Change options through network relations

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Abstract

This paper takes up the ideas of Gulati, Nohria and Zaheer (2000) and Håkansson and Ford (2000) who propose that network relations have a dual side. On one hand, networks offer access to resources, such as learning and new knowledge and information. On the other hand networks constrain and limit firm activities. This dual nature of networks is particularly relevant in times of change, as networks offer resources that improve the change positions in firms, e.g. enhance firm platform options (Kogut and Kulatilaka 1994). At the same time networks restrain the repertoire of actions by linking the firm to the network structure (Håkansson and Ford 2000).

In this paper, we take these ideas a step further by trying to understand what these resources and constraints are all about. First, we draw on a quantitative study giving information both on how the firm perceives its network in total and some of its network partners. On the network level we see that firms that claim to get valuable resources from the network are also those that feel most "locked in". On the relationship level we can see that access to knowledge vary between networks. What is interesting to see is that those firms that get most knowledge out of their network relations are those that perceive risk to be lowest. This suggests either that knowledge is only transferred or created in situations of low risk, or that risk is secured through trust or adequate safeguards. Through these variables, we were able, through discriminant analysis, to distinguish between three different networks, giving some insight about the nature of resources and constraints, and the relation between them. To understand these differences further, and to explore more in depth the change options nature of these dual concepts, we suggest to perform interviews with firms from these networks. To this date, only one of these interviews has been performed. We end this paper by discussing insight from this interview.

Introduction

To what extent do relations with other firms constrain and/or give opportunities to a firm? This question has interested researchers for decades. Although researchers disagree as to what extent managers can adapt and change their internal structures willfully (Hambrick and Finkelstein 1987), there seem to be some general acceptance that firms to some extent purposefully can change (Lawrence and Lorsch 1967). Additionally, firms also are embedded in relations with other firms that affect these choices (Granovetter 1985; Håkansson and Snehota 1989). Furthermore, many strategists argue that the ability to change has become more important the last decades with the increasing globalization, technology changes and fluid industry structures (Ashkenhas et al. 1995; DÀveni 1994; Volberda 1996).

Gulati, Nohria and Zaheer (2000) and Håkansson and Ford (2000) point to the dual nature of networks. Håkansson and Ford discuss network paradoxes, and argue that social networks both offer firms opportunities and constraints. In network relations, the individual firm can be restrained by other companies; …"*each companies` considerations and action can only be fully understood within a structure of individually significant counterparts and relationships"* (p.7). This point is also followed by Gulati et al (2000) arguing that networks have both positive sides, offering firms information, resources, markets and technologies, as well as dark sides illustrated by unproductive relationships or lock-ins. Our focus in this paper is to discuss this dual side of networks, at the same time constraining and enriching firms. The aim is to understand how networks give resources and constrain networks, and also to point to structures or processes of networks that seem to be connected to resources to and constraints on firms.

We start by discussing theoretical approaches to these issues. Then we present some results of a quantitative study of networks. In this study we discuss networks that

differ on constraints and resources to the firms. To understand these implications further, we are in the process of performing some interviews with firms in the networks trying to get some more information on the actual resources and constraints the firms are experiencing. In addition we are interested in the extent to which these resources and constraints are linked to the ability of the firms to change.

Insights from previous studies

It is well documented that network relations are seen as important tools for information, knowledge transfer and learning. Conner and Prahalad (1996) for example, argues that firms often lack expert knowledge and must seek that externally. Both Hamel (1991) and Inkpen (1998) and Badaracco (1991) see network relations as representing a superior situation to knowledge acquisition as it is possible to short circuit the process and avoid the position of being a perpetual follower. Powell et al (1996) refer to the *"liability of unconnectedness"* at work in many fields of rapid technology development. *"At a core of this relationship is a vital need to access relevant knowledge: knowledge of a sort that is sophisticated and not easily produced and captured inside the boundaries of a firm"* (p.143). Several researchers argue that this knowledge should not be strategic or tied to the core of the firm (Barney 1991; Reve 1990) as the firm may then risk loosing the foundations for its survival. Others have found that a narrow focus on own core resources may lead to competency traps, resirculating old knowledge (Leonard-Barton 1992; Lewinthal and March 1993). Ingram and Baum (1997) found that organizations initially benefited from their own experiences but were harmed by them in the long run, and that external knowledge is important for a firm to prosper. Cyert, Kumar and Williams (1993) post that firms have different ability to deal with external knowledge, and that even if strategic knowledge is exposed, firms will have different capabilities to build value from it. Consequently, we may argue that external information and the sense-making of this information, what we may call knowledge, is very important for many firms.

