

CHALLENGES OF CREATING A NETWORK-LEVEL PERFORMANCE MEASUREMENT SYSTEM FOR SME NETWORKS

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ABSTRACT

There has been hardly any research about the management tools and the holistic performance measurement systems which are very important when managing SME networks. The present study is based on two different perspectives to produce added value to discussion on networking. These perspectives are a system view and a view that considers networks as entities. In the present study, the main objective is to create and operationalise a network-level performance measurement system for SME networks. The second objective is to analyse a case network by the means of this performance measurement system. The third objective is to discuss the challenges of building this kind of network-level performance measurement system.

INTRODUCTION

Gaps in the previous networking and performance measurement research

During recent years, the authorities have attempted to promote inter-firm co-operation very actively by trying to persuade small and medium-sized enterprises to enter different alliances. Nevertheless, the results are not always very flattering. Different promoters of networking have had limited knowledge about how to contribute to successful development in cooperative groups. Evidently, practitioners (consultants as well as entrepreneurs) do not have effective enough tools at their disposal when trying to form networks. It is very conspicuous that there has been hardly any research about the management tools and the holistic performance measurement of SME networks. For instance, network accounting has been approached mainly theoretically, introducing some evident problems (Järvenpää, Partanen & Tuomela, 2001; Tomkins, 2001; Kulmala, 2003). Applying system-level control mechanisms and performance measurement tools to a network might be very important when trying to manage them. A network is not an intrinsic value but a tool to organize operations between companies, and that is why there is so much interest in the ability of networks to succeed in their tasks. The companies in a network are interested in the benefits and costs of networking; the investors are interested in the revenue opportunities involved

in a network; and the customers in the value chain are interested in the ability of the network to manage production tasks as well or better than an integrated single company.

At the moment, the research on applying management accounting (MA) methods in network environment is in its early stage. The academic papers presented so far have been mostly working or discussion papers. The number of empirical papers is limited and there is only a little hands-on experience on applying management accounting at network level. The most frequently studied area in the field of network management control is *cost management* (e.g. Kulmala & Paranko, 2002; Kulmala, 2003; Dekker, 2003). Networking sets special challenges for cost accounting; single companies should be aware of their product costs as a precondition for further analysis. Furthermore, open book costing and wide dissemination of cost information is required. (Tomkins, 2001; Kulmala & Paranko, 2002). In this area, the overall goal of these analyses, based on the concept of extended value chain, is to minimize the total costs and to maximize the revenues in the network.

Objectives of the paper

The present ongoing study is based on two perspectives, by means of which we try to produce added value to discussion on SME-networking. These perspectives are a system view and a view that considers networks as entities. A network-level performance measurement system emphasizes win-win situations in the network between the leader enterprise and the other members of the network. *In the present study, the main objective is to create and operationalise a network-level performance measurement system for SME networks. The second objective is to analyse a case network by the means of this performance measurement system. The third objective is to discuss the challenges of building this kind of network-level performance measurement system.*

Ebers and Grandori (1997: 268) have indicated, among other things, that more research is needed to focus on certain types of networks and to assess and predict which models of networks produce certain results. In the present study, we are concentrating on SME networks headed by a leader company, because that model is the most common one in practice and research results have proven the fact that this way is also the most successful model of networking. In many cases, in vertical networks, co-operation between the leader company and the other cooperative members, which usually are subcontractors, resembles more a zero sum game than win-win co-operation. Our assumption is that not even a leader company can succeed in the best possible way if the network around it is not performing well.

We employ a *constructive research approach* developed by Kasanen, Lukka & Siitonen (1993), by working as an exceptionally large research team, which includes 13 researchers representing different disciplines of managerial research, such as accounting, management and entrepreneurship. The research project started in 2002 with a pre-study. This part was funded by Sitra (The Finnish National Fund for Research and Development) and during the project, a theoretical framework for the network measurement system was created. (Varamäki, Pihkala, Järvenpää & Vesalainen, 2004). The project is now continuing with the financing and steering by Sitra, Tekes (National technology agency in Finland) and case firms. There are four case networks in the study. All of them are so-called leader-driven networks, including one strong leader firm. So far we have conducted 100 interview sessions with case networks, lasting approximately 1.5

to 2 hours per session in order to build and test network-level measures. Additionally, we have conducted phone interviews, meetings and e-mail queries.

Case contexts of building a performance measurement system

A network-level performance measurement system has been developed by working closely with four case networks which all were from the metal industry. In this paper we illustrate the framework and measurement system through one case, which represent steel construction network.

The leader company of this network, as well as its subsidiaries, is situated in western Finland. Although the company's main market area has traditionally been the Nordic Countries, its transition to a global business has been indisputable. The leader company supplies systems of structural frames for buildings, bridges, and machines.

The most significant procurements from the contract suppliers include semi-finished products, namely sheet metal parts and concrete reinforcements. At the moment, the company uses three separate suppliers for sheet metal parts, while reinforcement steel is mainly made by one supplier. Furthermore, some construction structures require welding and surface finishing, for which there are two suppliers.

According to the leader company's CEO, the contract suppliers act as an additional factory in the company's business, equivalent to the leader company's own factories. However, the share of contract manufacturing never exceeds 30 per cent of its total supply.

Earlier, the leader company had a separate group of workers for contract supplier procurement operations. Nevertheless, the experiences of this way of operating were not satisfactory. First, the operations did not develop according to expectations, nor were the group's employees satisfied with their own level of know-how and its development. In addition, also the contract suppliers found the system deficient. For this reason, the group for contract supplier procurements was axed, and the procurement workers were transferred to work with the project managers.

Communication over the network is constant, but, in the CEO's opinion, not very authentic. Having rather loose contacts in the network might be merely favourable, and for a contract supplier it is not desirable to have a too significant portion of net sales coming from one client. On the other hand, the company has to accept that in some situations the suppliers' capacity might already be in use for some other client.

