
SOCIAL CAPITAL IN MODE 1 AND MODE 2 KNOWLEDGE PRODUCTION: A FINNISH CASE STUDY

(Paper ID: A296)

Author: Otto Auranen
Group for Science, Technology and Innovation Studies (TaSTI)
Research Institute for Social Sciences
University of Tampere
otto.auranen@uta.fi

Topic area: science studies, studies on social capital

Keywords: social capital, networks, intellectual capital, knowledge production, Mode 2, Triple Helix

Abstract: The paper combines the analysis of social capital with the analysis of scientific communication and collaboration. Specific attention is paid to the meaning of the structure of researchers’ networks and trust and reciprocity between researchers and their contacts at two Finnish university departments operating in different modes of knowledge production. Results are based on the analysis of the survey questionnaire responses and thematic interviews. The results show the difference in the direction of network ties in two departments. Trust was found to lubricate researchers’ communication and collaboration with their contacts. Different forms of trust found in the network ties are introduced. Possible lack of reciprocity between senior and junior researchers raises a question which is discussed. The well-networked researchers were found not to be scientifically more productive than the others. At the end of the paper ideas about the further research on the topic are presented.

---

1 I thank the members of the TaSTI research group for their comments and ideas in preparing of this paper, and Dr. Joan Löfgren for the language checking.
Introduction and research questions

Recent discussions on social capital emphasize the role of personal relationships as information channels and carriers of phenomena such as trust and reciprocity (Ruuskanen 2001, Siisiäinen 2003). Social capital is an important concept in explaining various social phenomena and the success of some individuals, communities, organisations and even societies compared to others (Knack & Keefer 1997, Portes & Sensenbrenner 1993, Putnam 1993). It has also been argued that social capital can act as a facilitator of new knowledge (Nahapiet & Ghoshal 1998). The extent of actors’ networks and the intensity of their relationships have implications for their possibilities for exchanging information and creating new knowledge (ibid., Granovetter 1973).

How is social capital connected to science? Science and knowledge production is social and collective activity. Science is social and collective at least from the perspective of the utilization and dissemination of the existing stock of knowledge. Researchers use previously published knowledge in creating new knowledge. Publication forums for scientific results, the institution of scientific citation, conferences and seminars indicate the collective nature of science. (Pinch 1990, 219-220)

Besides being expressed as formal communication in scientific communities, the collective nature of research activity can be viewed as personal communication and collaboration among researchers: group work, research teams and so on. This is not a new phenomenon (Price 1965). However, during recent decades research groups and collaboration have become more common also in fields that were previously based on work done by individual researchers. The transition is due to – at least in Finland – the growth of competition based research funding which has forced researchers and organizations to join resources in order to be more productive and survive in competition. On the other hand, collaboration is a way of meeting the new challenges set by emerging research topics. Interesting topics are more often found in between the old scientific fields. This calls for groups that will bring together the knowledge and capabilities of researchers from different areas. There is also an idea of critical mass in doing research supported by the current science policy in many countries. According to this policy, multidisciplinary research groups will lead to high-level and innovative research. (Hakala et al. 2003)
The third dimension of the collective and social nature of science is informal communication and collaboration among scholars. The importance of informal activity for the scientific productivity and the quality of scientific work was recognized early on, both in practical awareness shared by researchers and in science studies. The work by Diana Crane (1972) on invisible colleges argues that informal communication between scientists is an important part of scientific productivity and the accumulation of knowledge. More recent studies support Crane’s findings (Katz & Martin 1997, Melin 2000, Weedman 1993). It is possible that the much discussed, emerging changes in funding, activities and the organization of science and technology systems have had their effect on the directions and functions of researchers’ contacts. Previously – at least in the 20th century universities – it was somewhat clear that researchers had most of their contacts among colleagues, and the purpose of the contacts was usually related to doing basic research. This may be changing. Creating and using network relations outside academic communities is possibly an important part of working in the current research system and also an important part of academic research careers today (Shove 2000).