The question then becomes to what extent the firm needs and makes use of this knowledge for change purposes. The manner in which firms acquire knowledge is not understood as a direct rational process. Kogut and Kulatilaka (1994) for instance talk

about platform investments as investments in resources and capabilities over time that makes the firm able to change its strategies. Ansoff (1965) talks about the firm investing in resources not necessarily to "*perform own breakthroughs*", but to exploit *"expeditiously and intelligently breakthroughs performed by others"* (p.66). The idea of *"absorptive capacity"* (Cohen and Levinthal 1990) and *"dynamic capabilities"* (Teece, Pisano, and Shuen 1997; Teece 1998) take up the same idea - the firm has a collection of resources that enables it to observe and act on information in its environment. The idea is that a firm that employs people that actively follow-up the developments within a marked, will much faster and more accurately be able to construct strategies that can meet these changes. These follow-up resources necessary for understanding are a part of a cumulative, constant resource building process where people within the firm need exposure and access to market changes. If firms within the network possess complementary or different knowledge or exposure to changes, the network links may be a manner in which the firm updates its own platform resources. Huber (1991) talks about an important part of organizational learning being knowledge acquisition, definer as the *"process in which knowledge is obtained"* (Huber 1991:90). He argues that the organization may both search intentionally, scan, and notice. That is, the organization may set out to learn something the other networks firms know, but the firm does not. Additionally, the firm may periodically try to monitor new knowledge the other firms are acquiring. Thirdly, Huber mentions the idea of noticing, defined as the *"unintended acquisition of information about other firms external environment, internal conditions and performance"* (p. 97). This idea implies that network relations may not only give intended resources, but may also be seen as links that can serve as information channels that could be faster and more accurate than other contacts.

Proposition 1: Networks are important sources for platform resources

Even if network relations give access to important resources, they may also be problematic. A review by Das and Teng (2000) show that between 30 and 70 % of all alliance relations are considered unsuccessful. Kanter (1994) argues that "…*potential partners must find compatibility in legacy, philosophy and desires, because specific opportunities are often short lived and will not sustain a long term relationship"* (p.101). This process of alignment is often difficult, leading to conflicts (Alter and

Hage 1993), change of bargaining position (Hamel 1991; Inkpen and Beamish 1997), evolvement problems (Doz 1996) and increasing contracting costs (Pearce 1997). Even if alliances and networks are seen as more easily to exit compared to internal organizations (Williamson 1991), termination or exit of networks may have some costs connected to it related to lock-in and foregone alternative opportunities (Gulati, Nohria, and Zaheer 2000; Håkansson and Ford 2000). We may therefore argue that firms are more or less tied into a network in the sense of having fewer alternative cooperative partners (Heide and John 1988), being constrained by loss of autonomy and the ability to control outcomes (Hladik1988) and delays in decisions due to problems of coordination (Moxon, Roehl, and Truitt 1988).

One theory that discusses the issue of dependence is transaction cost theory (Williamson 1975). The more asset specific the transaction within the networks, the more the firms will loose if they exit the network. In addition, firms invest relational resources in alliances (Macneil 1980), and we may argue that networks that have developed relational norms easing transfer and structuring of network relations may serve as a loss to firms terminating a network. We may therefore argue that investments firms make in a network, in terms of specific investments and/or social investments restrain or lock the firm into network relations.

Propositions 2: Knowledge networks constrain firms

The quantitative study

In the fall of 2000, a total of 284 questionnaires were sent out to networks receiving support from the research council in Norway. The response rate ended up to be 33% which is not considered bad for these types of studies. 94 surveys were returned, and 71 of these were seen as usable. The reason for the high discard rate was the complex design of the questionnaire, resulting in many firms returning it incomplete. We used an informant approach, contacting the manager of the firms in the networks, asking them to give the questionnaire to the person within the firm knowing most about the network partners. Each informant was asked to answer some question regarding the

firm and the network. In addition we requested that the informant pointed out three to five of the firms that they most frequently cooperated with within the network. Then we had them describe each individual relation. We were then able to collect information on 12 networks and 239 network relations.