The leader company's aim is to have a network where no supplier is favoured over the others. According to the CEO, patronizing a supplier would result in losing competitiveness in the long run. Similarly, this will apply to the leader company's subsidiaries – each unit has to be as competent as any other optional supplier in the market. Therefore, the company's units have to maintain and develop their competitiveness by competing with other companies in the market in executing their own projects. Group-internal pricing will no longer be used and it should be possible to measure the performance and profitability of each unit separately. The renewal also aims for growth in exports, as new regional partners will join the projects abroad.

A FRAMEWORK FOR A PERFORMANCE MEASUREMENT SYSTEM IN NETWORKS

According to our pilot study (Varamäki et al., 2004), the suggested framework for a performance measurement system is composed of factors that enable action and success, of processes, as well as of the productivity and profitability of activities. The issues enabling success are (1) the values and culture, (2) resources, competences, as well as the (3) modes of action of the network. The performance of activities can be divided into the (4) performance of internal processes, into (5) customer perspective and into the (6) financial perspective of the network. The *values and culture* of the network describe the mental state of the network through trust, commitment, partnership values and communication within the network, such as interaction manners and openness. *Resources and competences* are connected in particular to the ability and capacity of the network to produce core output to the business effectively and, on the other hand, to create and to develop new modes of action. The resource base of the network is comprised of the tangible and intangible resources of the individuals and the companies in the network, and of the compatibility, specialization / overlapping of those resources. *The modes of action of the network* describe the ability of the actors in the network to design and to exploit different modes of action in the network; for instance, the elements and models of bilateral and multilateral co-operation.

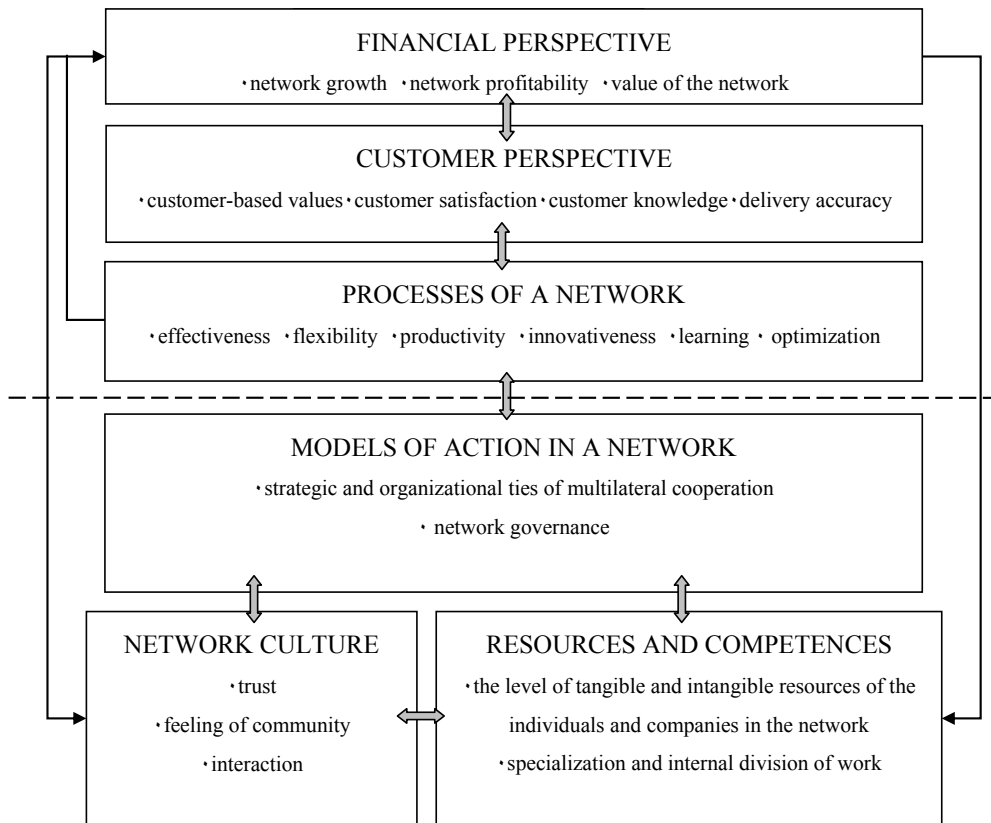
In the network, the above-mentioned enabling elements (values and culture, resources and competences, modes of action) are the *structural and operational choices, achievements and capabilities*, which are the seminal value drivers creating the base for the financial performance and profitability of the network. This performance could be evaluated by using the familiar logic of the Balanced Scorecard (BSC). In the causal logic of the BSC, it is generally assumed that a learning and well-being organization is 1) able to make innovations, and, furthermore, 2) effective and high-quality processes. Moreover, if these innovations and processes are customer-driven, the firm or the network will achieve 3) satisfied and profitable customers. This success in the eyes of the customer and customer profitability will be also reflected in the 4) overall financial success (profitability, solvency and liquidity) of the company/network, according to the logic of the BSC. In a well-run network, the profit is not divided in a zero-sum game, in which a profit increase in one part means a profit decrease in some other part. The framework is illustrated in figure 1.

In the following, the different perspectives of the suggested framework for a performance measurement system will be conceptualized in more detail. Moreover, empirical illustrations of a case network's evaluations will be presented in regard to resources of network, models of actions and customer perspective.

Network culture

Market exchange is embedded in social relations; therefore, the social element has an effect on the different aspects of this exchange (Granovetter 1985). Here, we define network culture as a shared mindset of the actors in the network. The shared mindset is constructed on the basis of trust and a feeling of community.

