



Value chain analysis in interfirm relationships: a field study

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Abstract

Interfirm relationships introduce new challenges for management accounting. One such challenge is the provision of information for the coordination and optimization of activities across firms in a value chain. According to the literature, a *value chain analysis* (VCA) is a useful tool to meet this challenge. However, little empirical evidence has been published on the use of this analysis in practice. This paper presents a case study on the use of an activity-based costing (ABC) model by a large UK retail firm and a group of suppliers for supporting their supply chain management (SCM) practices. This cost model was based on the principles of value chain analysis and integrated cost information across the supply chain. It was used to improve supply chain operations by performing benchmark analyses, strategic what-if analyses and cost monitoring. An interpretation of the case findings is provided using organizational theory and transaction cost economics.

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1. Introduction

Interfirm relationships and networks are an indispensable part of business relationships, yet in the past they have gained little attention on the agenda of management accounting researchers. Only recently more attention towards this issue has been called for in the accounting literature (Hopwood, 1996; Munday, 1992; Otley, 1994; Scapens and Bromwich, 2001). Due to the recognition of the implications for organizational design and management control within and between organizations, the topic currently is drawing increasing research interest. Specific issues addressed by the accounting literature are the make-or-buy decision and outsourcing of activities (Anderson et al., 2000; Gietzman, 1996; Mouritsen et al., 2001; Van der Meer-Kooistra and Vosselman, 2000; Widener and Selto, 1999), inter-organizational cost management (Carr and Ng, 1995; Cooper and Slagmulder, 1999), supply chain relationships (Frances

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and Garnsey, 1996; Ittner et al., 1999; Seal et al., 1999), alliances and business networks (Dekker, 2003; Tomkins, 2001) and value chain analysis (VCA) (Shank, 1989; Shank and Govindarajan, 1992, 1993).

This paper focuses on the use of value chain analysis in buyer–supplier relationships for coordinating supply chain interdependence. In the management accounting literature the VCA is regarded as a core analytical tool of strategic management accounting (SMA). This method to analyze the value chain for strategic improvement was introduced by Porter (1985) and in the management accounting literature further developed by Shank (1989) and Shank and Govindarajan (1992, 1993). The core idea of the analysis is to break up “the chain of activities that runs from basic raw materials to end-use customers into strategically relevant segments in order to understand the behavior of costs and the sources of differentiation” (Shank and Govindarajan, 1992, p. 180). The development of VCA in the literature, however, has primarily been conceptual and anecdotal, and mainly from an *intrafirm* perspective. Little empirical evidence of its use in practice is available, which has been a reason for criticism on the relevance of the concept for practice (Lord, 1996). In addition, although a VCA conceptually spans the entire value chain, crossing organizational boundaries, its role in *interfirm relationships* has received scant attention.

The core of this paper is a case analysis of how a large UK retailer, J. Sainsbury, used VCA to manage the supply chain in cooperative relationships with suppliers. Sainsbury has developed an activity-based costing (ABC) model to support its supply chain management (SCM) practices with a group of suppliers. As far as the author is aware, no empirical evidence on the use of such practices by firms has been published in the literature before. Therefore, first an in-depth description of these interfirm cost management practices is provided and key features of Sainsbury’s VCA practices are identified. Second, an explanation of the case observations is provided, based on organizational theory and transaction cost economics. Important theoretical issues in the case study relate to the coordination of supply chain activities, the exchange of sensitive cost information, and the division of costs, benefits and investments resulting from identified supply chain improvements. The explanation of the case findings thus provides some theoretical underpinnings for the use of VCA in interfirm relationships.

The remainder of the paper is structured as follows. First, the role of management accounting in interfirm relationships is discussed, by focusing on control problems that arise when firms engage in interfirm relationships. Then, the concept of VCA and its role in interfirm relationships is discussed in more depth. In particular, attention is paid to the use and problems of accounting information for performing a VCA. After these theory sections, a case study is presented of how Sainsbury uses principles of the VCA concept to support its supply chain management efforts with suppliers. This case description is followed by a discussion of the case findings, in which an explanation of the findings is provided. In addition, it is assessed to what extent Sainsbury’s cost model complies with the conceptualization of VCA in the literature, and what the empirical findings might add to the value chain approach. Then some directions for further research emerging from this study are provided. The paper ends with a conclusion.

2. Management accounting in interfirm relationships

Over the last two decades in several fields of organizational research, such as management, organizational behavior and strategic management research, interfirm relationships have become a research topic of substantial importance. Despite their importance in other disciplines and their rapid proliferation in

organizational practice, until recently interfirm relationships have had only a relatively modest impact on management accounting research. In those other areas of organizational research, most research has focused on explaining the *choice* for and the (governance) *form* of interfirm relationships (Gulati and Singh, 1998). Research into the *management* of interfirm relationships, however, has remained limited. Management accounting may play a key role in this management of interfirm relationships. Recognizing this gap in the literature, Tomkins (2001) calls for an increased focus on the management of interfirm relationships, by arguing that “the area warrants more empirical research with a greater emphasis upon business processes and the use of accounting in action/negotiation” (p. 164). He raises a large number of issues about the role of information in the management of interfirm relationships, alliances and networks that need to be addressed in research.

Seal et al. (1999) discuss three important roles of management accounting in interfirm relationships: (1) the make-or-buy decision that can lead to the initiation of a partnership, (2) the use of management accounting in the actual management of a partnership and (3) the partners’ responsibilities to each other, which creates a role for performance measurement. Tomkins (2001) positions the use of information in interfirm relationships, including accounting, in a broader framework by relating it to two purposes, the *mastery of events* and the *development of trust*. While the mastery of events essentially relates to the management of tasks to be performed in the relationship in the pursuit of value creation, the development of trust reflects the need to gain confidence in each other’s behavior.