In order to look at differences between networks, we chose three different networks to study further. We chose to look at two networks that were within the same type of industry, namely printing, and one that had a stated goal of information sharing. Except from one of the printing networks, that was small, these were also the networks that had most firms responding.

Prinfo AS was one of the largest networks in the study with 41 firms. 14 firms responded with usable questionnaires. The network was established in 1988. The network is nationwide, and the different companies are the stock-holders. Each of the companies are quite small (about 5-10employes). The fields of cooperation are purchase, sales and marketing, job allocation, capacity coordination and special competence.

Trykk i Nord: was the smallest network, consisting of 7 printing companies in Northern Norway. We were able to get usable responses from 3 of these. The network was founded in 1995. Each company has 6-12 employees. The network was formed to share experiences/knowledge, develop a joint profile towards customers, and increase efficiency and decrease costs through product specialization and coordination of competence and technology.

Instrumenteringsnett; was the largest network in our study with 60 firms. We received usable questionnaires from 11 of these firms. The municipality of Trondheim was central in establishing this network in 1998, and the aim has been to exchange knowledge and information through network based communication. The firms have cooperated by supply agreements, exchange of equipment and information sharing.

Measures

Each question in the questionnaire was measured on a Likert scale from 1-7, with 7 representing strongly agree and 1 strongly disagree.

To look at knowledge access and constraints, we looked at questions regarding the ease in which firms could withdraw from the network and contact other firms outside the network. These measures are similar to the ones used by Heide and John (1988):

- ***It would be easy for us to exit this network***
- ***To perform activities in this network we are dependent on this network ®***[1]
- ***The resources we access through this network are easily available other places***

Cronbachs alpha in this measure was .66

Regarding access to resources in the network, we took as a proxy the frequency of contact between the firm and other networks/ and network management. In addition, we included the preferences for the firm doing business with network firms, and the extent to which being part of the network has contributed to growth within the firm.

- ***Being part of this network has contributed to growth in our firm***
- ***In our company we are well known with the other companies within our network***
- ***It is natural for us to choose a network company before another company when doing business***
- ***We have often contact with network management***

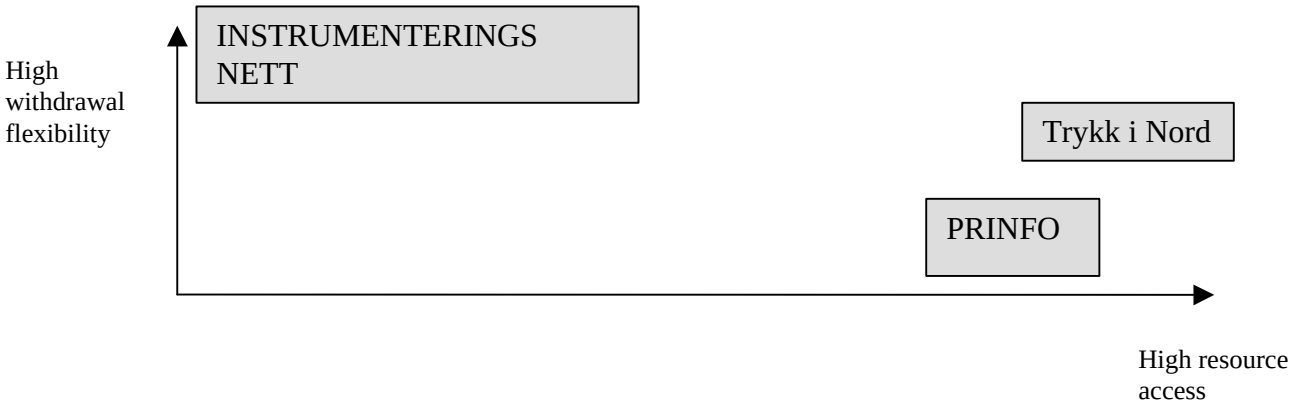
Cronbachs alpha for this measure was .85.

If we look at correlations between these variables the two variables are negatively and significantly correlated (-.67, p< 001) demonstrating that firms that say that it is easy to withdraw from their network are those that claim that they get few resources from their network. Factor analysis does separate between the factors, but the loadings are

[1] Reversed

somewhat on the high side. Consequently the two factors as measured here have borderline convergent and discriminant validity.