In the following I put together the two strands described above: the social capital research on the one hand and the studies on scientific communication and collaboration on the other. My intention is to examine the question of how dimensions of social capital facilitate knowledge production and learning in academia. More specifically I will concentrate on the roles played by 1. the totality of researchers’ network ties, 2. trust, and 3. reciprocity in knowledge production. I will also analyze the possible effect that the claimed changes in knowledge production (Mode 2 and Triple Helix discussions, see Gibbons et al. 1994; Leydesdorff & Etzkowitz 1997) have had on the role of social capital in research communities. What are the differences and similarities in the three dimensions of social capital (network, trust, reciprocity) between the more traditional academic and quite recently developed, semi-academic contexts? Is social capital used for different purposes and do benefits created by social capital differ?

The paper is divided into three parts. In the first part I explore the role of communication and collaboration in academic knowledge production and the transition from Mode 1 to Mode 2 of knowledge production. This exploration is connected to a theoretical presentation about the different dimensions of social capital and the role they assume in the creation of new knowledge and in the development of researchers’ knowing capability – in short, their
intellectual capital (Nahapiet & Ghoshal 1998). In the second part of the paper I introduce the subjects and the data of the research, as well as the results of the analysis. The conclusions form third part of the paper.

**Mode 1 and Mode 2 knowledge production**

There is a broader framework for the change that influences the work and values of academia: the claimed transition to a new phase or new mode of academic knowledge production: Mode 2 which differs itself decisively from the previous mode, Mode 1. This transition is claimed to affect the goals, values, practices and structures of research. (Gibbons et al. 1994, 1-8; Hakala et al. 2003, 18) The current ideal for the scientific knowledge production is Newtonian physics. According to the Mode 2 argument, universities have begun to conduct research in wider social and economic contexts and across the disciplinary boundaries.

Previous, Mode 1 university knowledge production has occurred inside academic disciplines and in the context defined by the cognitive and social norms of a scientific community. Typical features of Mode 1 include knowledge production in the scientific context, mono-disciplinarity or sometimes multi-disciplinarity, demand of accountability to peers (other researchers), and the evaluation of quality inside academic community. Organizational forms in Mode 1 are stable, homogenous and hierarchical. Mode 2, on the other hand, is characterized by knowledge production in the context of application or applicability, trans-disciplinarity (going over disciplinary borders to create new approaches and concepts), a demand for broader social accountability, and socially determined criteria of quality. Organizations are heterogeneous, non-hierarchical and dynamic. (Gibbons et al. 1994, 4-6; Nieminen 2005, 16-19)

The critics of Mode 2 argument have pointed out that the claims by Gibbons and his colleagues are exaggerated and describe something that is actually nothing new in science. The whole system of knowledge production is definitely not shifting into a new, unseen phase, say the critics of Mode 2 thesis. (Nieminen 2005, 24-25) Instead of representing a total transition, Mode 2 could mean a shift in balance of different forms of knowledge production, the kind of forms that have existed and continue to exist side by side (ibid., 25-26). This would mean that one can already find the two modes of knowledge production for example at today’s universities.
Social capital facilitating intellectual capital

Knowledge production can still be viewed as a core of scientific activity, even if one holds true the argument that there is a transition in the nature of knowledge produced and in the values, practices and structures of research. This is the reason why I have conceptualized the work of researchers as an accumulation of intellectual capital. I see intellectual capital as do Janine Nahapiet and Sumanta Ghoshal (1998), as knowledge and knowing capability. They argue that the creation of new knowledge happens through two generic processes, the combination and exchange of existing knowledge. Combination and exchange are not necessarily the only ways of creating new knowledge. However, taking these two as a focus suits my purposes well, since I’m interested in the collective and social nature of science and knowledge production, and combination and exchange refer to communication and interaction among actors, in this case researchers.

There are certain conditions in the process of creating new knowledge which can also be considered as conditions of intellectual capital creation:
1) the access for combining and exchanging knowledge,
2) anticipation of value through combining and exchanging knowledge,
3) a motivation to combine and exchange knowledge, and
4) capability to combine knowledge. (ibid., 249-250)

Different elements of social capital, of which networks, trust and reciprocity are explored in this paper, influence the creation of new intellectual capital by facilitating the communication and collaboration of researchers, which in turn leads to the combination and exchange of knowledge.

