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Open-Book Accounting in Networks

ABSTRACT

There is extensive on-going discussion in networks on the benefits and disadvantages of revealing a firm's cost information to other firms. Open-book accounting is mentioned as one of the most important means in striving for success in business. This is especially the case in manufacturing networks. However, most of the literature seems to cover only customer-supplier relationships and not multilateral networks. Furthermore, the utilization of open-book accounting seems to be limited to certain accounting situations. In this study a framework for analyzing open-book accounting is presented and empirical open-book practices are viewed in relation to research questions linked with the characteristics of successful partnerships.

Keywords: *Cost accounting, Customer-supplier relationship, Network, Open-book management*

1 INTRODUCTION

1.1 Cost behind price

The cost of a product depends on the direct material and labor used, as well as on the operations inside a firm, allocated as overheads, necessary to produce and sell the product (Burch,

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1994, p. 131). In this paper, the total cost of a product is based on two elements: material bought outside a firm and operations conducted inside a firm. In other words, direct labor and overhead costs are separated from material cost because they occur inside a firm, while the material cost is a price paid to the material supplier. One of the elements in a firm's total product cost is therefore the price of material bought. In this sense, outsourced or subcontracted work is also analyzed as direct material cost. The difference between the terms "cost" and "price" is that cost is sacrificed to achieve an object (to produce a product, for example), while price is the amount of money given in exchange for something (to get the ownership of material, for example). In physical production, the cost typically occurs before a producer can set a price for a product.

If there were perfect competition in the market, the price would include all the information about the material, its producer, etc. (Begg et al., 1997, p. 125). However, in the typical market there is either oligopoly or monopolistic competition. Assumptions based on a perfect market are not valid in these cases. Hence, prices hide – from the customer's perspective – the actual costs of the operations conducted at the material supplier's. The costs of the supplier's operations and of the way in which the customer-supplier relationship is managed are not visible to the customer.

To have a rational influence on the cost of an end product, i.e. to conduct a procedure called cost management (Ax & Ask, 1995, p. 14), the elements in the cost of the product should be known. However, the lack of transparency in cost accumulation in supply chains leads to situations where a firm knows purchasing prices and internal costs, but not the costs of suppliers. The result is that a main contractor of a multi-tier network knows only a fragment of the elements of an end product's total cost. Hence, managing the accumulation of the cost of a network's end product becomes difficult.

A method suggested for tackling the problem of hidden costs in supply chains is open-book accounting (Kulmala et al., forthcoming; Axelsson et al., 2002; Seppänen et al., 2002; Mouritsen, 2001; Cokins, 2001; Cooper & Slagmulder, 1999, 1998; Hines, 1996; Ellram, 1996, 1995; Frey & Schlosser, 1993). In open-book accounting, a firm reveals its cost structure to another firm in order to show commitment, to strengthen its position among competing firms, to learn about the other firm's operations, and to conduct joint cost-reduction efforts concerning the total cost of a supply chain's end product. Open-book accounting has been studied so far mainly from the viewpoint of a firm's internal and dyadic partnership (Kulmala et al., forthcoming; Schonberger, 2002; Axelsson et al., 2002; Mouritsen et al., 2001; Seal et al., 1999). An approach toward analyzing networks as an accounting environment is emerging (Kulmala et al., 2002; Seppänen et al., 2002; Tomkins, 2001; Dahlgren et al., 2001; Frimanson & Lind, 2000; Lind, 2000), which encourages expanding open-book analysis to cover networks as well.

Traditionally, outsiders of a firm have had no information on a firm's costs (Cooper & Slagmulder, 1998). In this paper, openness of cost accounting is analyzed in the context of the barriers to cost information flow between a limited number of firms belonging to a network. Some of the problems of network-wide opening up of cost structures are introduced by analyzing open-book accounting in the light of six empirical case descriptions and by an illustration of a firm network. The analysis of open-book accounting is limited to concern cost accounting only.

1.2 Research setting

The research setting of this paper builds on eight earlier discussions regarding the factors influencing relationships between firms:

- On the six primary characteristics of partnership success examined by Mohr & Spekman (1994). The characteristics are commitment, trust, coordination, communication quality, participation, and joint problem solving.
- On the relationship between trust and information in relationships, alliances, and networks by Tomkins (2001). The analysis concerning relationships was extended to the network context because networks are formed from configurations of alliances and relationships.
- On six empirical case studies on open-book practices in manufacturing industry by Kulmala et al. (forthcoming), Seppänen et al. (2002), Mouritsen et al. (2001), Dahlgren et al. (2001), Frimanson & Lind (2000), and Seal et al. (1999).

As the case studies are from manufacturing industry, this is also a limitation to the analysis. In addition to the empirical studies, Axelsson et al. (2002) conducted six case studies in Sweden in the early 1990's, but no open-book practices were found.

Following the argumentation of Tomkins, it is reasonable to expect that issues that have been considered essential for partnership success are somehow important also in networks. However, Tomkins mentions that networks are more complex than dyadic relationships and alliances (p. 164). The characteristics mentioned by Mohr & Spekman (1994) were positively connected with the success of partnerships. Seven other characteristics were also tested, but there was no observation of their connection with the success of partnerships. Mohr & Spekman define the primary characteristics as follows (pp. 137–139):

1. "**Commitment** refers to the willingness of trading partners to exert effort on behalf of the relationship. It suggests a future orientation in which partners attempt to build a relationship that can weather unanticipated problems."

