to be mostly occupied with technological innovation: it is therefore important for them to acknowledge that both technological *and* organizational concerns are of importance to innovation and regional development. "The state has a relevant and partly new role in the knowledge economy in support of knowledge activities" (Cooke et al., 2007: 51). Since regional communities of practice influence regional collective learning and innovation, development and participation in such communities need to be integrated into strategies and practice. Trust represents a relational feature that is critical to innovation, reduces complexity and enriches the firms' opportunities and access to resources, and influences knowledge sharing. In spite of its importance, the level of trust seems to be decreasing in Western societies. Hence social mechanisms and processes that subjectify the participants and develops regional co-operation, regional communities of practice and interpersonal trust are

important. Because network reflection seems to be such a mechanism, the method is important for firms, clusters, universities and policy makers.

Firms and clusters, especially high-tech SMEs, are recommended to cooperate and challenge their regional university college to arrange inter-organizational educational programmes practicing the network reflection method, and to participate in such programs. Moreover they need to be more proactive and systematic about cultivating and participating in regional communities of practice. *Universities* need to utilize the network reflection method in their educational programmes for experienced practitioners. They are advised to implement the method into their strategies to become an entrepreneurial university – for co-operation with their environment – and into their role as an important regional actor. Universities should promote the importance of co-operation and regional communities of practice towards their regional environment, and the effect of network reflection as one way to increase such co-operation. Furthermore, they need to acknowledge a new role as an important supplement to their existing tasks, that of a facilitator in connecting people and implementing several interventions in the business community. They also need to co-operate with the regional community in technical-oriented and organizational-oriented research networks to contribute to open innovation. Universities, moreover, need to participate in regional communities of practice and network reflection themselves. Finally, they should continue to develop the method and test it in different professional contents and settings, and follow up by research on its effects. *Policy makers* seem to have acknowledged the importance of clusters and regional innovation systems, but they need to acknowledge that such systems can not be decided or structured from the

outside, rather they need to be built by the actors – as natural systems – from the inside. Policy makers can, however, cultivate and support the creation and development of such systems, and network reflection seems to be a useful social mechanism to this aim. This is also in accordance with Noottebooms' (2006: 160) suggestion that policy makers “should probably retreat from the design of cluster structure to the facilitation of processes of cluster development”. Propris (2002) asserts that innovation policy promotes inter-firm linkages, and since cultivating regional communities of practice is one way to achieve this aim, cultivating regional communities of practice ought to be included in innovation policy. Moreover, policy makers need to support and encourage more research on *processes* to improve regional co-operation. Finally, firms, clusters, policy makers and universities need to utilize the potential of reflections. In this respect, the findings have practical implications for firms, clusters, universities and policy makers in general, and especially to regions with high-technological SMEs.

8.5 Theoretical implications and further research

The main theoretical contribution of this work is that network reflection has a capacity to increase regional collective learning, innovation and trust, the conceptualizing of network reflection, the development of a framework of trust-creating processes in networks and the extension of organizational concepts to the regional level. Furthermore the work challenges community, cluster and knowledge creation theory by focusing on the need for reflection. By considering whether universities may play the procuress role in connecting people, the work contributes to the debates on the role of universities within regional networks including the development of

entrepreneurial universities. Finally, by providing a process focus at the micro level, this work addresses the lack of empirical examination on how to develop inter-organizational CoP and co-operation to enhance regional collective learning, innovation and trust.

This work contributes to several theoretical debates and fills a gap because longitudinal, process-based studies of development of trust and networks are scarce. By examining network reflection in a context of a cluster, the work contributes to the cluster debates. By combining the debates on development of trust in networks and management education, a new framework of trust-creating social mechanisms and processes in networks is developed. It contributes to the debates on how to stimulate development of inter-organizational CoPs by filling the lack of empirical examination and by introducing the regional university as a new element. Moreover, it contributes to the debates on management education by the empirical examination of experienced reflection and by the investigation of a secondary effect – developing forms of co-operation which enhance regional collective learning, innovation and trust.

This study is generalizable to theoretical propositions. By starting off with theories and using a case to enlarge the domain of these theories, this study provides analytical generalizations (Yin, 1984). Network reflection is conceptualized by theoretical inspiration of concepts from knowledge creation, organizational learning, trust, action research and management education. Rich longitudinal research enables dynamic process data and allows to get closer to theoretical constructs by unraveling the underlying dynamics of phenomena that plays out over time (Siggelkow, 2007).

Siggelkow (2007: 22) argues that case studies usually can "get much closer to theoretical constructs and provide more persuasive argument about causal forces than broad empirical research can."