By use of discriminant analysis we can see whether our three networks differ regarding withdrawal flexibility and resource access from the network. Our analysis show that based on these two variables two statistically significant functions can be derived (Function 1 explaining 91% of the variance, $p<0.01$, and function 2 explaining 9% of the variance, $p<0.1$). Function 1 separates Prinfo and Trykk i Nor from Instrumenteringsnett, describing the first two networks as giving more resources to their member firms than Instrumenteringsnett. Function 2 separates Trykk i Nor and Instrumenteringsnett from Prinfo, the two first companies having higher withdrawal flexibility than Prinfo. Consequently, Instrumenteringsnett comes out as the network with highest withdrawal flexibility, but lowest resource transfer, whereas Prinfo is the opposite and Trykk i Nor in the middle.



In addition to looking at the network as a whole, we may look at the effects of the dyadic relations within the network. Here we have also looked at constraints and resources from networks, but in somewhat different variables. First we have looked at access to knowledge

- ***We share activities and projects that provide opportunities for learning with this company***
- ***Sometimes we obtain important knowledge from the direct observation of the***
- ***We visit regularly each others facilities and observe onsite how operations are conducted***

- ***The company and ours have learned much from the direct contact between out two organizations***
- ***We exchange knowledge about customers, suppliers, and competitors with this company***
- ***We share knowledge with this company about how we can both improve our internal processes and provide better services and products***

Cronbachs alpha .83.

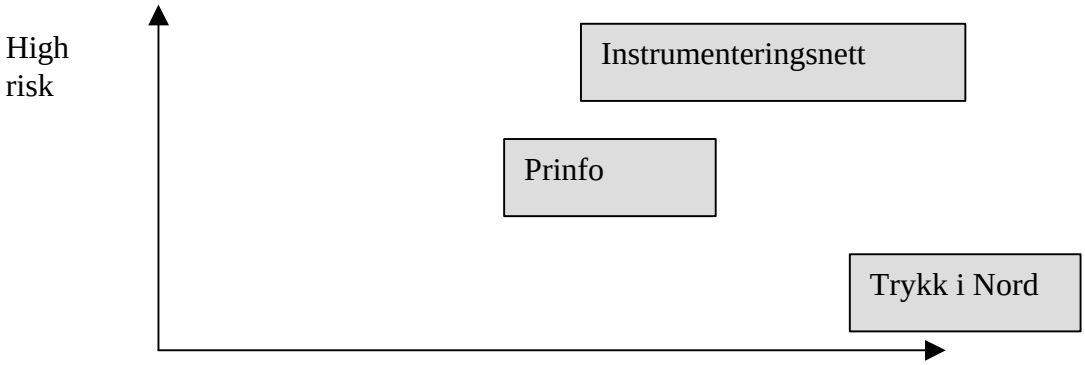
We have also looked at risk, trying to measure the problems associated with being tied to this particular partner:

- ***We try to minimize risk when cooperating with this firm***
- ***We try to defend ourselves from influence of this firm***
- ***We try to avoid sharing risky projects with this company***

Cronbachs alpha .79

Factor analysis was able to separate nicely between these two factors indicating high discriminant and convergent validity. Risk and knowledge are significantly negatively correlated (-.17, $p<0,05$). That means that the more knowledge the firms get out of their network contacts, the less risky they perceive the relations to be.

