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Trouble in Paradise: a Case of a Technology Industry Supply Network

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Abstract

The development of value networks is regarded as a necessity for achieving agility in global markets. Nowadays the focal companies often state that they are committing to more in-depth partnerships with selected suppliers, which are given more responsibility over both production and R&D. In this article we study the relationship of one focal company with its suppliers and identify the main concerns regarding governance and cooperation within the studied supply network in relation with the focal company's strategy to enhance its innovative capabilities and ensure capacity in its supplier network. By analyzing the network relationships from three differing vantage points (the focal company, the supply companies, and the venture capitalists) we present three most challenging issues in the development of partnerships within the strategic context.

Keywords

Supply network, supply management, partnering.

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Introduction

Networks are often seen as intermediate forms of organizing that are taken to alleviate some of the problems related to hierarchies and markets as forms of organizing economic activity (Powell, 1990), as well as to provide competitive advantage to its members (cf. e.g. Jarillo, 1993; Alter & Hage, 1993). While the positive aspects of networks may extend far beyond those noted above, networks as a mode of organizing, sometimes referred to as hybrid organizations (Holland & Lockett, 1997) are, however, far from unproblematic. While this is not a novel claim, the findings of this paper further confirm that problems related collaboration have remained common in networks as for instance Liedtka (1996), Roussos & Fawcett (2000) and Kohtamäki & Kautonen (2008) have shown.

The theoretical foundation of the research framework comes from two distinct, but closely connected streams of literature. We will utilize theory and ideas found within the network literature (see e.g. review by Oliver & Ebers, 1998), as well as literature dealing with social capital building on the works of Bourdieu (1986) and Coleman (1988). For reviews of the literature see Mouw (2006) or Portes (1998). The two streams, we feel, complement each other in a way that provides us with more covering representation of the network relationships studied. In addition, the two streams of literature in combination offer us better tools for interpretation than would either alone. Moreover, we discuss the three generic coordination mechanisms of supply chains – price, authority, and trust – and their application in the case supply network in relation to the theories outlined above. Specifically, we analyze the studied supply network's management through purchasing portfolio matrix (Kraljic, 1983).

The goal of this paper is to identify the main concerns regarding governance and cooperation within supply networks through a case study of a focal company and several small and medium sized technology provider companies. We analyze the network relationships from three differing vantage points: the focal company, the supply companies, and the venture capitalists in a case study of a supply net. The empirical data includes interviews carried out in the focal company and its sister company, six SME supplying high technology products and services, and four venture capitalist firms.

The findings of this study point out three hindrances to the development of network relationships: First, unsolved issues regarding intellectual property rights in networks affects trust and willingness of the members to share knowledge, ideas or patents within the network; second, the dilemma between constant bidding and need for close partnership is visible in the disparity between aspirations of the top management and everyday practices of the supply managers and buyers. And third, the dilemma between the need of independency and at the same time deeper commitment requirement of the suppliers and partners causes problem in R&D resource allocation.

In the following section, we review some key constructs from the theories of social capital and network literature. We then outline the research context and describe the research method. The findings – three obstacles to the development of network relationships – are presented. The findings are discussed in terms of prior research, and their implication for practice in the focal organization are considered.

Theories and views on relationships and collaboration

Networks are depicted in literature as the third generic organization form of economic transactions. The other two are markets and hierarchies (Powell, 1990). Each of these stresses different means to coordinate the cooperation between parties, and all have their pros and cons.

Often markets are seen as the most efficient means to organize transactions. The assumption is that when supply and demand are met in free markets, economically the most efficient outcome is achieved. Hierarchy, in turn, is presented as a panacea to non-functioning markets in certain circumstances (Coase, 1937; Williamson, 1985). It is not possible to exchange all

products in markets due to e.g. difficulties in determining the price and thus the organization has to internalize the transaction to be governed by the rules of its own hierarchy. Networks are generally understood as a combination of markets and hierarchies; this view is reflected also in the alternative term, hybrid organization, which is applied to describe networked relationships (Williamson, 1985; Holland & Lockett, 1997). The central view of the theorists is that networks may help to relieve problems of pure market and hierarchy based models. Networks are promoted as an alternative economic organization mode that offers the golden mean to combine the best means of markets and hierarchies and at the same time avoiding their worst problems (Powell, 1990).