In this study, we suggest that network values and culture have an enabling role in a network. They enable profitability and growth by bridging and bonding the actors. In the earlier research, the social dimension is often argued to reduce transaction costs (partner search costs, negotiation

Figure 1: A framework for analyzing performance measurement in networks

costs and monitoring costs) (Gulati, 1995; Zaheer, McEvily & Perrone, 1998; Dwyer, Schurr & Oh, 1987; Sako, 1992), to induce commitment (Morgan & Hunt 1994), to induce customer loyalty (Foster & Cadogan, 2000), to support specialization, and to support information sharing and learning (Parkhe, 1998; Ring & Van de Ven, 1992; Hamel, 1991).

In this study, the social dimension is defined as network culture consisting of three sub-dimensions, i.e. trust, a feeling of community and interaction. In this study, trust is defined as a belief consisting of eight different sub-beliefs. Trust as a belief refers to an attitude based on the cognitive rationalization of one's experiences and feelings. The sub-beliefs are the 1) capability belief, 2) predictability belief, 3) integrity belief, 4) benevolence belief, 5) honesty belief, 6) deterrence belief, and 7) reciprocity belief. The measurement of trust is based on these sub-dimensions. (McKnight, Cummings & Chervany, 1998; Blomqvist, 2002; Butler, 1991; Butler & Cantrell, 1984; Kee & Knox, 1970; Swan, Trawick & Silva, 1985; Coulter & Coulter, 2002; Dasgupta, 1988; Good, 1988; Luhmann, 1988; Rotter, 1967; Coleman, 1990; Gustafsson, 2002.)

The second dimension is the feeling of community between the actors in the relationship. By feeling of community, we mean the shared feeling amongst the network actors that "we're in this together". This means that the actors have a 1) shared vision, 2) shared mission and purpose,

3) shared goals, 4) shared rules, and, to some degree, 5) shared values. (Lewicki & Bunker, 1996; Hart, Capps, Cangemi & Caillouet, 1986; Coulter & Coulter, 2002.)

By 'interaction', we refer to the quality of interaction in the dyadic relationship. We suggest that along with trust and a feeling of community, the quality of interaction is an important determinant of network culture. It may increase both trust and a feeling of community (Lewicki & Bunker, 1996).

Resources of the network

When considering the resources in the network environment, the value of the whole network and its resources could be described as the sum of the (1) resources fit with customer needs, (2) the co-operation ability and willingness of the network and (3) the entrepreneurial capability of the network to reach new business opportunities. This means that the resources within a network are valuable only when particularly the leader company of the network is able to see the potential of the network resources correctly and is able to co-operate with the network resources and their owners and, at the same time, is able to coordinate the resources to fulfill the customers' existent or potential needs. This model of resource measurement within the network aims to be a tool for analyzing the subjective value of the network resources within their own context. The purpose is not to find the absolute values or market prices for the resources. The main contribution of this type of tool and measurement process could be that it allows the companies to see positive or negative progress within the network by the aid of longitudinal measurements.

The value of a resource depends on the process it enables, and the value of the process is determined by the market where it takes place. Hence, the demand of the market and the competition among the companies in the market are essential value drivers. The ultimate value of the resource depends on the resources fit to the customers' needs. The process that the resource of the supplier provides must have interaction with market demand through the customer's acts – in this case, the leader company's acts. Without the willingness and ability to cooperate, the resources of the network will not have that interaction and the value adding potential will be lost.

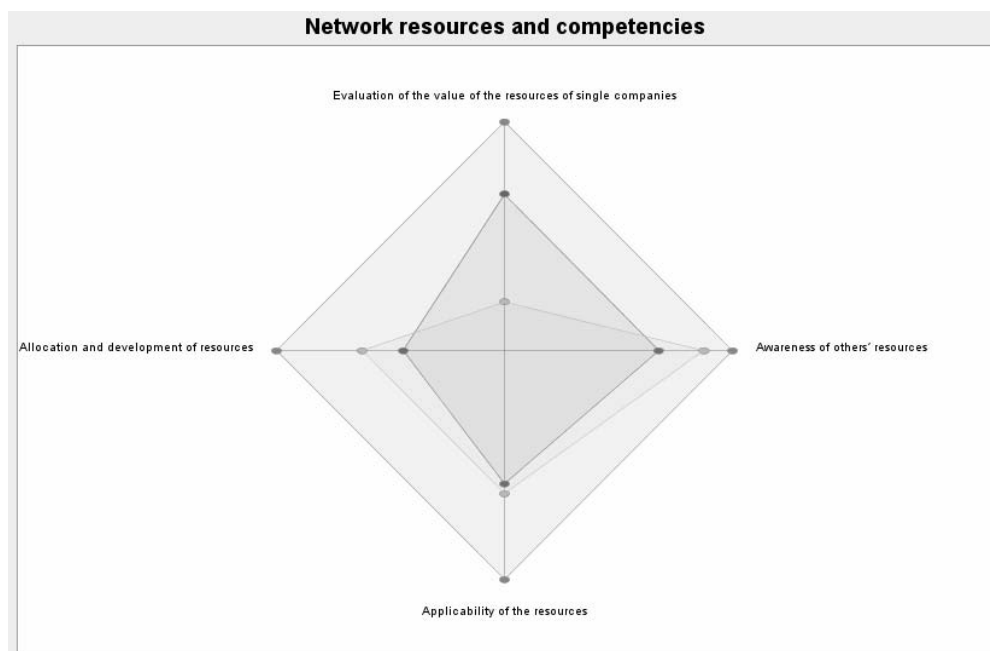
From the customer's point of view – in this case, from the leader company's point of view – one additional requirement for the full utilization of the resources in a network is the ability to recognize and to evaluate the resources correctly. Without it, the leader enterprise is unable to use the resources in the strategy. If the leader company does not know the resources of the network or makes an inadequate evaluation of them, it is forced to build its strategy upon its own resources. The sum of the perceived value of the network resources for the leader company is the comparative value of the suppliers' resources in relation to the value of the resources of their competitors and the leader company's valuation of them. The better the valuation, the better the opportunities to bring the resources into interaction with market demand. Again, without cooperative skills and willingness to cooperate, the evaluation process of the network resources is often too demanding and likely to be inaccurate.