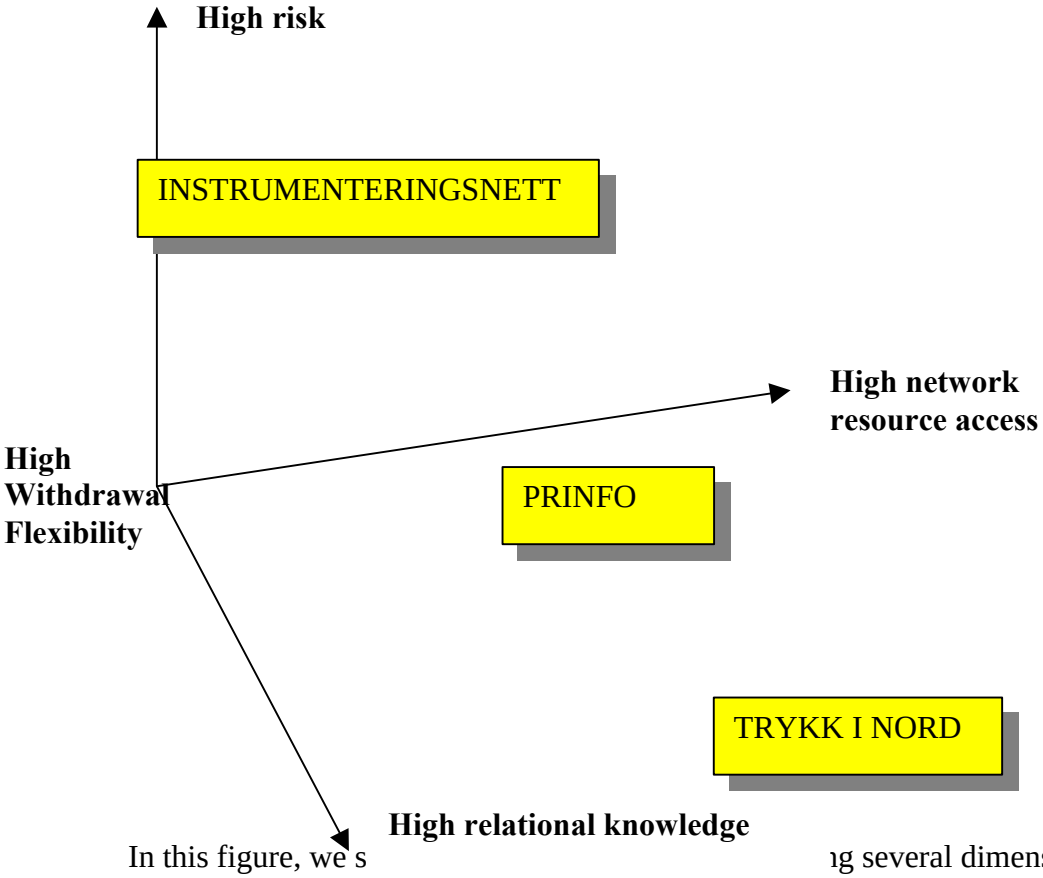
In a discriminant analysis, we see that one of the two canonical correlations are significant ($p<0.05$), separating between Instrumenteringsnett and Prinfo on one side, and Trykk i Nord on the other. Risk is the main factor contributing to this difference. What this means is that Trykk i Nord is a network where the firms perceive less risk in the relationships with other firms within the network than firms within Prinfo and Instrumenteringsnett do. Instrumenteringnett and Trykk i Nord have somewhat higher knowledge in their networks than Prinfo, but this function is not significant.



If we look at the means and distribution of these variables in total (total database) and in each of the three networks, we get the followi

	Withdrawal flexibility		Network Resources		Risk		Knowledge	
	Mean-	Standev	Mean-	Standev	Mean-	Standev	Mean-	Standev
Total	2.7	1.5	4.9	1.6	2.7	1.3	4.9	1.6
Prinfo	2.6	1.4	5.5	.9	2.9	1.3	4.2	1.2
Trykk i Nord	3.5	.0	6.8	.0	1.9	1.4	5.2	1.5
Instrumenterings nett	4.4	1.7	3.0	1.7	3.4	.7	4.5	1.3

To combine network and relations dimensions, we can get an overall picture by allowing withdrawal flexibility and network resource access to be one dimension instead of two. We may then be able to place the three networks in a three dimensional picture:



In this figure, we s ıg several dimensions. Instrumenteringsnett has high withdrawal flexibility on the network level, but high risk on the relational level. Additionally, this network provides fewest network resources, but relatively high knowledge resources. This indicates that there may be a tight ”network within the network” providing some ties that enhances knowledge within the firm. These ties, are however perceived to be risky, thus the duality of the network relations are highly present on this level. The network as a total, remember that is consisted of 60 firms, seems to perceived as loosely coupled, the firm does not know many firms within it, and will loose little by exiting this network.

Trykk i Nord, however is the opposite situation. The network consists only of 7 firms, and network resources are very strong. The firm knows well of the other firms, and sees the network as important for its growth. The network is, however not seen as totally difficult to exit. On the relational level, the relations within the network are seen as giving them much important knowledge. What is very interesting here is to note the significant difference in the level of risk between this network and the other networks. The Trykk i Nord firms do not see any reason at all to minimize risk in their

relations with the other firms within the network. This is probably due to the small size of this network, and the similarity of the network firms signalling strong trust.