2. **Trust** – “the belief that a party’s word is reliable and that a party will fulfill its obligation in an exchange”.
3. “**Coordination** is related to boundary definition and reflects the set of tasks each party expects the other to perform.”
4. **Communication quality** is defined as five characteristics of information: accuracy, timeliness, adequacy, completeness, and credibility.
5. “**Participation** refers to the extent to which partners engage jointly in planning and goal setting.”
6. “Firms in a strategic partnership are motivated to engage in **joint problem solving** since they are, by definition, linked in order to manage an environment that is more uncertain and/or turbulent than each alone can control. When parties engage in joint problem solving, a mutually satisfactory solution may be reached, thereby enhancing partnership success.”

To build and refine all these characteristics in a relationship, information is needed. The information needed in developing relationships is divided into two groups: information to warrant trust and information to master events collaboratively (Tomkins, 2001, p. 172). The characteristics of Mohr & Spekman emphasize different kinds of information and they are thus, in this study, connected to information groups of Tomkins as follows:

- Commitment and trust emphasize information related to warranting trust.
- Coordination, communication quality, participation, and joint problem solving emphasize information related to mastering events collaboratively.

The research questions in this study concern open-book accounting. The research questions derive from earlier theories of cost accounting and from the discussions of Mohr & Spekman and Tomkins. Table 1 illustrates the research setting of this study with the driving statements behind the particular research questions.

The objective of the study is to describe open-book practices and analyze open-book accounting in the network context. Six research questions are expressed, relying on earlier understanding and in order to steer the analysis. The research approach is descriptive and conceptual by nature. A literature review on open-book accounting is carried out, and some of the problems in open-book practices are analyzed using a fictitious network to illustrate the organization of cost information in networks.

The illustrative example of this study is presented in Figure 1. The fictitious network consists of six individual firms. Three of them are suppliers (Suppliers 1, 2, and 3) to the Main Contractor and two of them are subcontractors (Subcontractors 1 and 2) to the three suppliers. The network has the End Customer, but there could be many end customers. All the firms have

TABLE 1. Research setting of the study.

Information type (Tomkins, 2001)	Characteristic (Mohr & Spekman, 1994)	Research question	Driver for the research question
Information to warrant trust	Commitment	Where are the boundaries of open-book practices in networks?	Which parties are committed enough to be understood as "insiders" and to have access to cost information?
	Trust	Is trust between network members a requirement for open-book accounting or vice versa?	Trust is often seen as a result of practices and/or behavior (Tomkins, 2001).
Information to master events collaboratively	Coordination	Do open-book accounting and cost-reductions have a connection?	Systematical reduction of costs of a product calls for information on every phase of the production (Cooper & Slagmulder, 1999).
	Communication quality	Do network members use standardized or versatile accounting?	ABC-information could create a starting point for a supply chain's firms to help each other to reduce costs. (Cokins, 2001).
	Participation	Are there such accounting situations in which open-book accounting is applied more than in other situations?	Different accounting situations call for different cost information (Neilimo & Uusi-Rauva, 1999) which should be noted in planning and goal setting.
	Joint problem solving	How can open profitability information and openness direction influence joint problem solving?	Joint problem solving is a process. The results of a process may depend on the perceived justness of the process (Kim & Mauborgne, 1997).

a cost structure of their own, illustrated by five cost elements and the total product cost under the bottom lines. The arrows between firms describe the supply relations. The arrows are cut in order to illustrate the fact that the customer firm sees the purchasing price only, while the selling firm knows the cost structure behind the product's selling price.

In the following, the text refers to the details given in Figure 1. The figure illustrates a multi-tier supply network. The structure is common in manufacturing industries that are in the mature phase of business as regards the growth of these industries (Cooper & Slagmulder, 1999; Christopher, 1998).