Within hierarchies the typical coordination mechanism is authority and decision power based on hierarchical levels within the organization. In markets the central power is the price and contractual terms. In networks the trust and benefit oriented interaction are seen as the major coordination mechanisms (in Figure 1).

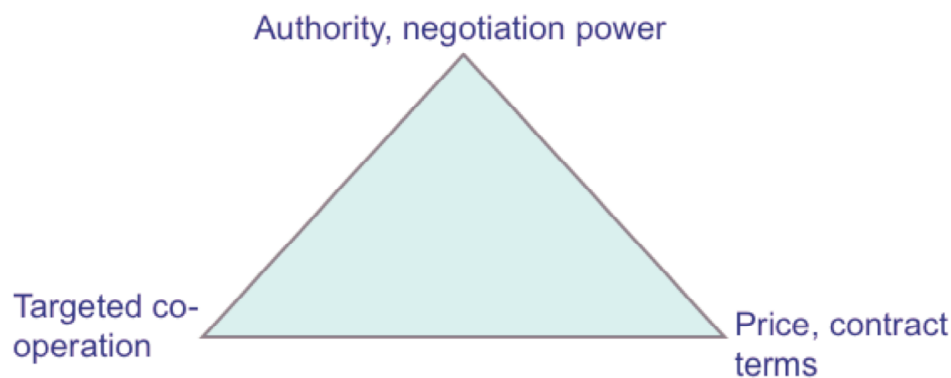


Figure 1. Three coordination mechanisms

It should be remembered, though, that all the three theoretical coordination mechanisms are ideal types; in reality coordination is achieved with a combination of hierarchical, market and network coordination mechanisms (Grandori, 1997; Grandori & Soda, 1995; Kohtamäki & Kautonen, 2008). Thus also governance of supply networks may in differing circumstances and differing strategies combine these three coordination mechanisms in differing proportions. Next we describe three alternative models:

First, the authority and negotiation power reflect the capability of the hierarchy to organize its operations so that it optimizes its inter-organizational relationships with regards to price and contract terms (such as delivery times). A well-known method for this purchasing portfolio management frameworks (such as Kraljic's matrix, 1983, in figure 2), which categorizes suppliers according to supply risks and profit impact. It is widely applied in industry even though it has been criticized of being suitable to manage relationships concerning already available products. It is not suited to products or services being developed together with partner organizations. In addition, it is suitable for analyzing dyadic relationships only. Thus, when using purchasing portfolio management frameworks the productivity and innovation capacity through multi partner relations may stay uncovered (Dubois & Pedersen, 2002).

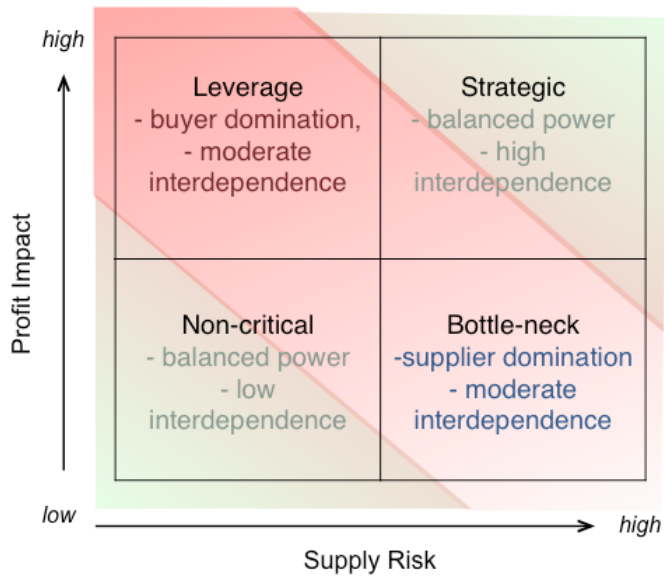


Figure 2. Purchasing portfolio management matrix

Second, a model where venture capitalists take part in financing the business operations is nowadays gathered as the best model for ensuring efficient markets and fastest means to reorganize the industry, and to improve the rate of innovations (the Silicon Valley model). This model seems to have especially importance in global networks; the first tier partners must carry inventory, development and R&D costs more than before, and thus need more reserve funds for overseas operations with the focal company. The model has been criticized that it leads to too limited views on benefits from cooperation: the partners are valuing the pros and cons of cooperation only from their limited viewpoint. As a result no one is concerned about the whole value chain and thus cooperation arrangements benefitting the industry by new collaboration within the value chain may be lost (in figure 3.).