In our framework, the measurement of resources starts from the (1) evaluations of the resources of a single supplier, continues with the (2) evaluations of the awareness and familiarity, and with the (3) evaluations of the applicability of the suppliers resources and ends with the

(4) evaluation of the allocation and development practices within the network. The logic in the measurement tool is that these dimensions will provide the assessment of the value and also value potential of the resources within the network headed by the leader company.

The average of the suppliers' answers and that of the answers of the leader company is presented in the following figure. The biggest gaps between the opinions are in the dimension Firm-specific Value of the Resources. The suppliers have seen their resources as relatively stronger compared to their competitors and environment (the leader company correspondingly compares its resources with those of its own competitors and environment). In the dimensions Awareness of Others' Resources and Allocation as well as the Development of Resources, the leader company gave a slightly higher rating, and, in the Applicability of the Resources dimension, the opinions are similar.

Figure 2: Network resources and competencies in the case network; ● Present state, suppliers average, ● Present state, leader company



Models of action in the network

Multilateralism

By models of action in networks, in this study we refer, on the one hand, to the level of multilateralism in a network and, on the other hand, to the type of network governance. Multilateralism means that more than two companies in a network have a shared common interest. Multilateralism can exist in a network in spite of whether companies have exchange or not. Dyad relationships always form a ground for a larger network (e.g. Johannisson, 1988) and although the level of analysis in our study is that of a network, it is evident that bilateral relationships between a leader company and suppliers must perform well in order to guarantee

success in the whole network. In addition to the quality of bilateral relationships, the quality of multilateral co-operation has to be taken into account in system-level performance measurement. The assumption in our study is that inter-organizational relationships in a network are regarded as deeper if the links between parties are highly organizational, i.e. structural, highly strategic and more multilateral (see Vesalainen, 2002a; 2002b).

The most essential question when developing multilateralism in a leader-driven network is: what are the benefits it offers? The evidence of the absolute benefits of networking is scarce, also in the case of the form of networking we are dealing with. The evidence is based primarily on separate cases. However, on the basis of logical thinking it is possible to point out several benefits related to multilateral networking. These include (see e.g. Varamäki, 2001, Varamäki & Vesalainen, 2003):

- *Learning*, based on exchanging information, discussing things and finding innovative solutions in a group, as different kinds of knowledge are integrated during open discussions; the benefits of learning can be realised either at the level of the entire group or in individual enterprises. In the first case, the learner and the one putting the know-how acquired into practice is a group of enterprises (a network as a learner) and, in the latter, an individual enterprise (a network as a learning environment).
- *Cost division*, which usually can be achieved by acquiring and utilizing resources together, and the costs will be shared. This kind of cooperation has many tailored examples among SMEs. For instance, a common export manager, common premises, transport equipment, and production equipment represent these types of cooperation.
- *Credibility and image in the markets*. These benefits are based on a group of enterprises creating an image for themselves in the market, based on a group image or on the brand of a product range offered jointly.
- *Innovativeness*, which is mostly based on transferring knowledge and advantages of learning. However, an essential aspect is that achieving innovations requires investments. If multilateralism leads to combined resources and risk sharing, this provides a better ground for the rise of innovations than enterprises investing in development separately.

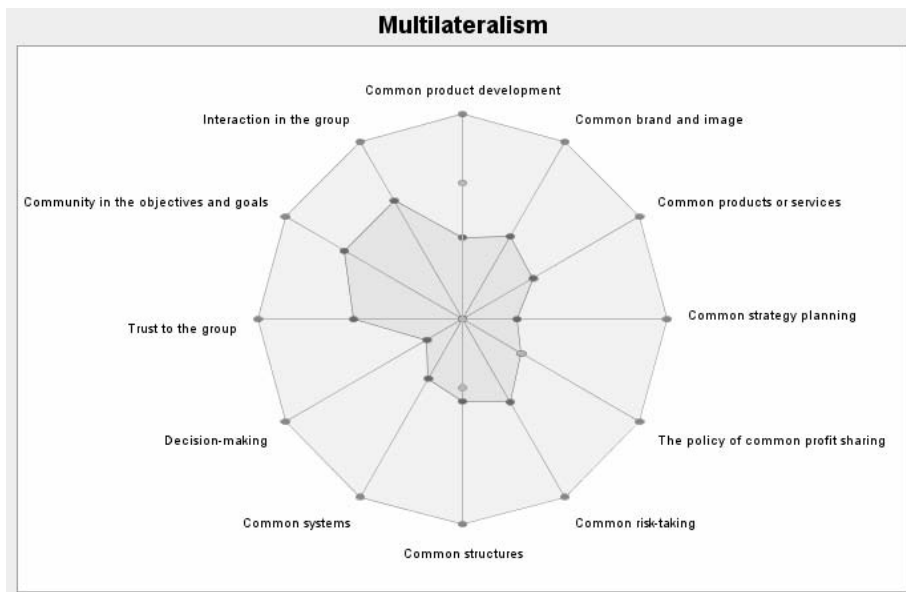
In business, benefits are always realised in individual companies. Networking may benefit a network e.g. in the form of savings in costs or a better competitive position, but, ultimately, these benefits can be seen in the final lines of companies' income statements. This leads to the necessity of discussing the benefits of multilateral cooperation also within the group. In practice, this is often regarded as a difficult issue, because enterprises are loath to disclose information about their costs and profits, even within networks.