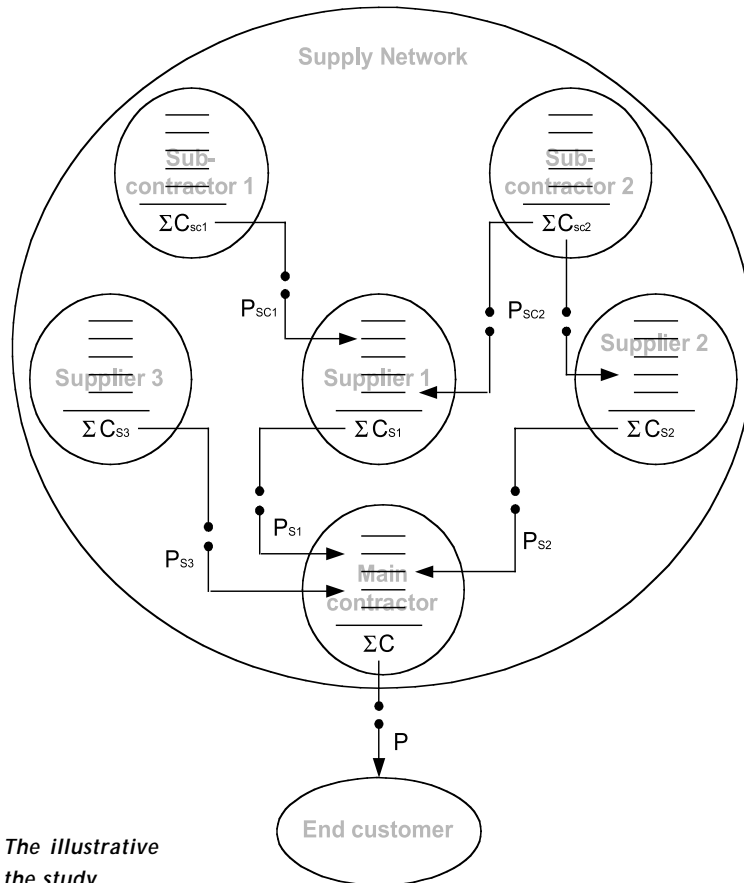


FIGURE 1. The illustrative example of the study.

2 OPEN BOOKS AND CHARACTERISTICS OF A SUCCESSFUL PARTNERSHIP

2.1 The boundaries of openness

When analyzing open-book practices in a network, it is imperative to define the boundaries of the network within which the members participate in open-book accounting. The primary point of interest in this sense is to whom the books are opened (Question 1 in Table 1). Leaning on the argumentation of Pfohl & Buse (2000), Beeby & Booth (2000), Cooper & Slagmulder (1999), Hines (1996), and Håkansson & Snehota (1989), two assumptions are made. First, networking offers a competitive advantage, which should be seen in the price P or in extra features or services offered by the supplier of the network's product to the End Customer. Second, the firms depicted here as the members of the Supply Network are committed to the network and

are expected not to act contrary to the network's benefit. In Figure 1, non-members are located outside the Supply Network and the End Customer represents non-members in this context.

Seal et al. (1999) report on a U.K. customer-supplier relationship that was developed toward partnership. In this case, openness of cost information was a goal that was not reached due to weaknesses in the internal cost accounting systems of the parties and due to unwillingness to take such a big step. A network had no role in this study. In the study of Kulmala et al. (forthcoming), a Finnish supplier's cost information concerning all the costs of all products sold to a customer was revealed to this customer. The customer had a network in which the supplier had the position of supplier level (see Figure 1), but the network did not get access to this supplier's cost information. A dyadically open cost structure is reported also in a Swedish study (Frimanson & Lind, 2000). A supplier opened its cost structure to many of its customers in order to show them what the most cost-efficient manner was in which to place customer orders. A Danish study (Mouritsen et al., 2001) turned the setting the other way round: one customer implemented open-book accounting with many suppliers. In the example of Figure 1, the customer matches with Main Contractor. Dahlgren et al. (2001) studied three case networks in Sweden. They classified the networks as a market-oriented business network, a partnership-oriented strategic network, and a function-oriented hierarchy. In the hierarchic network, many suppliers provided one customer with all their cost information. However, the customer was the marketer of the suppliers' products and was jointly owned by the suppliers. In the strategic network, four suppliers established a jointly owned firm for coordinating some activities of the suppliers. In this case, these four suppliers got access to each other's cost data through the coordinating firm. Whether the suppliers, as the owners of the coordinating firm, can be interpreted as each other's customers or not, is not clear. A Finnish study by Seppänen et al. (2002, pp. 61–71) provides evidence of a subcontractor that opened its books both to its customers and customers' customers. Comparing the situation with Figure 1, there was a difference. In the case network, the subcontractor sold goods both to the supplier level and to the main contractor level, so that all those who got the subcontractor's cost information were their customers.

Summarizing the studies, there is no empirical evidence of a firm that opened its books to such firms that were not customers of the firm. In the light of empirical evidence, it seems that cost information openness is practical: those who buy from a firm can have an influence on the behavior of the firm. The commitment, measured by granting another firm an opportunity to get access to confidential-like cost information, seems to be dyadic by nature, rather than network-wide. It seems that either there are no firms, or there are no studies on such firms, that believe in both of the two assumptions to such a degree that the cost information would have been given to the whole network regardless of business relationships.

Hence, the boundaries of openness within a network seem to be limited to firms doing business with each other. This means, at the same time, that so far openness has not covered all network members, even where a defined network exists, and that openness cannot be expected to be limited to a defined network because the participants may belong to many networks.

2.2 Open-book accounting and trust

Let us take a look at Supplier 1 (Figure 1). Purchases are made from two sources, namely from Subcontractors 1 and 2. The prices, respectively, are P_{SC1} and P_{SC2} . These prices and the internal operations of Supplier 1 create the product cost C_{S1} . In ordinary trade, Subcontractor 1 expresses only the price P_{SC1} , so that Supplier 1 has no idea about the product cost C_{SC1} of Subcontractor 1. Supplier 1 cannot calculate, for example, what its effect on the Subcontractor's cost is, because the cost elements of Subcontractor 1 are hidden behind the price P_{SC1} . The situation is the same in all customer-supplier relationships of the network.