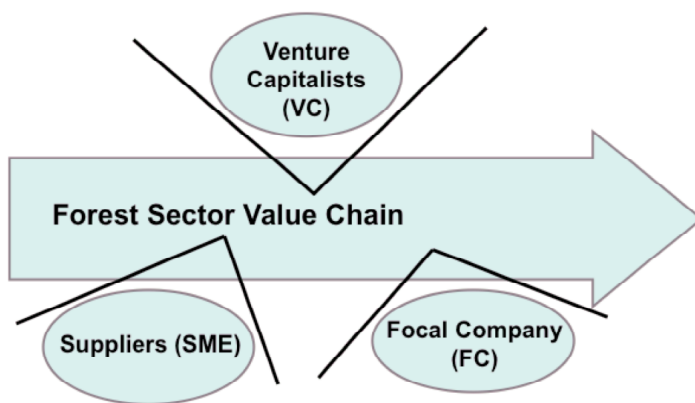


Figure 3. Efficient markets model (the Silicon Valley model)

To relieve the problems of the two above models, the theory of social capital has recently been widely discussed and developed in literature. Social capital model can be considered as

the purest model of relationships: relations and networks base on trust and commitment and they are explicitly being examined through the whole network. Thus the social capital model focuses on targeted cooperation in figure 1. It also takes in to account the previous experiences, personal relations, shared values and norms that are seen to affect the trust and sharing of information between representatives of different companies (Figure 4., modified from Ruuskanen, 2003). The ideal is that after joint operations the collaboration is deepening and the activities are mutually adjusted. The target is long term benefits, for instance through cooperative development and innovation activities, instead of short-term gains. Positive results and experiences over the collaboration can widen and deepen the joint operations even further. Of course, the above can also turn up to be a negative cycle resulting in ending of the relationship.

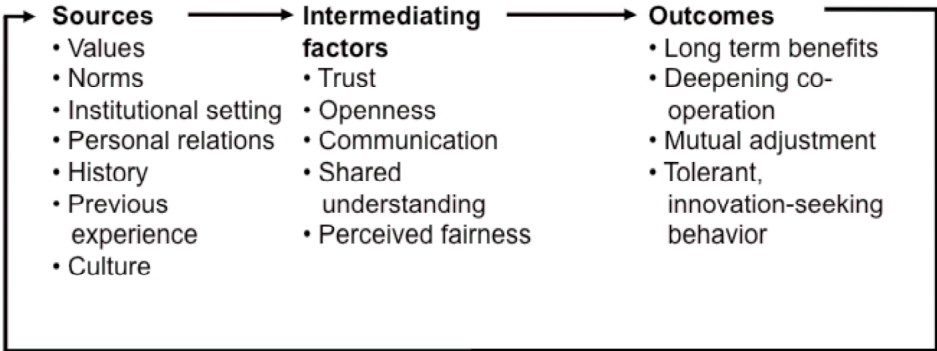


Figure 4. The social capital model

The three distinct models presented in this chapter formed the background for this research study. We reflected the viewpoints of the focal company representatives, technology provider companies and venture capitalists in our empirical research with the help of these theories. This analysis helps us to pinpoint the most challenging issues in development of innovation and fostering relationships between the focal company and its suppliers of high-tech products and services.

Next, we report the results from the three different vantage points on the key challenges the parties observed in the networked co-operation.

Research Context and methodology

The focal organization in this research study was a Finnish technology industry corporation operating in global markets. It has over 29,000 employees in more than 50 countries. For years it has been the leading supplier of capital goods in its own worldwide segment and was considered the technology leader in its field. The net sales in 2008 were EUR 6,400 million.

The focal company, typical to technology industry in general, is highly focused on its core competencies. It has aimed at long-term development of subcontracting since 1990’s (Honkanen, 2006). The extent of subcontracting can be grasped by the fact that the purchases amounted 65% of focal company’s net sales (Focal company CEO, 2007a). As supplier

network carries out more than half of the production, its competence and progress is of great importance to the focal company's business.