The connection between multilateral networking and benefits is not deterministic, i.e. may not be possible to recognise such regularity that a networked enterprise would always be more profitable than one not belonging to any network. The question is rather normative, i.e. if multilateralism is built in an appropriate way and the parties agree on the ways of action, benefits can be achieved.

When analyzing multilateralism in a network, business integration and organizational integration between the companies are considered. Business integration refers to how deep and strategic interest the companies have in their cooperation. Business integration is divided into six sub-dimensions, which are common product development, common brand and image, common products or services, common strategy planning, the policy of common profit sharing, and common risk-taking. Organizational integration describes those elements, through which cooperation gets its organizational model. Organizational integration is also divided into six sub-dimensions, which are common structures, common systems, decision-making, trust in the group, community in the objectives and goals, and interaction in the group.

When analysing multilateralism, in addition to paying attention to the present state, it is essential to always define the objective states. This leads to the parties focusing their attention on each indicator and analysing what benefits each form of manifestation of multilateralism might ultimately yield. The difference between the present and the objective states indicates the magnitude of change the enterprises are ready to accept.

Figure 3: Multilateralism in the case network; ● Present state, suppliers average, ● Present state, leader company



A leader-driven network is usually based on bilateral relationships, while the level of multilateralism remains quite low. This can be seen also in the case network. Especially, the leader company itself considers the level of multilateralism in its network very low, while the suppliers interpret that multilateralism exists to a greater extent in the network.

From Figure 3 we can see that the leader company's rating for the level of multilateralism corresponds to the zero-level in all but three sub-dimensions (Common Product Development,

Policy of Common Profit Sharing and Common Structures). In the leader company's opinion, product development includes more multilateral elements than the suppliers themselves recognise. In all the other eleven sub-dimensions, the suppliers think that there exists more multilateralism than the leader company does. The differences between the suppliers and the leader company are particularly remarkable in regard to social bonds. The suppliers see that there exists multilateral interaction, community in the objectives and goals, as well as people trust each other in the group, but the leader company does not recognise these kinds of things. This result is surprising, and common discussions will be required between the suppliers and the leader company in order to explain the differences.

Network governance

The other perspective, when evaluating models of action in a network, is the measurement of network governance. According to the earlier research, the leader company has a need to govern the partnerships and strategic network in order to increase learning (Parkhe, 1998; Hamel, 1991; Uzzi, 1997), commitment (Morgan & Hunt, 1994: 33) and loyalty (Foster & Cadogan, 2000: 195), and decrease transaction costs (Gulati, 1995; Zaheer, McEvily & Perrone, 1998; Dwyer, Schurr & Oh, 1987). Here, we will present a measurement method for measuring the level of governance in three different dimensions.

Network governance has been studied by researchers of the new institutional theory. Different researchers have considered the organization of an economic system, and the role of networks in it from four different viewpoints: 1) markets vs. hierarchy (Coase, 1937; Williamson, 1985); 2) networks as an intermediate form between markets and hierarchy (Powell, 1990; Heide, 1994); 3) networks as a distinct form from markets and hierarchy (Ouchi, 1980; Bradach ym., 1989; Mitronen, 2002 and 4) the simultaneous use of the three different mechanisms of governance (Adler, 2001). The theory is developed on the basis of the transaction cost theory. Later researchers of the new institutional theory have developed the framework of the transaction cost theory by adding a third mechanism of governance to the theory (Powell, 1990). The third mechanism is in this research defined as a social one.

In this study, the governance problem is approached by using the framework of three governance mechanisms (price, authority, and social). It is often argued that the different mechanisms of governance are used by the different forms of organizing: markets (price), hierarchy (authority), and networks (social). In the markets, the invisible hand governs the behavior of the actors (Smith, 1933). Within a hierarchy, the manager uses the visible hand when governing his subordinates' behavior (Gerlach, 1992). Researchers have also argued that the community may govern the behavior of its members by using social control, norms, trust and feeling of community (Ouchi, 1980). In this study, it is assumed that the leader company, when governing its partners and strategic network, may simultaneously use all the different mechanisms of governance.

On the basis of the measurement of the three dimensions of partnership governance, the partnerships are placed in a figure. The respondents evaluate the current and future state of partnership governance by using the method of analysis. On the basis of this measurement, it is possible for the leader company to compare the governance of the different partnerships, but also to systematically plan the development of the governance in the future.

Figure 4: The supplier's and the leader company's evaluation of the present state of price, authority and social interaction at the level of sub-dimensions ● Present state, leader company, average ● Present state, suppliers, average.