Partnerships emphasize cost-based pricing (Kulmala et al., forthcoming; Lazar, 2000; Spina & Zotteri, 2000; Söllner, 1997; Dyer, 1996; Hines, 1996; Munday, 1992a & 1992b; Ellram, 1991). As long as a customer cannot check the link between a supplier's cost and price, there is no transparency in cost-based pricing. Seal et al. (1999, p. 321) summarize: *"An ideal role for management accounting would seem to be in an open-book agreement whereby both parties can inspect each partner's revenues and costs."* The lack of information transparency may weaken trust. Lack of trust has been noted to be a destructive characteristic for a customer-supplier relationship (Donaldson & O'Toole, 2000; Carter, 2000; Lazar, 2000; Brennan & Turnbull, 1999; Sheppard & Sherman, 1998; Kalafatis & Miller, 1997). Furthermore, increased trust in a supply chain decreases the total cost due to reduced risks (Matikainen, 1998; Ouchi, 1979).

Axelsson et al. (2002, p. 56) mention about open-book accounting that *"establishing trust is a key issue when it comes to utilizing this technique."* On the other hand, Handfield & Bechtel (2002, p. 377) state about customer-supplier relationships that *"site-specific assets by a supplier is an important precursor to greater human asset investment and can lead to a greater level of trust between parties."* Open-book accounting practices can be interpreted as site or partner-specific assets. The question here is: In empirical cases, is trust a requirement for open-book accounting or vice versa?

Mouritsen et al. (2001, p. 225) set trust as a requirement for openness: *"Information, which previously was kept secret, is now made available [which] most likely requires a highly developed sense of trust between the parties involved, and it presupposes a system by which information is actively shared."* As mentioned, Mouritsen et al. consider also the technical system

for openness. On the other hand, Seal et al. (1999) see the relationship of the issues as vice versa: "[O]pen-book negotiations help to build trust even if inequalities in power are reflected by asymmetries in the sharing of accounting information. ... Trust and cooperation are likely to be more forthcoming, if agreements are transparent and are seen to be fair." (p. 310) "[A]ccounting may play a constitutional role in the establishment and management of trusting" (p. 320). Hence, two opposite opinions are expressed.

Seppänen et al. (2002) conducted a survey among the participants of the open-book practice. Seven out of the 13 representatives of network firms mentioned that there is nothing confidential in cost information. These respondents thought that they would provide any customer with cost information independently of the nature of their relationship with a particular customer. Six out of the 13 respondents mentioned that cost information calls for trust. One respondent stated that transparency should always be avoided. Another respondent stated that by varying the accounting method used, a firm can manipulate costs to look like whatever the firm wants. The results of the survey reveal some problems regarding openness, but leave the question unanswered. In addition, Kulmala et al. (forthcoming), Dahlgren et al. (2001), and Frimanson & Lind (2000) do not consider the relationship between trust and open-book accounting. Hence, in practice, trust has been seen both as a requirement for and as a consequence of open-book accounting, but the issue has been limitedly analyzed.

2.3 Managing the accumulation of cost in a network

Proceeding further with the problem of revealing the cost behind the prices, firms meet the challenge of influencing, which mostly means reducing, the total cost of a product. Management of supply chain and network is to a great degree management of cost accumulation (Uusi-Rauva & Paranko, 1998, p. 51). "*Inter-organizational cost management is a structured approach to coordinate the activities in a supplier network so that total costs in the network are reduced*" (Cooper & Slagmulder, 1999, pp.145–146). "*Cost transparency means the sharing of costing information between customer and supplier including data which would traditionally be kept secret by each party. ... The purpose of this is to make it possible for customer and supplier to work together to reduce costs.*" (Lamming, 1993, p. 214) Long-term relationships emphasize joint development of products and processes as an efficient way to manage the accumulation of costs in a supply chain (Beeby & Booth, 2000; Quinn, 2000; Handfield et al., 1998; Monczka et al., 1998; Stuart et al., 1998; Mohr & Spekman, 1994; Womack & Jones, 1994).

From the customer's perspective it is possible to reduce cost by developing either the product design (feed-forward technique) or the production process (feedback technique) (Cooper & Slagmulder, 1999, p. 63). Both of these approaches call for inter-organizationality, because in most manufacturing firms a lot of production is outsourced. If the parties have each other's

cost information, they can assess how the product features suit the overall production process. Within a network, transparency may reveal causes of inefficient operations or show up inconsistent practices. Let us take a look at Subcontractor 2. Suppliers 1 and 2 buy the same product at a price labeled P_{SC2} . However, the price may vary between the suppliers. If it is easier and therefore lower-cost to sell to Supplier 1 than to Supplier 2, the price for Supplier 1 might be lower. The negotiating power of Supplier 1 may also be better. The cost of selling to different customers would be visible if transparency of costs existed. Open-book accounting would give the Main Contractor an opportunity to analyze whether there are differences in the customer-specific costs of Subcontractor 2 and why. Unveiling the cost C_{SC2} does not mean that the customer-specific components of the costs and prices P_{SC2} are immediately united or minimized, but there is at least an opportunity to understand and influence the cause factors. It is not likely that a customer could significantly contribute to the supplier's production or development if it did not have the same starting point for assessment, i.e. costs, as the supplier has.