The key driver for the industry's profitable growth strategy is innovations and R&D, which is carried out in close cooperation with focal company, customers and subcontractors as well as with research facilities and universities. The focal company described one of its core competences as follows: *"Supply chain management and efficiency requires that we manage and deliberately develop our own processes as well as the prices and delivery terms for the raw materials, subcontracting and services we purchase"* (Annual report, 2008). Furthermore, while the company stated that *"providing jobs and income for its partners and subcontractors"* as its social responsibility globally, it also presented the risks related to supply network: *"Increasing global contract manufacturing not only challenges us to manage a functional supplier network, it also requires us to assess the ways of operating, the quality and the local impact of our cooperation partners."* (Annual report, 2008). The focal company has total 20 000 suppliers, of which the hundred biggest suppliers covers around 20% of the sourcing volume (Company's web-pages).

The focal company divides its sourcing to engineering, production and installation categories. Around half of the engineering work is carried out by suppliers. For the sourcing of production work the focal company has utilized traditionally highly competitive supply of small machinery companies. The installation work is purchased from several suppliers on project-based contracts (Honkanen, 2006). Our study focuses on the current state and development needs of the supply net of the first two supplier categories, engineering and production. We concentrate on one of the biggest business areas of the focal company (accounting for one third of the total net sales of the corporation) and the boundaries of a supply network and the focal company are determined to include only the actors to which the product or service, and its supply, are important.

The data collection arrangement of the study is outlined in Figure 5.

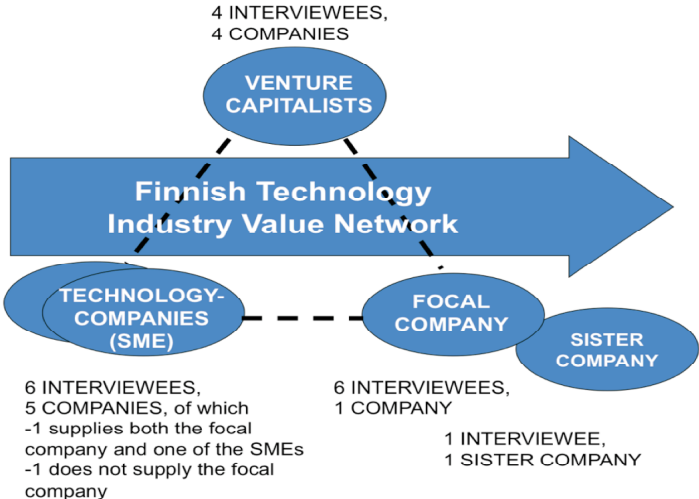


Figure 5. Empirical data

The local incubator company initiated this research. A management board consisting of a manager from a local a development company, managing director of one supplier company and the Senior Vice President of Technology of the focal company governed the research project. The board agreed over the size and coverage of the empirical data. It also helped to arrange the access to the following companies and to identify the persons responsible for intercompany relations:

- The focal company (FC) represented by two groups:
 - 3 persons taking care of the daily interaction with the supply companies within the studied network, and
 - 3 persons responsible for managing the supply relationships at corporate level.
- 5 supply companies (SME) represented by their CEOs
- 1 SME company (CEO) that has negotiated for years to become a supplier but has so far failed
- 1 sister company providing IT solutions added to the products of the focal company
- 4 Venture capital companies (VC) represented by CEO or founding members.

The results and discussion of the paper builds on a qualitative case study. The initial contacts to the network member companies were facilitated by the research project's management group, and additional interviewees were identified through applying a snowball method in which the interviewees indicated persons with whom they conducted daily business activities with within the network. The identified persons were then contacted for gaining additional data on the studied network relationships. Most of them agreed to be interviewed.

The data was collected by semi-structured theme interviews of total 17 persons from 11 companies in 2008. The interviews typically lasted two hours. Two or three researchers were present in each interview, except in the VC interviews, which were all carried out by one interviewer. Each interview was transcribed after the session by one of the researchers present at the interview situation to guarantee accuracy. The analysis of the empirical data was conducted by utilizing qualitative thematic analysis (Boyatzis, 1998; Leininger, 1985; Aronson. 1994).