Data and methods of the study

I have chosen two units at the University of Tampere, Finland as the subjects of study. The Department of Information Studies (INFO) was chosen to represent a research community operating in Mode 1 knowledge production, whereas the Hypermedia Laboratory (HYPER) represents the typical Mode 2 research community. The units are different in regard to the dimensions of the two modes, although there are features of both modes in both units. Research in the Hypermedia Laboratory operates strongly in the context of application, whereas at the Department of Information Studies research is still defined more in the
traditional terms of basic and applied research. Another important criterion of Mode 2, trans-disciplinarity, applies more to the Hypermedia Laboratory. The laboratory conducts research in the areas of adaptive contents, learning, experimental design and knowledge-producing systems, while information studies forms an established and relatively homogeneous branch of research and higher education.

Also from the organizational point of view the units belong to somewhat separate categories: the Department of Information Studies has a typical academic structure of a Finnish university department, but the Hypermedia Laboratory started as a flexible project organization and still does not have the usual structure of academic posts. The two units direct their knowledge production to partly different arenas. Researchers in information studies orient themselves more to their own scientific community, whereas at the Hypermedia Laboratory the staff has a stronger sense of accountability to actors outside the academic world.

I have used both a survey questionnaire and thematic interviews to collect the data. Survey data were collected in May-June 2003 comprising responses from 26 researchers, 12 of them at the INFO and 14 at the HYPER. The purpose of the data was to get information about the structural dimension of social capital: the number of researchers’ network ties as well as the direction and intensity of those ties. I carried out 16 interviews, eight in each unit. The interviews were conducted in June-July 2003 and May 2004, and provided information about the cognitive and relational dimensions of social capital: shared language, reciprocity, trust, group identification, and norms among researchers. Interview data were also used to analyze the relationships as information channels.

**Size and direction of the networks**

Nahapiet and Ghoshal (1998, 244) use the concept of the structural dimension of social capital to refer to ”the overall pattern of connections between actors – that is, who you reach and how you reach them”. There are three elements in the structural dimension: network ties, network configuration, and appropriable organization. I will analyze two of these elements in this paper, namely network ties (the amount of them) and network configuration (the direction of networks).
The size of one’s network is an important factor affecting the amount of social capital though many dimensions of social capital are not necessarily the consequences of a large network. For instance trust, norms and reciprocal expectations can also exist in smaller networks. A large network will, however, enhance the possibilities of acquiring information. Network ties create also expectations on the value of knowledge exchange and combination since there is a time benefit in acquiring information when one is well networked. Network ties also intermediate information on actors’ reputations, which also creates expectations and motivation for exchange and combination (Nahapiet & Ghoshal 1998, 252). It can be assumed that the larger someone’s network is, the more opportunities she has for acquiring information, the more expectations she has on the value of combining and exchanging knowledge, and the more motivation she has to engage such activity.

Network configuration will more precisely determine what kind of social capital network ties carry and how social capital fulfills the conditions of creating intellectual capital. One must therefore explore the shares of strong and weak ties of the researchers’ networks as well as the direction of the networks. If we assume that especially weak ties provide access to non-redundant, new information (Granovetter 1973, 1364-1366), we might expect that for university researchers a network rich in weak ties going out of the academy will provide a wide variety of information, and thus a great deal of social capital.

In the survey questionnaire I asked the researchers to report the number of persons to whom they had a) strong and b) weak ties in matters related to research. A strong tie was defined as a relationship in which persons are often in contact with each other and know each other well. A weak tie was defined as a relationship in which persons are rarely in contact with each other and do not know each other well. Table 1 presents the network size and numbers of strong and weak ties in their networks as average figures in both units.