The question about coordination is as follows: Have consequences of openness been reported in the sense of cost-reductions (question 3)? Mouritsen et al. (2001, pp. 233–234) mention about open-book accounting: *"Open-book accounting made it possible to benchmark suppliers and to redesign suppliers' production and distribution processes."* This also led to reduced cost. In the study of Seppänen et al. (2002), the network expected a 5–10% increase in the prices of one product group. After the opening up of the supplier's cost structure and a short redesign of the process, original prices were decreased by almost 20%. In the survey after the open-book agreement, 12 out of the 17 respondents were ready to apply cost information openness, because they believed in its direct effect on costs. Frimanson & Lind (2000) mention that when customers understood how their orders influenced the process of the supplier (set-up times, material storing, etc.), most of them were interested in selecting such delivery terms that resulted in lowest cost. This, in turn, led to reduced total cost at the supplier's. Seal et al. (1999) describe a procurement manager who expected 6% cost savings if some of the current "over-engineering" could be relaxed and the cost structure of the supplier was revealed. However, although target costing was the approach to be applied in the relationship, openness was not reached, so that the connection between actual cost reductions and openness remained unclear. Finally, Kulmala et al. (forthcoming) present a case customer who wanted to obtain accurate cost information from a supplier in order to define the cost-reduction potential in processes. However, there are no figures from the measurement of such a potential. Furthermore, Dahlgren et al. (2001) do not mention cost reductions in their study.

It seems that real-life business supports the interpretation that cost reductions are likely if open-book accounting is applied. However, the cost reductions reported might have been caused by other factors as well. The distinction between other factors and open-book account-

ing should be made in order to be able to answer the question whether open-book accounting leads to cost-reductions or not.

2.4 Accounting methods

The question here regarding the accounting methods refers to the communication quality in the spirit of standardized information: standardization is said to mean less misunderstanding. The emergence of cost is independent of the way in which the cost is accounted (Kaplan & Atkinson, 1998; Ax & Ask, 1995; Burch, 1994), but the calculated cost of a cost-object depends on the accounting method used (Kaplan & Cooper, 1998; Kaplan & Atkinson, 1998; Turney, 1991). In other words, different accounting methods produce different accounting results. In the case of an open-book network, a question may arise concerning how different accounting methods are utilized within a network. In order to analyze this issue in detail, two matters should be kept separate:

- How do network firms solve accounting problems? Are the problems solved similarly in all the member firms' accounting? The problems encountered are closely related to the nature of cost accounting and emanate from the four fundamental problems of scope, measurement, valuation, and assignment (Kulmala et al., 2002, p. 37).
- How do network firms select accounting methods to measure the cost of end products? Do all the member firms use the same accounting methods? There are many accounting methods to be selected from, from standard costing and process costing to activity-based costing.

From the viewpoint of fairness within a network, open-books reveal the features of the accounting methods used. If the pricing between network members is based on cost, the way in which the cost of cost-objects is calculated becomes essential in defining the prices. Network members may have an interest in getting the cost to look as high or low as possible, depending on whether they are customers or suppliers. The most confusing situation could emerge if a network member assigned most of its cost elements to network customers' products and sold products that seemed low-cost to non-network members. This would lead to high prices within a network due to cost-based pricing and possible high profits outside the network sales. To avoid this kind of situation, network members might accept the right to "audit" other members. As regards the success of the network, strict rules may harm it. Let us assume that all networks expect standardization of members' accounting systems. If a member firm takes part in four networks, it should operate with four different systems. From a firm's point of view this is not reasonable. The focus in networks should be turned on members' success: if the members succeed, the network has a solid basis. To guarantee the possibilities to succeed, the net-

work should not limit the creativity of members by standardizing everything. Hence, two perspectives, fairness and effectiveness, on the standardization of accounting systems within a network are expected to exist.

A standardized accounting system was applied in network firms in one out of the three networks in the study of Dahlgren et al. (2001). In the strategic network, four suppliers had a managerial team that controlled the calculations of each of the suppliers in order to avoid deviation in accounting methods. Absorption costing was used in this network. The suppliers of the hierarchic network, that also used open-book practices, did not have a standardized accounting system, but used individual methods. A full costing method, taking direct and indirect materials, direct labor, and an overhead coefficient into account, was used in this network. Kulmala et al. (forthcoming) illustrate that an agreement on the principles of how to solve accounting problems at the supplier's was made before the customer was allowed to see the supplier's cost structure. For example, decisions on what is the interest rate used, how depreciations are made, and which costs are included in the calculations were made in cooperation with the main contractor. The accounting method in this case was ABC. Furthermore, only one supplier's accounting was concerned, so there is no need to bring in the network perspective here. Other empirical studies do not consider the standardization of accounting systems within a network. It might be that the issue has not been essential in the cases involved.