Findings

In an annual consultation meeting with subcontractors, suppliers and partners, the focal company's CEO stated that the company will purchase more, but from fewer suppliers (2007b). It aims at having more partnerships, but it will have several competing suppliers in order to guarantee the best supply of products in all circumstances. The partners are expected to take larger responsibility in the value chain, and to deliver larger modules together with its own net of subcontractors. They are also expected to be innovative and improve the products, for instance with respect to the production technologies.

In this chapter we describe the major challenges that were recognized in the interviews concerning the innovation capability and capacity reservation of the supplier net. The three most challenging issues were related to intellectual property rights (IPR), the conflicting needs for close partnership and competition, and the balancing between commitment and independency. Next we will analyze each of these challenges in detail.

How to handle IPR issues?

Both the focal company and its first tier supplier recognized the need to develop the practices and procedures related to IPR. The practices should motivate the parties to share their new ideas within the network without the fear of losing the ownership to the idea. How could we improve the trust in the network in this matter?

We gathered in Figure 6. below the views of all interviewed parties over the importance of intellectual property rights to the innovation capacity of the value chain. The venture capitalists (VC) saw that R&D collaboration of the network is important to the competitiveness of the business. However they pointed out that all the IPR issues should be settled collectively within the network. The focal company (FC) insists on having the IPRs of all the R&D it has funded, even though can grant the cooperating supplier with a licence, which allows it to sell or modify the innovation to other industries or to limited customer segment.

Small and medium sized high technology companies (SME) in turn find the attitude of the focal company to limit their willingness to commit to R&D. They ask why they should invest in R&D if they are not benefitting from it. The focal company admits that the innovation capacity of the network is not utilized due to the lack of trust between the focal company and its suppliers regarding the rights to innovative ideas.

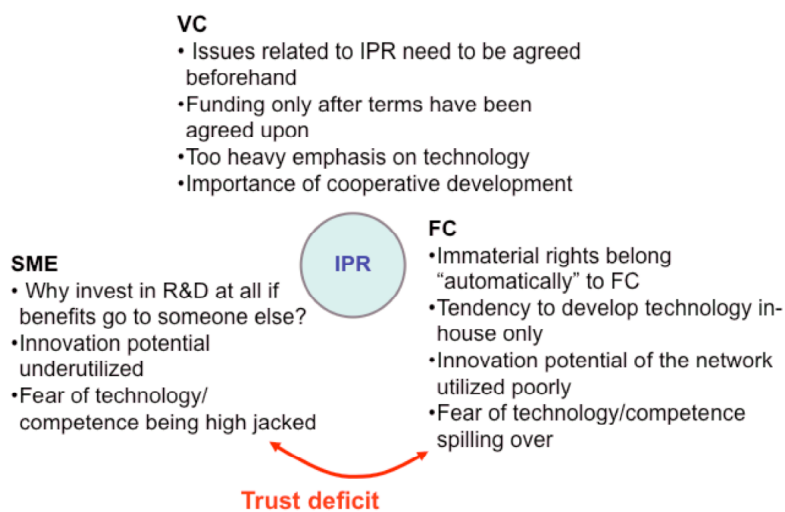


Figure 6. IPR challenges

How to balance between partnership and competition?

Even though the strategy of the focal company is to have a closer relationship with a smaller set of first tier partners, the companies belonging to the first tier partner category complained that they were still too often being valued only by the price. They felt this unfair, since they had made asset specific investments for instance in R&D, environmental protection and quality systems as required due to their partner status. When the demands set by the focal company are higher and more costly, it is difficult to compete with price. Thus, the partners

claimed that there is apparent divergence between the public strategy of the focal company and the daily practices in purchasing.

Figure 7 describes the diverse views of the interviewees on partnering and constant bidding. Venture capitalists view builds on efficient markets model where competition and constant bidding forces the markets to innovativeness and improved operations. SME companies saw the both sides of the coin: they admitted that competition drives positively towards improvement and efficiency, but on the other side, they brought up the question how a company investing in R&D can compete constantly with its rivals, that are not expected by the focal company to put so much effort in relationship specific investments.

The divergence of the focal company's strategy and the daily practices of the buyers was heavily criticized by some of the partners. They claimed that they would be happy to have more in depth partnership with the focal company and collaborate in development of the product, but the practise of constant bidding of the purchasing department forces them to cut down R &D. They suggested that to resolve this issue the focal company should reorganize it purchasing organization, so that the people acting in the boundary would also value innovations, and not only seek for the lowest price.