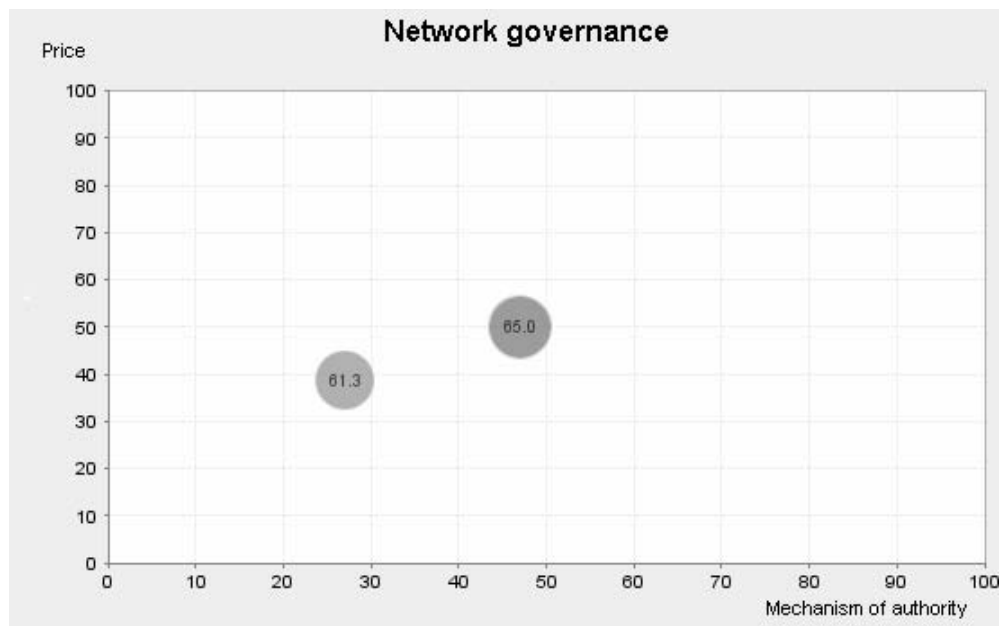


Figure 4 describes the evaluations at the sub-dimensional level. The horizontal scale describes the level of the authority mechanism and the vertical scale describes the level of the price mechanism. The social mechanism is illustrated with the size of the circle; the stronger the social mechanism, the bigger the circle. This is also clarified with the numerical value inside the circle. The evaluation is partnership-specific; the leader company evaluates its governance regarding a supplier and the suppliers evaluate how they experience the governance. Figure 4 illustrates the average values.

The figure suggests that the leader company systematically rates the level of governance higher than the suppliers do. This can be considered as rather surprising; previous experiences suggest that the leader company often underestimates its governance while the suppliers overestimate it. The biggest difference in the evaluations can be seen in the Authority dimension, whereas the levels of the Social and the Price dimensions are almost parallel. In relation with the expectations of the results, it is possible that the actual level of the governance mechanism is even lower than the suppliers estimate it to be and, consequently, much lower than the leader company considers it to be.

Performance of processes in the network

In a network, the above-mentioned enabling elements (network culture, resources and competences, modes of actions) create the basis for the financial performance and profitability of the network. Supply chain management (SCM) is an integrative philosophy to manage the total flows of a distribution channel from the suppliers' level to production, distribution and, ultimately,

to the end customer (Houlihan, 1985; Cooper, Lambert & Pagh, 1997; Simchi-Levi et al., 2000). The aim is to achieve goals related to total system performance rather than the optimisation of a single phase in a logistics chain. In the causal logic of the BSC, it is generally assumed that 1) a learning and well-being organization facilitates innovations, and, furthermore, 2) effective and high-quality processes (Kaplan & Norton, 1992). In the present study, we aim to build methods to measure the quality, efficiency and flexibility of processes and learning within the network process. By 'network process', we mean the order-delivery process within the network.

In a company or a group of companies (network), the activities in the value chain are the crucial points where the resources, capabilities and knowledge, as well as the management of the firm come together. However, value creating activities and their combinations, as well as the drivers for these, are more or less latent. Typically, companies only have a cumulative measure over the value chain from raw material to a product and, finally, to customers, such as costs, profit or contribution margin.

This part of the framework focuses on the impact of the case network's activities on value creation. The network's value chain is analyzed, so as to be able to locate the value creating and the non-value creating activities. The aim is to locate those activities which generate value (profit) for the network. The second aim is to find drivers for value-creating and non-value creating activities, which are currently latent in the organization.

Customer perspective in networks

According to studies (e.g. Malmi, 2001; Puiro, 2001; Toivanen, 2001), the customer perspective is commonly judged as the most important perspective of strategic performance measurement systems. This is obvious, because customers constitute one essential stakeholder group, particularly because money is received from the customer and the success in the marketplace is determined by the customer. To some degree, customers' focus is thus an absolute necessity and it is difficult to imagine a successful network without excellent performance in the customer perspective. Also the current fashion of customer-orientation and the quality movement in business life further underline the importance of the customer. The elements of the customer perspective are presented e.g. by Kaplan & Norton (1996). In the customer focus, it is generally expected that customer orientation increases customer satisfaction, which, in turn, increases customer loyalty, which, in turn, increases profitability and improves shareholder value. Of course, this relationship is neither straightforward nor linear and has many limitations in real life. (cf. Tuomela, 2000.)

Customer satisfaction is not the only topic in the customer perspective, but there are other important issues, too. Some core measures suggested by Kaplan & Norton (1996) are market share, customer loyalty, customer satisfaction, customer acquisition and retention, as well as customer profitability. So far, there is no reason to expect that overall customer measures in networks differ from those in single companies. The challenge is merely to manage the network in a way that these critical success factors could be achieved from the customer perspective. In network conditions, there are additional challenges to gather, disseminate and to apply customer information through the whole network. The level of customer management systems at the network level is also of great importance in order to manage customer processes effectively. The level of shared customer- oriented values lies in the core of the customer perspective. Leader

firms may be customer-oriented, but if the network partners do not share these values and do not behave accordingly, the total excellence of the network in the eyes of customers may suffer. Customer measurement has thus also a great potential to visualize the end customer perspective in network conditions and, therefore, to create customer-oriented reality in networks (Hines, 1988) by quantifying the customers and making them calculable (Vaivio, 1999).

Basing on the above theorizing, we have divided the measures into categories of customer values, customer satisfaction, customer knowledge and network-specific measures. Customer values include measures related to the importance of customer-based values in the operations of network companies. In customer satisfaction, the actual level of customer satisfaction, as well as the level of acquiring and using information about it (e.g. customer surveys) in networks is measured. In customer knowledge, we measure how well customer needs and customer profitability are known in network organizations. Network-specific measures include important measures for each network, e.g. delivery accuracy. When summed up, the total performance in the customer perspective for each company as well as for the network could be calculated. Based on this measurement, variations and differences between companies and potential problem areas could be identified, as well.