Table 1. The average network size and numbers of strong and weak ties in HYPER and INFO

<table>
<thead>
<tr>
<th>Unit</th>
<th>Network size</th>
<th>Number of strong ties</th>
<th>Number of weak ties</th>
</tr>
</thead>
<tbody>
<tr>
<td>HYPER (n=14)</td>
<td>Mean 31.6</td>
<td>9.1</td>
<td>23.1</td>
</tr>
<tr>
<td></td>
<td>Median 17.5</td>
<td>7.5</td>
<td>10.5</td>
</tr>
<tr>
<td></td>
<td>Std. deviation 31.1</td>
<td>5.6</td>
<td>27.0</td>
</tr>
<tr>
<td>INFO (n=12)</td>
<td>Mean 17.7</td>
<td>6.1</td>
<td>11.6</td>
</tr>
<tr>
<td></td>
<td>Median 16.0</td>
<td>5.5</td>
<td>10.0</td>
</tr>
<tr>
<td></td>
<td>Std. deviation 10.2</td>
<td>4.2</td>
<td>7.4</td>
</tr>
</tbody>
</table>
In HYPER the mean and median of the network size differ significantly, unlike in the INFO unit. The same applies to the number of weak ties in HYPER. The result hints that there are researcher(s) at the Hypermedia Laboratory who have larger networks and more weak ties than the others. Excluding this, there doesn’t seem to be any significant difference between the two units when network sizes are compared.

When individual researchers are ranked according to the size of their networks, a group of HYPER researchers is revealed. The group of four has 40 or more network contacts. Remembering Crane’s (1972) findings on the better scientific productivity of the well-networked scholars, it is interesting to compare the productivity of the four ”intense networkers” to the other researchers at HYPER and INFO. I have compared the average figures of books, articles in scientific refereed journals, and papers in scientific conferences during the last five years of the “intense networkers” with the others. Book production doesn’t show any significant difference between the group of four and the rest. However, “intense networkers” have published more articles on average during the last five years than the others, as well as papers in scientific conferences. The median figures are 15 and 8.5 for the articles and 17.5 and 3 for the conference papers.

It must be pointed out that especially at the Hypermedia Laboratory there are researchers who had been working at the department less than five years at the time the data were collected. If these researchers are excluded from the comparison, we are left with 11 people plus the ”intense networkers”. Comparing the article productivity between the two groups doesn’t show a clear difference anymore. The median figure for articles during five years for the group of 11 is 14. The difference in conference papers remains, since the median figure of papers for the group of 11 is 5. So, according to my analysis, a larger network doesn’t necessarily give a significant advantage in the production of books, articles and conference papers. The data available are of course very limited and the publication cultures differ so much from each other that one must be careful not to jump to conclusions. It is quite possible that the analysis of more data on one coherent publication culture would end up with different results. My analysis raises a question about the benefits of the larger network: if not better scientific productivity, then what is the advantage created by it? I come back to this issue at the end of my paper.
I gathered information about the direction of the researchers’ network ties by asking about the percentual distribution of their strong and weak contacts in universities, other research organizations, research funding organizations, firms and other types of organizations. At the INFO unit researchers had more weak ties in universities than the researchers at the HYPER did, the median figures being 97.5 % of weak ties in universities at the INFO and 62.5 % at the HYPER. In the case of strong ties the difference wasn’t as clear, the median figures being 96.5 % of ties in universities at the INFO and 77.5 % at the HYPER. The result implies more versatile opportunities for the HYPER researchers in seeking and exchanging information and thus better opportunities for the creation of intellectual capital.

The other measurement of the direction of the network ties is the proportion of university staff and university colleagues among the contact persons reported most important for their current research projects and research work in general. I have included in “university staff” all the contacts that the respondents reported as working in some university. Contacts that respondents reported as working in universities and doing research work I included in "university colleagues". “Doing research work” is inferred from the titles of positions respondents reported their contacts to hold. The proportion of university staff and university colleagues in contacts reported most important for the current projects and for research work in general is presented in Tables 2 and 3, respectively.