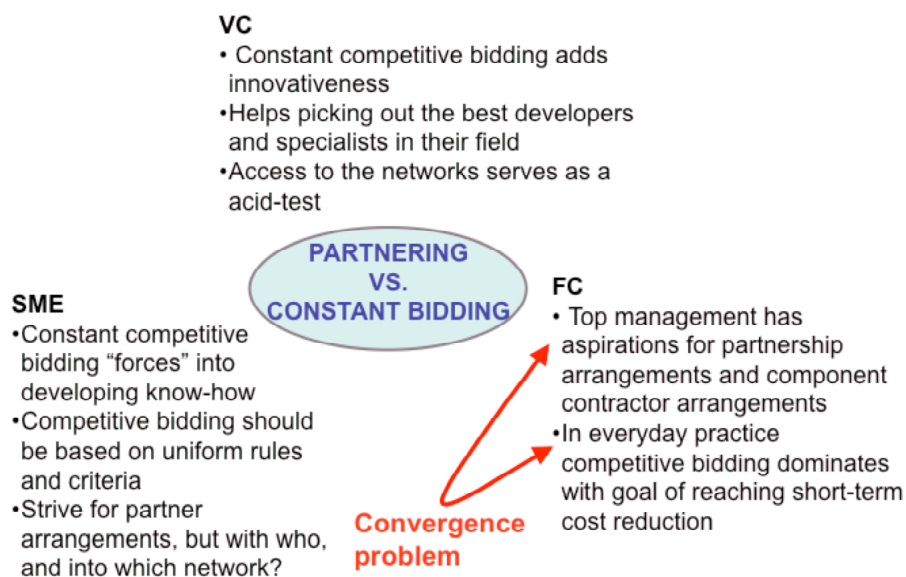


Figure 7. Partnering vs. competition

How to be committed and independent at the same time?

The vitality of the supplier requires that it can develop its products to suit several industries or business segments. In this way it would not be too dependent on orders by one focal company. A highly dependent supplier becomes also a risk to the focal company. On the other hand, in order to keep up with the development of the business segment of the focal company, the supplier should constantly invest in special know how and product development to this segment also. In SME this causes allocation problems related to limited resources in R&D.

Figure 8 points out the views of the interviewees on the parallel needs for deep commitment to the industry and the needs to keep independency of the company. Venture capitalists

seemed to more vote for independency. They see that large customer base and new potential markets would improve the value of the company more than high commitment to one focal company. Focal companies saw this issue as an optimization problem between risks and costs. Often the focal company expects the commitment from its suppliers, especially in case of partners. On the other hand, the focal company becomes concerned if the supplier is too heavily dependent on the coming orders from the focal company. They may go bankrupt, if, for some reasons, there is a period of no orders from the focal company. For reducing this risk the focal company tries to avoid highly dependent suppliers by for instance by finding a competing supplier. They also urge their suppliers to find new customers in other business segments.

From SME point of view the setting is tempting, but very challenging. Most often, the resources, time and information set the limits to the operations of the suppliers. The interviewed suppliers were well aware of the possibility that they could easily be replaced in the value chain, if not within months, but at least within couple of years. In order to keep up they should commit their R&D resources to serve the business segment of their most important customer, the focal company. However, at the same time they should look for new customers for their technology. The SME feel that the focal company is not providing help in this issue. To the contrary, since the FC does not approve that its suppliers start competing with it in its own business segment, the supplier must find the new customers from different industry or from a specific niche. Then it is the transferability of the technology that limits the expansion of the customer base. If it is not transferable as such the supplier must decide whether to put resources on development of the focal company's product line or on new potential application areas.