Figure 5: Customer perspective in the case network; ● Present state, suppliers average, ● Present state, leader company

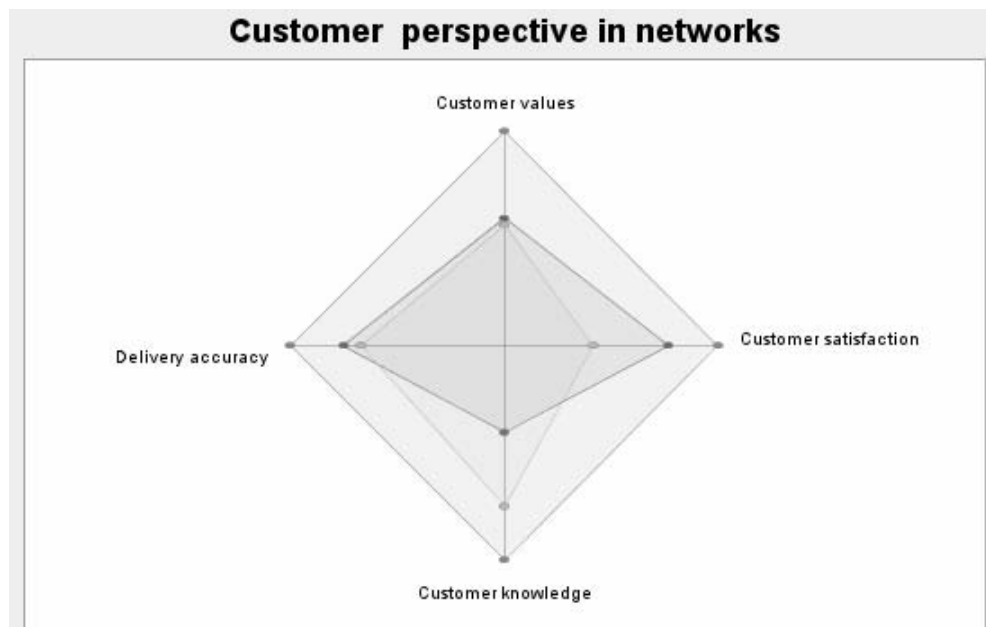


Figure 5 illustrates the present state of customer perspective fulfillment from the point of view of the case network suppliers and the leader company. Distinctively, the level of end customer knowledge is much lower among the suppliers. This is often the case in leader company-driven networks and indicates lack of information sharing in the network, primarily from the leader company to the suppliers. Furthermore, the suppliers estimate customer satisfaction to be on a clearly higher level compared with the leader company's estimation. Although, in this case,

customer satisfaction measures explicitly the level of end-customer satisfaction, suppliers tend to make the estimation from the point of view of their own customer satisfaction performance – as their end-customer knowledge is rather weak. Network-particular customer measure, which in this case is delivery accuracy, is estimated to fulfil fairly high standards in all the network companies. Furthermore, both the leader company and the suppliers have a similar estimation of the level of their customer values, which, however, seem to have much room for improvement.

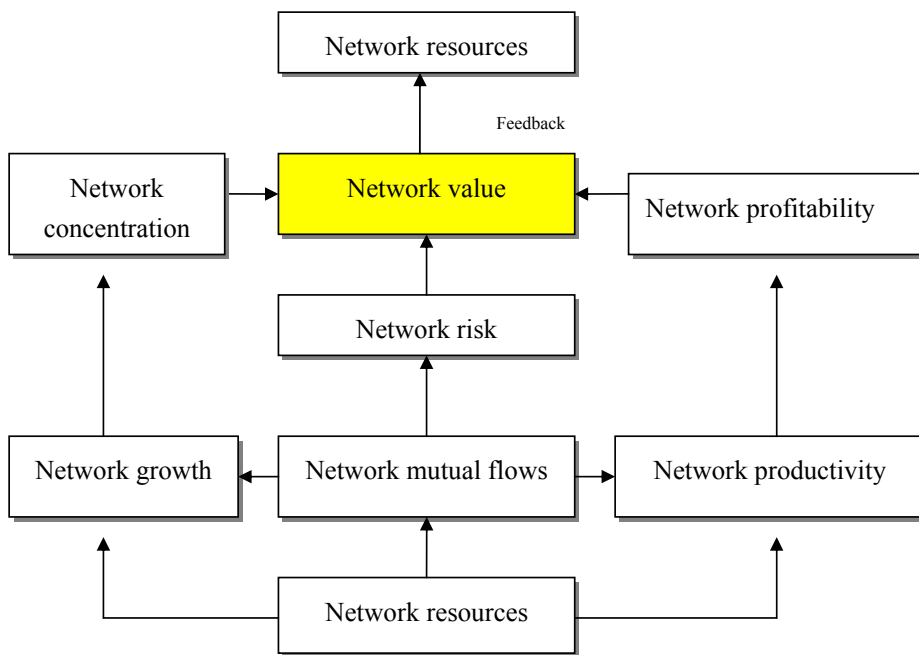
Financial data and financial statement indicators in estimating the economic performance of a network

In this part, a framework is presented for the measurement of the economic performance of the network and of the network member firms. The primary objective is to make an approach towards network financial statement analysis. This analysis consists of estimating and predicting the economic effectiveness of the network and the economic efficiency of its member firms, with the help of indicators based on the public financial statement information and the internal (intranet) financial data of the network firms.