Table 2. The proportion of university staff and university colleagues in contacts reported most important for the current research projects in HYPER and INFO

<table>
<thead>
<tr>
<th>Unit</th>
<th>Proportion of university staff in most important contacts</th>
<th>Proportion of university colleagues in most important contacts</th>
</tr>
</thead>
<tbody>
<tr>
<td>HYPER</td>
<td>48/67 (71.6 %)</td>
<td>40/67 (59.7 %)</td>
</tr>
<tr>
<td>INFO</td>
<td>47/53 (74.6 %)</td>
<td>38/53 (71.7 %)</td>
</tr>
</tbody>
</table>

Table 3. The proportion of university staff and university colleagues in contacts reported most important for the research work in general in HYPER and INFO

<table>
<thead>
<tr>
<th>Unit</th>
<th>Proportion of university staff in most important contacts</th>
<th>Proportion of university colleagues in most important contacts</th>
</tr>
</thead>
<tbody>
<tr>
<td>HYPER</td>
<td>44/63 (69.8 %)</td>
<td>36/63 (57.1 %)</td>
</tr>
<tr>
<td>INFO</td>
<td>38/46 (82.6 %)</td>
<td>34/46 (73.9 %)</td>
</tr>
</tbody>
</table>
The analysis confirms the conclusion that the researchers at the HYPER have more a versatile network configuration with respect to directions of networks. Although both HYPER and INFO researchers’ most important contacts for the current projects are mostly university staff, we began to see a clear difference when looking at the proportion of university colleagues in most important contacts. At the HYPER researchers have more important contacts outside the category of university colleagues with respect to both current research projects and research work in general.

The network configuration of the INFO researchers can be called more one-sided than that of the HYPER researchers. Is this a problem for the knowledge production at the INFO unit? This can be reviewed by looking at the interview answers of the INFO researchers to the question of the adequacy of their networks. They gave no clear indication that they were unhappy with their networks or that they wanted to establish more contacts outside the academy. They don’t consider their more academic networks as a problem, which is probably due to the situational nature of the network ties. Network ties are built, activated and used from the point of view of the foreseeable future. The current research orientation of the INFO researchers doesn’t require them to establish contacts outside universities as much as the research orientation of the HYPER researchers. Differences in the structure of social capital appear to be a consequence of the different modes of knowledge production.

**Trust embedded in researchers’ networks**

Trust facilitates several conditions of combination and exchange of knowledge: access, anticipation of value and motivation, hence it is very important element of social capital in regard to accumulation of intellectual capital. The connection between trust and strong interpersonal ties is repeated in the literature on social capital. Secondly, the mutually enhancing effect of collaboration and trust is stressed, especially in situations where no formal agreements define the collaboration. (see Coleman 1988, Misztal 1996, Putnam 1993). According to Barbara Misztal (1996), trust is actors’ belief that the results of somebody’s intended action will be appropriate from their point of view. I have been following this loose definition, which allows me to explore many kinds of dimensions of trust. I have assumed that the trust between HYPER and INFO researchers is indicated in strong ties, collaboration and in other forms of intensive communication in which affective elements can also be found. In
research work, co-writing, commenting on texts and other artifacts (ie. prototypes), planning research, scientific conversation, supporting and encouraging others usually indicate collaboration and/or affective communication.

The element of trust was strongly present in the relationships that researchers at HYPER and INFO had to the contacts they reported most important for their current projects. Many interviewees described these contacts as friends or fellows besides them being colleagues or collaborators. So, in these ties there was an element of trust. Trust was enforced in these ties by intense co-writing or other forms of collaboration although it must be remembered that collaboration was in many cases based on formal agreements, and the researchers had not themselves chosen the colleagues working in the same project.

The "basic trust" described above is one side of the element of trust which one could easily see in the interview responses. The other side of trust was trust in another party’s performance. I describe the features of the “trust in performance” later. The "basic trust” proved also to be transferable from one social context to another, as some of the interviewees stated that the persons closest to them – for instance a spouse or a mother – are important contacts with whom they could have confidential conversations about their work. This kind of transferring of ties from the private to the public sphere is an indication of appropriable organization, where resources created in one context become useful in another (Nahapiet & Ghoshal 1998, 253). It has also improved the potential of some researchers to exchange knowledge outside their own work environment though it is quite obvious that the importance of these intimate ties lies mostly in enhancing the work motivation and having support, not in the creation of intellectual capital.