Prinfo is the network that seems to differ from the two others by being high on resource access while at the same time being high on withdrawal flexibility. Thus, the firms within this network see the network as offering them valuable resources, but also see themselves as dependent on the network. On the relational level, the firms see their relations with other firms within the network as being more risky than the Trykk i Nord relations, and feel that they are learning less from the chosen firms within the network than the Instrumenteringnett relations. Consequently, this is a network that seems to be very tight and strong on the network level, whereas each relation within the network is less strong than other networks are. This can be due to the geographical character of Prinfo. Whereas both Trykk i Nord and Instrumenteringnett are consentrated within regions in Norway, Prinfo consist of firms from all over the country. The idea is to have one firm from each small region, hence the firms are separated from each other in geographical space.

If we look at these findings in regard to the propositions set forward, we may refine our thoughts somewhat.

Proposition 1: Network relations are important sources for platform resources

The firms in our sample seem to have given us some interesting information in this respect. One of the networks seem to offer the firm more resources on the "network level" (Prinfo), one of the networks seem to offer the firm more resources in single relations than on the network level (Instrumenteringsnett). One network offers high resources both on the network level and through alliances with single firms in the network (Trykk i Nord). We may also notice that the means for both the variables network resource access and knowledge access through relations are fairly high, which means that the firms agrees with the statements that both the networks and the chosen relations offer valuable resources to the firms. We may therefore argue that firms through networks may access resources that are important for learning and knowledge development. We may modify proposition 1, however and argue that:

New proposition 1: Important sources for platform resources may be the relationship between a firm and a network and/or single network relations.

Proposition 2: Knowledge networks constrain firms

The significant negative correlations between withdrawal flexibility and network resources give some support to this proposition. These relations suggest that if you are going to get access to valuable resources in a network relation, you need to accept being "locked - in" within the network with the consequence that it is more difficult to withdraw from the network. Prinfo and Instrumenteringsnett are "clean" examples of this relation. Prinfo is the network where the firms are locked in, but also say they get valuable resources, whereas Instrumenteringsnett get fewer resources, but are more flexible. Trykk i Nord is the interesting deviation with extremely high network resources, but also relatively high withdrawal flexibility.

The relation between knowledge and risk show that firms that get much knowledge out of single relations within the network see these relations as less risky. This fact may indicate that the firm has taken steps to safeguard these relations, either by formal measures like contracts or ownership or developed trust. This correlation can indicate that single network relations where the firm learns less, is less prioritized to take these safeguarding measures, and risk is perceived as higher. Trykk i Nord is the clean example of high knowledge access corresponding with low risk. Prinfo sees their relations as having higher risk and giving less knowledge than the average mean, whereas Instrumenteringsnett is also in line with this relation as the risk is higher and the knowledge lower than the average mean. We may therefore conclude that knowledge networks constrain firms on the network level, but suggest that the relation between knowledge and constraints on the individual network relation level is dependent on the safeguards and trust applied.

New proposition 2a: Knowledge networks constrain firms

New proposition 2b: The risk associated with knowledge relations within networks is related to safeguards such as ownership, contract and trust

So far we have set forward some propositions that pose relations between knowledge resources and constraints on firms from networks. To proceed from here, we could develop hypotheses and try to test them. Another route is to try to understand better what really these abstract concepts of resources and constraints are, and do they mean the same within these three networks? We have been able to identify some differences between these networks, but what is the knowledge that is being accesses in the network and through the relations? What are the constraints and the risk associated with the network and the relations? Are our assumptions right that these resources are platform resources that are dynamic and improve the change options for the firm? Are we correct in assuming that the constraints placed on the firm by the network and the network relations will restrain the firm from change?

To get some more understanding about these issues, we have decided to follow up this quantitative study with some interviews with firms within these three networks to try to get a deeper understanding of the manner in which networks may affect firm change options. As this paper is written, only one of these interviews has been performed, with one company from the Prinfo network. The aim of this study is to continue doing interviews with administration and member firms of all of these three networks.