The findings and exploratory analysis need to be followed up, and the model needs stricter testing. This study shows some capacities of network reflection. The new role of the university, facilitating interventions that trigger people-based informal links and knowledge-sharing, raises many questions, also of an epistemological nature, which need to be addressed and followed up. Network reflection, on the other hand, is not yet a fully developed concept; therefore, further conceptualizing is necessary and auspicious in the future.

8.6 Concluding remarks

This work shows that the participants – 27 managers from 14 firms, who were mostly strangers to each other – increased their co-operation considerably both during the network reflection programme and later on, after the programme ended. The participants established strong and stable communities presenting high level of trust and learning, innovations and systems to coordinate actions aimed at confronting common problems. Moreover, the activity in the cluster association increased considerably. The work concludes that network reflection has a capacity to increase regional collective learning, innovation and trust. Therefore the answer to the overall research question 'How can regional forms of co-operation that enhance innovation be developed, and how can the regional university assist in this development?' is that regional universities may enhance regional forms of

co-operation by utilizing network reflection in organizing management education programmes for networks of regional firms.

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Appendix

Appendix I: Roster rating questionnaire – the Autumn of 2004

Ledelsesakademiet for EC. Kompetanseledelse 2001 - 2002

Datainnsamling foretatt oktober 2004

Kontakten skal måles a) **Våren 2001** b) **Våren 2003** c) **Høsten 2004**

Type kontakt: **A** = møttes ansikt til ansikt **T** = telefon samtale **E** = e-post.

	5	4	3	2	1
Navn³³/ Hyppighet av kontakt	Minst 2 ganger/uke	Mellom 2 ganger/uke og 1 g/mnd	Mellom 1 gang/mnd og 4 g/år	Mellom 4 ganger/år og 1 g/år	1 gang/år eller sjeldnere
<i>SUM</i>					
<i>Soc.interac.</i>					
<i>TIES</i>					

³³ To keep the participants anonymous, the names are removed here

Appendix II: Interviewguide – long interviews – the Spring of 2006

Innledning:

Takke for at jeg fikk lov til å komme.
Sikre at vi kan sitte uforstyrret.
Sjekke at det er ok med opptaksutstyr?
Forsikre konfidensialitet. Slette opptaket senere.

Starte med å fortelle at de ikke må svare slik de tror jeg forventer, eller for å gjøre meg glad eller skuffet. Det jeg er på jakt etter er hvordan du opplever det og husker det. Og hva du gjør. Så det ”riktige” svaret er der du er 100% ærlig og forteller meg dine tanker om det jeg spør om.

Innledende spørsmål:

Kan du fortelle meg på 2-3 minutter hva du jobber med nå, og hva som er det viktigste i jobben din?

Det begynner å bli noen (4) år siden kurset. Har du sett litt på de 2 dokumentene jeg sendte deg (kjøreplan og navneliste)? Hvis ikke tar vi et par min pause for å memorere.

1. Hvordan opplevde du forholdet til med-studentene fra andre bedrifter/lærere under kurset?

- Kategori spørsmål:
 - Når dere jobbet med oppgaver i små grupper på samlingene?
 - Under bedriftsbesøkene?
 - I pausene?
 - Mellom samlingene?
 - I arbeidet med prosjektoppgaven. (ta med denne. Vis den frem nå)
 - Lærte du noe av de andre? (kan du gi noen eksempler)
 - Hjalp dere hverandre?
 - Hadde dere de samme forventninger til samarbeidet? (Zucker 1986:60)

- Hvis noen gjorde noe feil, hva skjedde da? Ble det oversett eller tilgitt?
- Hendte det dere skaffet dere informasjon om noe som dere trodde at de andre kunne ha nytte av? (relasjonsspesifikke investeringer)
- Spesielle/faktiske hendelser:
 - Kan du gi noen eksempler på hva som skjedde mellom dere?
 - Kan du fortelle om noe som skjedde som belyser hvordan forholdet endret seg?
 - Forskjeller før og etter hendelsen. Hvordan var det før, og hva var annerledes etterpå?
 - Hva tenkte du under hendelsen?
 - Hva tenker du om dette nå?
- Kontrast spørsmål:
 - Var det en åpen eller lukket atmosfære?
 - Var det preget av konkurranse eller ”spell hverandre gode”?
 - Var det preget av trygghet eller utrygghet?
 - Virket de andre reserverte eller inkluderende?