Some of the researchers’ ties to contacts they reported being most important for their research work in general were characterized by lower level of trust than ties to other important contacts. The researchers pointing out these contacts had no strong ties with the contacts in question, or not much communication or collaboration with them. These contacts were more often found in the networks of HYPER researchers. A probable explanation for this is the fact that there are more junior researchers in the HYPER unit. They often had in their network senior researchers who had affected the scientific career of the juniors, often by personal encouragement and support. In many of these cases there weren’t strong ties or collaboration between the two parties because as the researchers they were of a different generation.
Encouragement and support were more distant in nature. Still, apart from these exceptions, the analysis of the trust between HYPER and INFO researchers and their most important contacts indicates a certain recursive nature of trust. One could speak about a Putnamian virtuous circle (Putnam 1993, 177) in which people who know each other well communicate and collaborate which in turn brings about the reinforcement of ties and trust, and this reinforcement motivates people again to communicate and collaborate.

**Reciprocity in researchers’ networks**

The reciprocal structure of expectations and obligations is another important element of the relational dimension of social capital as formulated by Nahapiet and Ghoshal (1998), facilitating access to knowledge combination and exchange, as well as creating anticipation of the value of such activity. The reciprocity of this kind can operate without explicit norms. In a research environment reciprocity is perhaps best manifested in commenting on texts and exchanging information, for example on interesting literature, conferences, research funding and job opportunities. Both commenting and information exchange of this type are generalized reciprocity (Putnam 1993, 172), in which exchange happens through the delayed repaying of services: ‘if I comment on her text or send her interesting information, I have permission to expect her to repay in the future and she will feel obliged to do so’. Conversation, whether general scientific conversation or more focused conversation, for instance about a research project or a publication, can be interpreted as balanced. Balanced reciprocity refers to the simultaneous exchange of items – in this case of ideas and insights. According to Putnam, generalized reciprocity is more important from the perspective of social capital (ibid.)

I looked for signs of the two sorts of reciprocity based on what the interviewees reported they were doing with their most important contacts. Conversations about research projects, free scientific conversation and conversations related to co-publication are balanced reciprocity, which dominated the communication between interviewees and their contacts. Generalized reciprocity of commenting on texts and exchange of information was less common. Balanced reciprocity dominated the communication in both units. Furthermore, part of the commenting on texts occurred in situations structured by formal norms, for example during research group meetings or seminar sessions.
It is rather surprising to find out that generalized reciprocity is not evident in many of the ties between researchers and their most important contacts considering that most of the ties in question are strong ties characterized by trust. According to social capital theorists, the structure of expectations and obligations should prevail in strong ties. Two things can be offered to explain the observations on the sorts of reciprocity. First, the relationships between researchers and their most important contacts reflect separate roles and goals in research work. The implication is that relationships operate with respect to goals and the element of generalized reciprocity is not necessary in communication and collaboration. Second, the interplay of trust and generalized reciprocity is based on the idea that the services are not counted. There may well be a mutual structure of expectations and obligations and both parties might well be conscious of it and see it as a possibility, even if it is not actualized.

Analysis of the interviews revealed another, more serious risk to reciprocity than the possible lack of generalized reciprocity. The difference in intellectual capital of senior and junior researchers can endanger the motivation to engage in communication, collaboration and exchange of knowledge. Both units had several junior researchers working on their doctoral or even master’s thesis. Junior researchers usually named the supervisor of their work as one of their most important contacts. Similar were the cases in which a senior researcher comments on a junior researcher’s work, sends her information or encourages her in her academic career. Does the junior researcher in these cases have something to give from the point of view of intellectual capital? Is the senior motivated to keep in contact with the other party? Other elements of social capital can naturally compensate for the lack of reciprocity. This was sometimes the case between younger interviewees and their supervisors or other seniors. There was one case in which both supervisor and her student were interviewed. It is telling that the senior researcher did not list her student as one of her most important contacts, whereas the student pointed out that the supervisor is among her most important contacts in regarding both her current work and research work in general.