The amount of internal financial statement information (openness) determines what and how reliable results are obtained from the analysis. However, the objective of the analysis is to create at least a coarse idea of the effectiveness of the network and of the fairness of the distribution of the economic advantage of the network between the member firms, irrespective of the amount of this information. The more reliable figures the member firms desire to have about these matters, the more they should invest in developing accounting systems and in the openness of information. Especially, the member firms should be able to separate their mutual network transactions from their other business

The objective of networks-specific financial statement analysis is to estimate the effectiveness of the network and the efficiency of its member firms. The frame of reference developed in the study contains the basic factors of the economic analysis of the network and of relationships between them (a strategic map). In this approach, the *resources* of the network are considered as a starting point for the operation of this network. These resources will generate causal links towards three different directions. In the first direction, the *growth* and *concentration* of the resources of the network are analyzed between the member firms. In the second direction, both the *productivity* and the *profitability* of these resources are estimated. The third direction describes the *mutual (internal) flows* of the network (in other words, the business interaction between its member firms, containing inside the network the flows accomplished by the resources. These flows are vital to the operation of the network and they also have an effect on its growth and profitability.

Figure 6: A framework of the network financial statement analysis



SUMMARY

In Table 1 we provide a summary of the perspectives and preliminary measures of the network measurement system created in this research project.

Table 1: Summary of elements and concepts in a network-level performance measurement system

Element of the performance measurement system ("perspective")	Sub-dimensions	Concepts to be measured
Network culture	Trust	Trust in deterrence, reciprocity, predictability, capability, benevolence, integrity and honesty
	Feeling of community	Shared purpose and mission, vision, values, goals and rules
	Interaction	Quality of interaction
Network resources and competencies	Evaluation of the value of the resources of single companies	Double frame (networking strategy) Common objectives Cooperation capability of a network Flexibility of a network Development work in a network
	Awareness of others' resources	Awareness of the resources of the suppliers Awareness of the resources of the other cooperative partners

	<p>Applicability of the resources</p> <p>Allocation and development of resources</p>	<p>Applicability of suppliers' resources to the needs of the leader company Applicability of the other cooperative partners' resources to one's own needs Common needs for development of the resources</p> <p>Double frame (networking strategy) Common objectives Cooperation capability of a network Flexibility of a network Development work in a network</p>
Models of action	<p>Business dimension</p> <p>Organizational dimension</p> <p>Network governance</p>	<p>Common product development Common brand and image Common products or services Common strategy planning The policy of common profit sharing Common risk-taking</p> <p>Common structures Common systems Decision-making Trust to the group Community in the objectives and goals Interaction in the group</p> <p>Price mechanism Mechanism of authority Social mechanism</p>
Network processes	<p>Quality and efficiency</p> <p>Flexibility</p> <p>Learning</p>	<p>Productivity development Cost accumulation Unit costs Waste Capacity utilization</p> <p>Internal customer satisfaction (experienced by network partner) Throughput times Internal delivery accuracy</p> <p>Problem solving ability Identification of the disturbance factors on the modularity surfaces Improvement % of the efficiency and productivity in processes</p>
Customer perspective in networks	<p>Customer values</p> <p>Customer satisfaction</p> <p>Customer knowledge</p> <p>Network special customer measures</p>	<p>Importance of customer in values, Operation based on customer needs Processes defined according to customer Customer information shared in network</p> <p>Customer satisfaction to products and processes Measurement of customer satisfaction.</p> <p>Knowledge about current and future needs of customer Customer management systems Customer profitability analysis</p> <p>Delivery accuracy</p>

Financial key ratios	Network value	Network resources Network growth Network concentration Network productivity Network profitability Network flow Network risk Network value
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DISCUSSION

In the future, we will continue our study by testing a network-level performance measurement system in practice with different case networks. So far it has been tested with four networks. Our study aims to contribute both to a theoretical and a managerial perspective. These results will help us understand the successful and the unsuccessful development and performance of vertical networks in the spirit of a strategic map (Kaplan & Norton 2001). The potential benefits of this *total research project* for practical actors, entrepreneurs, small business managers, network promoters, authorities, and network investors will be the following:

- It is possible to inform companies and other practitioners of how a network headed by a leader company acts “ideally” in different areas of networking.
- Members of networks and investors in networks are able to use the “ideal model” for a network headed by a leader company as a tool to analyze, evaluate and to develop networks.
- Within networks headed by a leader company, it is possible to utilize this model to consider suitable networking strategy and to choose the most suitable level of networking.
- The “ideal model” to be developed allows companies, consultants, authorities, and investors to use it as a tool for education.
- The “ideal model” will produce new innovative methods and ways of action.

So far the biggest challenges of building the tool have been the following:

1. to build a performance measurement system in conditions with no single network strategy

Extreme options to solve this problem are 1) to choose a “non strategic approach” and to build diagnostic general measurement tool in the spirit of EFQM, which measures the overall state of the network. Another approach is 2) to choose the “strategic scorecard approach” and to build the system on the basis of this defined strategy. Recently we have moved towards option 1 with some extra strategic measures.

2. to fulfill the needs of both 1) networks including leader companies and also their partners (at least to some extent) and also 2) the needs for external investors such as Sitra and Tekes.
3. to define the ownership of the measurement system, i.e. who in the network will run the performance measurement system.

4. to ensure the proper application of the network measurement system in the future.
5. to manage our large scientific research group in a meaningful way.
6. to converge and to reduce the potential approaches in order to solve the practical measurement problems in the field
7. to manage the most heterogeneous nature of different perspectives and different measures.
8. to manage the great number of potential measures, which might lead us to an unclear and too large measurement system.
9. to commit the case networks to build a system, because the development process has taken a lot of time

One key finding of the research project so far related to the ability of a common measurement system to create a shared view of the goals and strategies of the network and – particularly as a precondition to this – to create a shared view of the network as a shared and meaningful entity. This notion is based on theories on accounting as constructing reality and, more broadly, on the theories of a socially constructed world (Berger & Luckmann 1966). Materializing this “network enactment” and, furthermore, “network learning” in practice, would be practical and perhaps also theoretical achievement of this study.

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