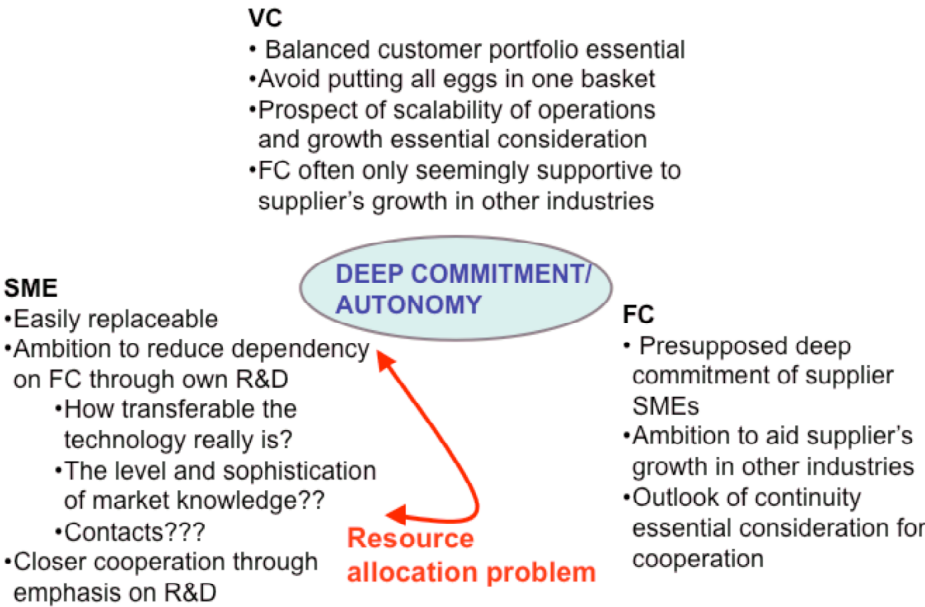


Figure 8. Commitment vs. autonomy

Discussion and conclusions

The strategy of the studied focal company, expressed by its CEO, to have more closer relationship with fewer suppliers goes well in line with the famous ‘move to the middle’ hypothesis by Clemons et al. (1993). However, its strategy is not primarily to reduce the transaction costs, but to enhance innovative capacity for product and process innovations, and to ensure the availability of capacity, also abroad. The conclusion from our study is that the focal company has problems both in its foundations and actual implementation that hamper the development of its supplier relationships. The most important of those based on our analysis appear to be the following three issues, which both the focal company’s and the SME supply firms’ representatives, as well as the venture capital firms’ representatives had strong and diverging views about:

- 1) Issues related to intellectual property rights,
- 2) Issues related to attributes used in distinguishing network SME supply firms’ status between partner firms and “purely” sourcing firms by the focal company, and
- 3) The contradictory needs for simultaneous deep commitment to the focal company’s business and the drive for greater independence from the focal company.

The above challenges are rather fundamental requiring the parties to take explicit stance on the ownership of ideas and of customers as well as on the responsibility over development of the business. That is, to utilize the innovation capacity of the network it should improve the awareness (Vervest et al., 2008) of the network parties on their roles, responsibilities and location within the network.

More over, in order to get venture capitalists to fund the partner network, the partners should enhance their customer base and reduce their dependency on the focal company to foster their innovative capacity and stability of their business.

Furthermore, our observations indicate, that different type of activities would call for different ways of governing the network. Now the focal company applied primarily purchasing portfolio management framework (such as Kraljic’s matrix, 1983) in managing the supplier relationships. Instead it should start to apply explicitly different sets of governance mechanisms in the business relationships. Especially, to benefit from the innovative capacity of the network the governance mechanisms should promote more cooperative approach.

Maybe, the first practical step towards this direction is to tackle the divergence between strategic views and operational actions within the focal organisation. This discrepancy stems from different interpretations and distorted incentive schemes at different levels of organization. For instance, it could be useful to introduce for the buyers dealing with first tier suppliers and R&D partners alternative incentives payments that would promote, instead of short term price cuts, long term development and collaboration.

This study has many shortcomings and limitations. It attempted to improve our knowledge on the challenges related to improving innovation capacity of supplier networks through a case of technology industry supply network. Even though we interviewed total 17 representatives from the focal company, the suppliers and venture capitalists, it still merely provides a snap

shot picture of one empirical case and thus, does not provide proper grounds for generalisations. Thus we believe that follow up studies - case studies, ethnographies, action research, experiments e.g. – replicating or challenging our case study and suggesting suitable governance mechanisms would be welcomed to accumulate scientific knowledge.