It could be reasonable to assume that the input by a junior researcher to a reciprocal relationship is her finished thesis, and that would motivate the supervisor to communicate with her apprentice. One must remember that this activity is governed by official norms and doesn’t operate only through social capital. However, the writing of a thesis can still be facilitated if a junior researcher feels obliged towards her supervisor or other senior who has provided help.
The decreasing proportion of core funding for research and the increasing proportion of project funding at the Finnish universities has transformed some of the senior researchers into manager-like staff whose duties include starting and managing projects. They have less or no time to conduct actual research themselves. (Ylijoki 2003, 328-329) Communicating with junior researchers gives senior researchers-manager an opportunity to keep up with the current research themes and approaches in their field of study. On the other hand, junior researchers are natural followers of seniors’ work. It is rewarding to see your student advancing in the same research area you have been developing yourself. Hence, reciprocity can also be embedded in the need to secure the future of the research area and the continuity of knowledge production.

Dialectics of intellectual and social capital

Intellectual and social capital are in a dialectic relation to each other in the network ties of INFO and HYPER researchers. As stated previously, production of new knowledge remains in the core of scientific activity which applies to the researchers of INFO and HYPER, too. The research tasks in the field of hypermedia studies may come closer to the applicability of knowledge but researchers in the field also value “pure” or “curiosity-oriented” research. Having adopted the ethos of universities which is geared towards knowledge production (Becher & Kogan 1992), the researchers require that network ties must be useful to research by bringing intellectual content into communication. Because of this ethos, the researchers want to mainly build and maintain ties to persons who have something to give intellectually.

The elements of social capital are needed to secure the exchange of intellectual capital of the researchers and their contacts. Many interviewees told that they are having difficulties contacting unknown persons although they would expect the persons in question to be useful in research collaboration or communication. Persons who the researchers already know are the most pleasant partners.

On the other hand, knowing what the other party knows and can do is a motivating factor for the researchers because it will facilitate communication and collaboration. Through intense communication with someone whom you know well makes it possible to accomplish new achievements and develop yourself. As the ties grow stronger, they become embedded in trust
and the reciprocal structure begins to build up. In the interviews this is indicated by the researchers telling how they have learned to know the other party’s ways of expressing herself, or how easy it is to ask for help from someone they know well, or how they constantly comment on each other’s texts or exchange hints on literature.

“Trust in performance” is linked to the dialectics of intellectual and social capital. Trust in performance is trust in someone doing her job, knowing what she’s doing. Trust in performance comes in two sorts, the chain logic or the logic of guarantee. In the chain logic, a researcher may ask her contacts - whom she trusts – if they know ”good persons” in a certain field of study, and the contact can point to someone she thinks is “a good person” (intellectually). In the logic of guarantee, a researcher (and her intellectual reputation) can act as a guarantee. The researchers’ contacts will trust her intellectual capital and her ability in research work because they know her – or at least her reputation.

The more low-profile form of trust in performance is belief in other parties’, usually one’s long-time contacts’, ability to do their part in collaboration, that it is worth it to have contact with them in matters of research work. Some of the junior researchers I interviewed reported that they were recruited to a research project by a senior researcher who already knew them. This can be interpreted as a function of trust in performance: a senior colleague trusts that a person she knows will have something to give in the research area.

**Benefits created by network ties**

When the INFO and HYPER researchers were asked about the instances in which they had noticed their network ties to be beneficial for research, the one impact was described very similarly by researchers from both units: getting fresh perspectives on the process of knowledge production and through that, learning. A fresh perspective may follow from communication with a colleague who has a slightly different focus in her research, or with a colleague who is in a totally different research area or is not a researcher at all, or with a senior researcher who simply knows more. All the sources of fresh perspectives mentioned above were reported by the interviewees. Fresh perspectives often come through comments, when texts or other forms of scientific production are handed to other people for evaluation. Other important occasions are conversations in the meetings of the research or project groups, or in less formal situations.
It is an old idea to get new perspectives for your research work by using your personal contacts. There may be changes taking place in the values and practices of science or in the forms of scientific communication and collaboration (Gläser 2003, Ziman 1996). Despite all this, it seems to be the case that researchers seek persons with whom they can share their stock of knowledge and generate fresh perspectives. If the rise of the new academic values were very strong, one would expect it to be reflected in these interviews too. Researchers would consider the main benefits of network ties to be something else than getting a fresh perspective on their article draft or research plan. “Benefit for research” appears still to be interpreted as meaning ”benefit for actual research”, from which other matters, such as the funding of research and the applicability of research results can be separated. This may be an indication of the persistence of traditional academic values (Ylijoki 2003).