To avoid unfairness, at least the accounting problems should be solved jointly, and in a similar way in each of the member firms. The details of accounting problems, the interest rate used, and the depreciation method selected, for example, are independent of the accounting method used: they can be solved similarly for all the costing methods. It is anticipated that trying to use jointly accepted principles in solving accounting problems will not unduly restrict the freedom member firms need. A network may consist of different kinds of firms that have different accounting needs (Tomkins, 2001; Dahlgren et al., 2001). Activity-based costing, for example, is at its best in a multi-product environment in which the production volumes vary, while other methods would serve single-product processes better (Kaplan & Atkinson, 1998; Ax & Ask, 1995; Turney, 1991). Tomkins (2001) and Dahlgren et al. (2001) state that a network as an accounting environment does not seem to directly necessitate new accounting methods, but the standardization of accounting principles and systems within networks is almost an unstudied topic.

2.5 Participation – when and how?

Beginning from the definition of Mohr & Spekman (1994), planning work and goal setting illustrate parties' participation. In this study, planning and goal setting are analyzed in the con-

text of situations when accounting information is needed. There are at least 14 different situations for using accounting information (Neilimo & Uusi-Rauva, 1999, pp. 111–112; Uusi-Rauva & Paranko, 1998, p. 4):

1. Pricing and offer calculation
2. Calculate and control costs of resources
3. Calculate and control profitability of products and customers
4. Product mix selection
5. Transfer pricing
6. Make-or-buy and outsourcing decision
7. Investment decision
8. Product development decision
9. Production process selection and operations management
10. Calculation and control of economical efficiency of cost centers and activities
11. Increasing cost awareness within an organization
12. Helping budgeting and financial planning
13. Stock valuation for book-keeping
14. Benchmarking

First the participation is analyzed from the point of view of the accounting tools and then the tools are connected to the accounting situations. In this way it is possible to create an overview of situations that would emphasize open-book accounting. Planning and goal setting in mature industries often tangle cost issues. Functional analysis, value analysis, and value engineering are the most typical approaches in the reduction of product costs. These tools can be interpreted as planning tools. Goal setting related to product costs is often carried out in the form of a target costing process (Shank & Govindarajan, 1993; Dyer, 1996; Cooper & Slagmulder, 1997, 1999; Mouritsen et al., 2001). Concerning the life cycle of a product, life-cycle costing can be divided into new product cost design (target costing) and existing product cost reduction (kaizen costing) (Kaplan & Atkinson, 1998, p. 222). All the tools mentioned here are also suggested for use across firm boundaries (Cooper & Slagmulder, 1999). The tools can be used at least in situations 1, 3, 4, 6, 7, 8, 9, and 14. This is due to the nature of these situations: members of a supply chain or network could cooperate in these situations because the situations are related to the cost analysis or cost reduction either of a firm, supply chain, or network. In addition to these, also situations 10, 11, and 12 could be supported by the network approach if these situations were understood as network responsibilities. However, it is not clear that only the techniques mentioned are essential. For example, Ellram (1996) has stated that different customer-supplier relationships emphasize different cost-reduction tech-

niques. This may also mean that in different relationships different accounting situations are underlined. On the other hand, the relationships in a compact network are expected to be important for all the members of the network and therefore many members should participate in using a particular technique.

Question 5 links the accounting situations to practices: For which accounting situations have inter-organizational or open-book practices been reported? Table 2 summarizes the empirical studies concerned. It must be noted that in the case study of Seal et al. (1999) no openness was reached in practice, although there was an agreement on principles. To summarize, openness has been considered and reported most in accounting situations 3, 9, 10, and 11. This is in line with earlier theories of joint process improvement and joint effort regarding the profitability of products, customers, and activities. Furthermore, almost no reporting on open-book accounting covers accounting situations 5, 7, 12, 13, and 14. Transfer pricing seems not to be an issue here, which may be because partnering firms are independent. It comes as a slight surprise that benchmarking was a purpose in only one case. However, the partnership approach may prevent too much benchmarking, at least that done to help in supplier selection.

TABLE 2. Openness in different accounting situations.

Study	Accounting situations in which openness is reported
Seal et al. (1999)	3, 6, 8, 9, 10
Frimanson & Lind (2000)	1, 3, 4, 9, 11
Dahlgren et al. (2001)	1, 2, 3, 4, 5, 8, 9, 10, 11, 12
Mouritsen et al. (2001)	2, 6, 9, 10, 11, 14
Seppänen et al. (2002)	1, 3, 4, 6, 9, 10, 11
Kulmala et al. (forthcoming)	1, 3, 4, 8, 9, 10, 11

Concerning the accumulation of costs of a network product, many accounting situations can be interpreted as inter-organizational. There are several accounting situations that emphasize planning and control, and there are several accounting tools which have been developed for such planning and control work. According to empirical studies, open-book accounting has been applied especially when calculating and controlling the efficiency of activities, analyzing product and customer profitability, increasing cost awareness of organizations, and improving production processes.

2.6 The use of cost information in open networks

The last question is about joint problem solving in networks. Joint problem solving is understood here as a process. The results of a process may depend strongly on the perceived justice

of the process (Kim & Mauborgne, 1997). Furthermore, cooperation is likely to exist if agreements are seen to be fair (Seal et al., 1999). Following these ideas, the quality and results of joint problem solving may correlate with the perceived justice. Accordingly, the way in which cost information is used in networks is analyzed from profitability information and openness direction perspectives.