Interview with one Prinfo firm

The firm has been a member of the Prinfo network for 4 years. The firm has 10 employees and is a typical small printing firm. The firm had some problems prior to the joining of Prinfo as they lost one of their main customers. The firm then realized that they needed a strategic partner to be able to survive, and Prinfo was seen as interesting. The main resources offered by the network were access to IKT competence, knowledge and services. Prinfo has an agreement with one IKT supplier that offers valuable services to this firm. Prinfo also has an intranet available offering information about market changes, product or technology development. This information was considered to be valuable and of good quality by the firm. The intranet also offered active chat sites and a help function where any firm could post a

question, that other members of the network usually picked up and answered fairly quickly. The firm was also very satisfied with an order and calculation system that the network had developed for its members. The firm met formally with the network administration and other members of the network about twice a year. At these conventions there were usually some lectures or presentations about topics relevant for small printing firms. The network and its services were therefore considered valuable although there had been occasions where the administration had been inflexible and constrained activities within the firm. One such occasion was the attempt of the firm to establish production unit with some Prinfo firms and some firms outside the network. Even if this attempt was considered to be strategically sound, the attempt was stopped because some of the firms did not belong to Prinfo. Another episode was the transfer of a marketing responsible from the firm to the network administration. This individual had on some occasions pursued some of the firms customers to benefit other Prinfo firms, and the administration had not been firm enough trying to stop this perceived attack on the firm.

Regarding relations with other firms within the Prinfo network, the firm considered the quality of these firms as variable. Some firms had excellent standards, and the firm had good working relations with these. The firms had specialized in small size print, and cooperated with other Prinfo firms that took larger sizes. In addition the firm posed as one of the big advantages that they were able to take on larger customers, as they had a much more flexible capacity system. Trust was said to be extremely important in these networks, and through dealing with these partners for 4 years the firm had developed close personal ties with these firms. There were no ownership issues in these relations, but standard contracts were used. The firm said that they learned some from their Prinfo network partners, but that there also were other firms outside the network they considered important partners. One was a design firm, located on the same grounds, that possessed complementary knowledge and would help the firm get closer to the decision processes at customers. The firm claimed that belonging to the network reduced risk at the relational level, although they had access to alternative suppliers and did not see themselves as dependent on other Prinfo firms. They did see, however, that belonging to the network also had a flip side since they had more incentives to use Prinfo firms as partners, and that belonging to Prinfo made them be associated with the network. Recently a firm within

the network went bankrupt, and the firm had received some negative publicity associated with this happening. The firm told us that the nature of the network was about to change in the sense that the firms would be more closely linked to the network, for instance would the logo of each firm also include Prinfo. This could lead to more benefits for the firm by increasing level of cooperation and market power, but could also restrain the firm even further from exiting the network and increase dependency on other firms within the network.

The story from this firm gives us some information about the nature of the resources and constraints and the relations between them. First, we see that the knowledge resources obtained through the network are important for the firm, offering both information about market, product and technology changes, but also enabling the firm increased access to various customers. Hence the change options are improved by both improving the abilities of the firm to get access to and understand market changes, but also an ability to better meet these changes by using capacity within the network.
There are, however, constraints, both present as direct actions taken by the network administration, but also given to the firm through being associated with other firms and being increasingly tied into specific relations with Prinfo firms. Hence, the change options to take independent strategic options are limited by the network administration and the other cooperating firms, and over time, the firm has also reduced its alternative cooperative options by focusing mainly on Prinfo firms.

This information supports proposition 1 that firms gain access platform resources in networks. Clearly, this firm can meet other and more new situations faster and better by use of the Prinfo resources. This information also supports proposition 2, that these networks constrain firms. In addition we see that trust and formal contracts reduce the risk associated with the individual relations.

Summary

In this paper, we have set out to discuss the dual nature of networks, both providing resources to firms, but at the same time giving constraints. We argue that these resources may enhance the change options of firms, providing early and reliable information about changes. Furthermore, networks may give learning to enhance the ability to develop new strategies and change, and provide more and complementary resources to allow the firm to take on more and different sets of activities. Constraints may come from network management directly restraining what a firm within the network can and cannot do. In addition, being locked into relations with other firms may make it difficult to choose desired alternative partners. Being associated with these partners may also have negative constraints in the sense that fewer customers find the firm attractive. In this sense, the firm experiences actions from the firm that sets limits for what the firm can and cannot do. In change situations, these constraints can reduce the change options of firms.

In addition to giving some added insight on the arguments of Gulati, Nohria and Zaheer (2000) and Håkansson and Ford (2000), we have also shown that resources and constraints may be found on two levels. First the firm may experience resources and constraints from network management and combined offers and regulations of the network itself. Secondly, these resources and constraints may be seen in the single relations the firm has with other network partners.

This research is ongoing, and we are in the process of doing additional interviews.

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