2. *Hva har skjedd mellom deg og med-studenter fra andre bedrifter/lærere etter kurset?*

- Kategori spørsmål:
 - Har du kontakt med noen/mange?
 - Hvorfor har dere kontakt?
 - Hva gjør dere når dere møtes/snakkes?
 - Formidler du noen gang kontakt til andre (for eksempel kobler medstudenter til kollegaer)?
 - Føler du at dere har mye felles? Er det lett å forstå hverandre? Kan du si litt mer konkret om det?
 - Hender det at du hjelper en medstudent med noe når dere møtes? (altruisme)
 - Føler du at dere deler forventningene til samarbeidet? (Zucker 1986:60)
 - Kan du forstå eller forutsi hva de kommer til å si/gjøre? (knowledge based trust)

- Har de andre noe å lære deg eller har du fått noen nyttige råd? Kan du evt gi et konkret eksempel? (competence based trust, Sako)
 - Skjønner du deres ønsker eller intensjoner? (Identification-based trust)
 - Hvis dere samarbeider om noe, hender det at dere kontrollerer hva de andre gjør?
 - Hvis de gjør noe feil, hva skjer da? Overser eller tilgir du?
 - Hender det at du lærer deg noe eller skaffer deg informasjon om noe som du tror at den andre kan ha nytta av? (relasjonsspesifikke investeringer)
 - Har kontakten utviklet seg til en form for personlig vennskap (companion trust)
 - Føler du at samarbeidet har ført til at dere har noen form for forpliktelser overfor hverandre? (commitment)
 - Har dere inngått noen kontrakter med noen av medstudentenes bedrifter?
 - Har den ført til noen formelle eller uformelle 'problemløsningsprosesser'?
- Kontrast spørsmål:
 - Er det åpen eller lukket atmosfære mellom dere?
 - Er du trygg og stoler på dem, eller føler du deg litt utrygg? (def willingness to rely on an exchange partner in whom one has confidence)
 - Lærer og deler dere erfaringer eller opplever du at det er litt konkurranse?
 - Har ryktet til medstudentene endret seg etter kurset, er det bedre eller dårligere? (deterrence based trust)
 - Har ryktet til de andre bedriftene forandret seg etter kurset, er det bedre eller dårligere? Hva er forandret? (deterrence based trust)
 - Spesielle hendelser:
 - Vil du gi noen konkrete eksempel på hva dere gjør?
 - Hva tenkte du da?

3. Har resultatet av samarbeid med medstudenter har bidratt til:

- Nye måter å organisere på?
- Nye måter å produsere på?

- Nye tjenester?
 - Nye markeder?
 - Nye råvarer?
 - Nye leverandører?
 - Nye produkter?
 - Nye idèer?
 - Videre utvikling av idèer?
 - At noen idèer har medført noe konkret?
- Spesielle hendelser:
Vil du gi noen konkrete eksempler på dette?
 - Kategori spørsmål:
 - Hva samarbeider dere om?
 - Hva kommer det konkret ut av samarbeidet?
 - Hva er forandret?
 - Hvor mange timer har dere brukt for eksempel på et felles prosjekt for å forbedre en prosess eller et produkt?

4. Har dette (svaret på spm 3) ført til andre endringer?

For eksempel at nye måter å produsere på, har medført behov for nye råvarer eller nye måter å organisere på?

(innovasjoner er ofte "systemisk koplet"): dvs. at eks. produktinnovasjoner ofte også krever andre innovasjonstyper (eks. input innovasjoner (nye råvarer - husk at dette også kan være ny type kunnskap) prosessinnovasjoner, organisatoriske innovasjoner etc.)

- Spesielle hendelser:
Vil du gi noen konkrete eksempler på dette?

5. Hvordan svarte kurset til dine forventninger til høgsolen?

- Kategori spørsmål:
 - Forventninger til undervisning / pedagogikk?
 - Kjennskap / holdning til bedriftene?
 - Profesjonalitet?
 - Forventninger til informasjon og service?
 - Forventninger til nettverkskompetanse?

- Kontrast spørsmål:
 - Hva er forskjellen mellom før og etter kurset?
 - Hvordan opplever du ryktet til høgsolen etter kurset, er det bedre eller dårligere? Hva er forandret?
 - Hvordan opplever du ryktet til lærerne etter kurset, er det bedre eller dårligere? Hva er forandret?
- Spesielle/faktiske hendelser:
 - Kan du peke på noen konkrete hendelser som bidro til å påvirke dette?
 - Kan du peke på noen konkrete hendelser som viser forandringen?

Avslutning:

Tusen takk!

Du kommer antagelig på noen andre momenter om dette, som du gjerne skulle fortalt meg, etter at vi er ferdig. Jeg blir veldig glad hvis du vil gi meg disse momentene også. Bruk e-mail, eller ring.

Det kan også være jeg finner ting jeg må spørre deg mer om. Håper det er ok at jeg evt tar kontakt på tlf eller mail.

Jeg mailer deg utskrift av intervjuet for godkjenning og evt rettelser så snart som mulig.

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