Network-wide cost and price transparency might launch a discussion of the profitability of the network members. A consequence of transparency is that the customer knows the profitability of the supplier, at least at the product level. A behavioral problem emerges if the customer prefers a certain profitability for suppliers. The customer may want to change suppliers' pricing against the suppliers' will or against the market mechanism. This may lead to conflicts in the relationship, which does not help in striving for joint development. "*[O]pen book relations may not be based on partnership and trust but may be forced*" (Seal et al., 1999, p. 310). The case study of Seal et al. (1999) indicated that the element of force in the customer's behavior might to some extent have prevented openness.

The benefits or cost reductions created via networking can accrue to some participants due to the asymmetry of power within a network (Ebers & Jarillo, 1998, p. 5). Networking may even be a means for big firms to control and squeeze the small ones (Stuart et al., 1998, p. 84). In order to avoid this possibly destructive feature of networking, should all the good be fairly shared between the participants? Kulmala et al. (forthcoming) report on a win-win situation in which joint problem solving in the development of one product had led to significant cost savings, but the price was not changed. This was due to the fact that the customer did not pay a price for other products that would even cover their costs. In this case, the profitability of different products were considered, but not balanced. In the study of Frimanson & Lind (2000), the connection between customer orders and their profitability was evident. The supplier tried to steer the customers to place such orders that were low-cost. However, the discussion was dyadic and customers could not know the profitability of other customers. Although the supplier in the case of Seppänen et al. (2002) opened its cost structure to many customers, they would not have done so if there had not been a high probability of increasing sales. In this case the supplier accepted lower profitability but wanted to guarantee continuity with increased sales volume.

Networking is also a tool for efficient and effective division of duties between firms (Pfohl & Buse, 2000; Ebers & Jarillo, 1998; Håkansson & Snehota, 1989). By removing the competition between network members, the network can reduce the costs caused by internal friction in the operations and concentrate on competing against other networks. However, in a monopolistic market the number of potential suppliers and customers can be very low. In a small local area almost all the firms could be members of the same network. If a main contractor

controlled all these firms, it could stabilize the network by a division of duties among members, which would cause the competitive component of the market economy to fade away. In the study of Dahlgren et al. (2001), these characteristics emerged. One of the three case networks was run by a marketing unit that controlled the suppliers. The suppliers were located in a small geographical area. However, no conflicts were reported.

The transparency discussed so far is one-way: the supplier opens its books to the customer. The purchaser's perspective on openness is the dominating paradigm in the literature (Kulmala et al., forthcoming; Seppänen et al., 2002; Mouritsen et al., 2001; Frimanson & Lind, 2000; Seal et al., 1999; Cooper & Slagmulder, 1999; Frey & Schlosser, 1993). One-way openness means that firms have knowledge of the costs of suppliers' taking part in the process before them, but not of those participating after them. The Main Contractor has access to the cost information of Supplier 1 and Subcontractor 1. The reason may be one of the underlying assumptions concerning joint problem solving: it is not so explicitly clear that the supplier would have the opportunity or competence to develop the customer's process as it is in the reverse case. However, one-way openness may lead to several embarrassing situations: the supplier may feel pressured by the customer, the supplier may feel unequal compared with the customer, or the customer may dictate the supplier's decision-making.

Continuing the example of the open-book network, same-level suppliers may know and discuss each other's material costs: Suppliers 1 and 2 know each other's purchasing prices from Subcontractor 2. It is likely that the one paying a higher price for the same product would like to discuss the reasons for the situation. Furthermore, the network members could multilaterally analyze and solve the problem of different customer-specific cost by implementing the minimum cost process for all customers. Hence, open-book accounting could support learning between network members. The learning perspective is an important incentive for many firms to take part in networks (Beeby & Booth, 2000; Stuart et al., 1998). However, pure open-book accounting would include two-way practice in order to fulfill the mutual learning implication (Mouritsen et al., 2001, p. 233): *"By opening the books they learn more about us and we learn more about them"*.

If the Main Contractor wishes to have an influence on all the network members' operations and profitability level, the situation begins to be reminiscent of transfer pricing. The analogy between transfer pricing and negotiating over cost reductions in partnerships is evident (Seal et al., 1999). In transfers, departments or units of a firm produce goods for other departments or units, and the price paid for the goods is agreed to create a differential profit for the firm (Burch, 1994, p. 1027). One or more departments or units may suffer from transfer pricing compared with selling/buying out of the firm. Transfer pricing would be dangerous in a network context, because it would transform the original setting of independent firms into an or-

ganized hierarchy in which a firm cannot independently decide whether it wants to sell/buy or not outside of the network. Furthermore, the lack of competitiveness may leave development potential unused (Quinn, 2000; Kapoor & Gupta, 1997; Begg et al., 1997).

In this chapter, joint problem solving was considered as a process, and it was analyzed from the viewpoint of open profitability information and the direction of openness. It seems that the profitability discussions, in the context of sharing the profits of joint development, are limited in networks to customer-supplier relationships. Furthermore, openness seems to occur in one direction only – from supplier to customer. The influence of these two issues on the quality of joint solutions seems to be unclear, which should be considered when designing further studies.