I will now return to the question of the benefits created by a larger network. In light of my data, a larger network doesn’t seem to improve the scientific productivity. Could there be something in the new mode of knowledge production that sets new functions for the social capital of researchers? It is a relevant question, since all the intense networkers worked at the Hypermedia Laboratory, the unit operating in Mode 2. Interview data revealed that the HYPER researchers consider lay persons as the audience of their research more often than the INFO researchers, who were more oriented to publish for an academic audience. Secondly, securing research funding, ”the next project”, or job opportunities possibly outside the academic community was a more important function and benefit of network ties from the HYPER researchers’ point of view. Perhaps the intense networkers saw benefits like dissemination of results to the wider public or getting research funding as more relevant for themselves than the others?

The differences described above were between the units, however, not between the intense networkers and the others. The analysis of interview data from the perspective of the uses and benefits of contacts did not reveal themes that would separate the intense networkers from the other researchers. With this data the various possible benefits created by a larger network remain an open question.
Discussion

The transition to a new mode of knowledge production has been claimed to mean the rising importance of networks: researchers come together to solve problems in changing networks, no longer in static communities (Ziman 1996). This may be happening but it doesn’t appear to have an effect on the size of the individual researchers’ networks. There are still academics with very few contacts. It is, however, interesting to notice that all the intense networkers worked at the Mode 2 HYPER unit. At the departmental level this, combined with the more versatile structural dimension of social capital enjoyed by the HYPER researchers, could mean an advantage if the science and technology systems and the knowledge production are to move to a new phase.

Still, the researchers of INFO weren’t pronouncedly unsatisfied with their network size or configuration. This implies that the Mode 2 or Triple Helix (Leydesdorff & Etzkowitz 1997) does not dominate the academic knowledge production so that all the departments and researchers would feel compelled to acquire the kind of social capital that would give them access to the new markets of knowledge production. There is a still-existing difference between the modes of knowledge production: no transition from the mode to another is occurring, rather we can see the co-existence of modes (Gibbons et al. 1994, 8-11).

In the current paper I have attempted to analyze the role of social capital in the two modes of academic knowledge production. Some of the elements of social capital seem to operate in a very similar way in different contexts of research. The goal of further research should be the widening of the analysis to concern several research communities and cultures. This is necessary because a) it is well known that there are differences between academic cultures (Becher & Trowler 2001); and b) social capital appears to be contextual, which means its sources and mechanisms are different in different environments (Krishna & Shrader 1999). Studying social capital in several units in several universities, possibly in several countries, will give robustness to the findings which remain unavoidably suggestive in the analysis of the data available here.

It is also necessary to move away from the analysis of ego-centered networks to the direction of the analysis of macro structures of networks in research communities, for example a department at a university, to reveal all the mutual network ties between the actors. The
analysis of macro structures of networks will enable better exploration of the stock of social capital in the research community than the analysis of the ego-centered networks. At the same time it is reasonable to concentrate on the researchers that hold a large amount of social capital in a community: who has a great deal of network ties, who is named often as an important contact, who has ties embedded in trust and reciprocity, and what do these kinds of researchers mean for the knowledge-producing capacity of the research community? Once we turn our gaze on the research community as a whole, we must not forget the contacts outside the community. The social capital of the researchers and their communities hasn’t previously been limited into disciplines or universities either, and if shifts in the balance of the modes of knowledge production do happen, the interplay of intellectual and social capital will take place in ever more heterogeneous contexts.
References