References

- Alter, C & Hage, J. 1993. *Organizations Working Together*. London: Sage.
- Aronson, J. 1994. A Pragmatic View of Thematic Analysis. *The Qualitative Report* 2, 1 (Spring), <http://www.nova.edu/ssss/QR/BackIssues/QR2-1/aronson.html>
- Bourdieu, P. 1986. The forms of capital. In J. Richardson (Ed.) *Handbook of Theory and Research for the Sociology of Education*. New York: Greenwood, 241-258.
- Boyatzis, R. E. 1998. *Transforming Qualitative Information. Thematic Analysis and Code Development*. London: Sage.
- Clemons, E. K., Reddi, S. P. and Row, M. 1993. The Impact of Information Technology on the Organization of Economic Activity: The "Move to the Middle" Hypothesis." *Journal of Management Information Systems*. Vol. 10. No. 2, 9 – 35.
- Coase, R. 1937. The nature of the Firm. *Economica*, Vol. 4, Nov. 1937, 386–405.
- Coleman, J. 1988. Social Capital in the Creation of Human Capital. *American Journal of Sociology Supplement*. 94, S95–S120.
- Dubois, A. & Pedersen, A.-C. 2002. Why relationships do not fit into purchasing portfolio models - A comparison between the portfolio and industrial network approaches. *European Journal of Purchasing & Supply Management*. Vol 8. 35–42.
- Focal company CEO 2007a. "(company name removed) haasteet alihankkijoille", esitys Alihankintatoimen neuvottelupäivillä, Tampere 10.5.2007. (Challenges for the suppliers, a presentation in Sourcing consultation seminar, Tampere, Finland 10.5.2007).
- Grandori, A. 1997. An organizational Assessment of Interfirm Coordination Modes. *Organization Studies*. Vol. 18. No. 6, 897-925.
- Grandori, A. & Soda, G. 1995. Inter-firm networks: Antecedents, Mechanisms and Forms. *Organization Studies*. Vol. 16. No. 2, 183–214.
- Holland, C. & Lockett, G. 1997. Mixed mode network structure: the strategic use of electronic communication by organizations. *Organization Science*. Vol. 8. No. 5, 475–488.
- Honkanen, P. 2006. Valmistusalihankinta - Yksi [Veturiyrietyksen] menestyksen kulmakivistä. [Veturiyrietyksen] hankintajohtajan esitelmä Aamuseminaarissa 30.11.2006. (Production subcontracting – one of the corner stones of focal company's success. A presentation in a morning seminar. 30.11.2006.
- Jarillo J. C. 1993. *Strategic Networks – Creating the borderless organization*. London: Butterworth Heineman.
- Kohtamäki, M. & Kautonen, T. 2008. Conceptualising the dimensions of sourcing strategy: a governance-based approach. *Int. J. Value Chain Management*. Vol. 2, No. 2, 206–226.
- Kraljic, P. 1983. Purchasing must become supply management. *Harvard Business Review*, Vol. 61, No. 5, 109–117.
- Leininger, M. M. 1985. Ethnography and ethnonursing: Models and modes of qualitative data analysis. In M. M. Leininger (Ed.), *Qualitative research methods in nursing*. Orlando: Grune & Stratton, 33–72.

- Liedtka, J. M. 1996. Collaboration Across Lines of Business for Competitive Advantage. *Academy of Management Executive*. Vol. 10, No. 2, 20–37.
- Mouw, T. 2006. Estimating the Causal Effect of Social Capital: A Review of Recent Research. *Annual Review of Sociology*. Vol. 32, 79–102.
- Oliver, A. L. & Ebers, M. 1998. Networking network studies: an analysis of conceptual configurations in the study of inter-organizational relationships. *Organization Studies*. Vol. 19. No. 4, 549–594.
- Portes, A. 1998. Social Capital: Its Origins and Applications in Modern Sociology. *Annual Review of Sociology*. Vol. 24, 1–24.
- Powell W.W. 1990. Neither Markets nor Hierarchy: Network Forms of Organization. *Research in Organizational Behavior*. Vol. 12, 295–336.
- Roussos, S. & Fawcett, S. 2000. A review of collaborative partnerships as a strategy for improving community health. *Annual Review of Public Health*. Vol. 21, 369–402.
- Ruuskanen, P. 2003. Verkostotalous ja luottamus. SoPhi: Jyväskylä.
- Vervest, P., van Liere, D. & Zheng, L. 2008. *The Network experience, New value from Smart Business Networks*. Springer.
- Williamson O.E. 1985. *The Economic Institutions of Capitalism; Firms, Markets, Relational Contracting*. The Free Press, New York, NY.