3 SUMMARY

An illustrative example of open-book accounting within a network was presented in the study. Six questions concerning open-book accounting were approached from the viewpoints of information type and characteristics of successful partnerships. The study was conceptual in nature, but the argumentation was supported by six empirical studies on open-book practices. Table 3 summarizes the results of the study.

Two issues were analyzed from the trust-warranting information point of view: commitment and trust. The study indicates that the openness of cost information is restricted to customer-supplier relationships. Network-wide openness, such that a firm could have cost information from a firm that has no customer-supplier relationship with it, has not been reported. Hence, the limit for commitment seems to be in the actual placement of purchase orders and the making of payments. Trust is mentioned to be both a requirement for and a consequence of open-book accounting, and empirical evidence on the issue is very limited.

Four issues were analyzed from the event-mastering information point of view: coordination, quality of information, participation, and joint problem solving. Coordination should, finally, be noticed as cost reductions. The study slightly supports the interpretation that cost reductions are likely if open-book accounting is applied. However, the cost reductions reported might have been caused by other factors, and open-book accounting may be just a means of visualizing them. The standardization of accounting methods and systems within networks is almost an unstudied topic. Therefore the question related to communication quality remains unanswered after this study. The participation issue was approached from the perspective of inter-organizationality of different accounting situations. Open-book accounting has been applied especially when calculating and controlling the efficiency of activities, analyzing product and customer profitability, increasing cost awareness of organizations, and improving pro-

TABLE 3. Results of the study.

Information type (Tomkins, 2001)	Characteristic (Mohr & Spekman, 1994)	Research question	Results of the literature review
Information to warrant trust	Commitment	Where are the boundaries of open-book practices in networks?	The openness of cost information seems to be restricted to customer-supplier relationships.
	Trust	Is trust between network members a requirement for open-book accounting or vice versa?	Trust is mentioned to be both a requirement for and a consequence of open-book accounting. Empirical evidence on the issue is limited.
Information to master events collaboratively	Coordination	Do open-book accounting and cost-reductions have a connection?	The study slightly supports the interpretation that cost reductions are likely if open-book accounting is applied. However, open-book accounting may be just a means to visualize cost reductions.
	Communication quality	Do network members use standardized or versatile accounting?	The standardization of accounting methods and systems within networks seems to be almost an unstudied topic.
	Participation	Are there such accounting situations in which open-book accounting is applied more than in other situations?	Open-book accounting has been applied especially when calculating and controlling the efficiency of activities, analyzing product and customer profitability, increasing cost awareness of organizations, and improving production processes.
	Joint problem solving	How can open profitability information and openness direction influence joint problem solving?	Joint problem solving seems to be supported one-way only: cost information has been given by suppliers to customers.

duction processes. Finally, joint problem solving was supported one-way only: cost information was given to customers from suppliers. Furthermore, profitability discussions cover dyadic relationships, so that network perspectives mostly seem to be neglected.

The major limitation in this study is the low number of empirical network studies available. Further research needs to be conducted concerning the openness of accounting information in networks. In this study, six research questions were put, not only with a view to obtaining answers to them but also in order to indicate a direction future empirical research. There is wide on-going consideration of the issue, both in the literature and in practice. However, only

few studies so far have conceptualized the issue or reported on empirical practices. It is also a challenge for researchers to obtain access to open-book accounting practice so that analysis and reporting could be possible. ■

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Open-book accounting and supply-chain assurance. Report by the Comptroller and Auditor General. Ordered by the House of Commons to be printed on 30 June 2015 This report has been prepared under Section 6 of the National Audit Act 1983 for presentation to the House of Commons in accordance with Section 9 of the Act Sir Amyas Morse KCB Comptroller and Auditor General National Audit Office 29 June 2015. This volume has been published alongside a second volume, Open-book accounting and supply-chain assurance: Case studies – HC 91-II. HC 91-I | £10.00. This report focuses on how open-book can be used Accounting in networks by Håkan Håkansson, 2010, Routledge edition, in English - 1st ed. Open-book accounting in networks / Peter Kajater and Harri I. Kulmala. Accounting in networks : the transaction cost economics perspective / Shannon Anderson and Henri Dekker. Accounting in networks : the industrial-network approach / Hakan Hakansson, Kalle Kraus, Johnny Lind and Torkel Stramsten. Actor-network theory and the study of interorganisational network-relations / Jan Mouritsen, Habib Mahama and Wai Fong Chua. Accounting in inter-organisational relationships : the institutional theory perspective / Robert W. Scapens and Evangelia Varoutsas. Accounting in networks : the next step / Hak Open-book accounting is an extension of the principles of Open-book management to include in an organisation's accounts all those with an interest in the organisation, not merely its employees and its shareholders (including those whose shareholding is managed indirectly, for example through a mutual fund). This effectively means all members of the public. Advocates of open-book accounting argue that full transparency in accounting will lead to greater accountability and will help rebuild the trust in financial capitalism that has been so badly damaged by recent events such as the collapse of Lehman Brothers, the federal rescues of AIG, Fannie Mae and Freddie Mac, and the fire-sale of Merrill Lynch to Bank of America, not.