Similar to these purposes of information, Gulati and Singh (1998) discuss two purposes of governance in interfirm relationships: *the coordination of interdependent tasks* and *the management of appropriation concerns*. These ‘control problems’ (Dekker, 2003) are based on two distinct theoretical frameworks. Organization theory (Thompson, 1967), describing the coordination problem, suggests that the need for coordination varies with to the degree of interdependence (i.e. pooled, sequential and reciprocal) and the uncertainty of tasks performed within the interfirm relationship. This control problem is essentially related to the *creation of value* by interfirm coordination. Activities crossing or having influence across organizational boundaries need to be coordinated across those boundaries. The greater the task interdependence and uncertainty, the more coordination is required (Thompson, 1967). However, compared to intrafirm coordination, in which hierarchical authority is a main instrument, interfirm coordination takes place between independent firms, which situation lacks the use of formal authority relationships. Tomkins (2001) suggests that interfirm coordination is based on ‘Type 2 information’, which is needed for the mastery of events by collaborating firms, as if they form one entity. He argues that Type 2 information consists of information that enables entities “to plan and make decisions on collaborative futures” (p. 171), particularly “to make economic judgements on strategies, investments and on-going operations” (p. 178).

The management of appropriation concerns has been described by transaction cost economics (Williamson, 1985), which argues that partners in interfirm relationships need to safeguard their interests against the potentially opportunistic behavior of the other(s). The need to manage appropriation concerns is related to the characteristics of the transaction taking place (i.e. the *specificity* of assets dedicated to the relationship, the level of environmental *uncertainty* and the *frequency* of transacting), and characteristics of human beings (i.e. *opportunism* and *bounded rationality*). The higher the appropriation concerns, the more safeguards partners need to increase their confidence that the other will not engage in malfeasance. This control problem is essentially related to the *appropriation of value*. Trust in the other’s goodwill is an important informal control mechanism that adds to the partners’ level of confidence that opportunism will not occur, and thus influences the level of formal control required (Dekker, 2003; Gulati, 1995; Tomkins,

2001; Van der Meer-Kooistra and Vosselman, 2000).¹ Tomkins (2001) refers to information required to warrant trust as ‘Type 1 information’.

Both control problems require the use of control mechanisms and can have significant implications for the role of management accounting in interfirm relationships. An important question is which control mechanisms are available to manage and control interfirm interdependencies and whether these mechanisms differ from those used in intrafirm coordination.² Gulati and Singh (1998) suggest that in interfirm relationships hierarchical control mechanisms are particularly useful for the management of these control problems, by aligning incentives, providing monitoring and realizing control by fiat. Control mechanisms they describe to realize these purposes are command structures and authority systems, incentive systems, standard operating procedures, dispute resolution procedures and non-market pricing systems. Management accounting can have a key role in these mechanisms. For instance, in a case study of a strategic alliance between a buyer and supplier concerning the innovation of railway safety equipment, management accounting practices constituted an important part of the formal governance structure, and were used to manage both control problems (Dekker, 2003). To coordinate innovations and to safeguard their interests, the partners used planning and budgeting, performance measurement based on open book accounting, and a financial incentive system. Tomkins (2001) provides an in-depth analysis of the different information needs for different alliance types at different stages of their development.

In the literature on strategic management accounting, the *value chain analysis* is described as a technique that can play an important role in the management of supply chain relationships. This analysis, which builds on the concept of the *value chain*, was developed by Porter (1985), and in the accounting literature further developed by Shank (1989) and Shank and Govindarajan (1992, 1993). According to these authors, a VCA is used to *analyze, coordinate and optimize* linkages between activities in the value chain, by focusing on the interdependence between these activities. The next section addresses how a VCA is used as a mechanism for interfirm coordination and how its use relates to the two control problems discussed.

3. Value chain analysis as a coordination mechanism in interfirm relationships

3.1. Managing interdependence in the value chain

According to Porter (1985), one important purpose of strategic cost analysis is to better manage linkages with buyers and suppliers in the value chain. A value chain is defined as “the linked set of value-creating activities all the way from basic raw material sources for component suppliers through the ultimate end-use product delivered into the final customers’ hands” (Shank, 1989, p. 50). In a value chain different types of relationships or ‘linkages’ can be distinguished: relationships between activities, relationships between Business Units of the firm, and relationships between the firm and its buyers and suppliers (Porter, 1985). This last type of relationship, referred to as ‘vertical linkages’ in the supply chain, concerns how a firm’s internal value chain is related to those of its buyers and suppliers. A linkage expresses the relationship between the performance of one activity and its effects on the performance of another activity. In other

¹ For more extensive discussions on the complex relationship between trust and control related to both control problems, see Dekker (2003) and Tomkins (2001).

² Thanks are due to a reviewer who suggested discussing the question whether interfirm coordination requires different control mechanisms or simply can extend the use of intrafirm coordination mechanisms.

words, a linkage exists when there is a certain degree of interdependence between activities (Shank and Govindarajan, 1992). This interdependence needs to be managed by coordination mechanisms, in order to achieve efficient and effective outcomes (Thompson, 1967). The higher the interdependence between activities (i.e. the stronger their linkage), the more coordination will be required. For instance, while the ordering of standard products at a supplier reflects a situation of *sequential* interdependence, the ordering of customized products, where the buyer's input is required in the supplier's processes, reflects a situation of *reciprocal* interdependence (Thompson, 1967). This latter situation requires more coordination to take place between the buyer and supplier, using more extensive and complex control mechanisms (Gulati and Singh, 1998).

In a relationship between a buyer and a supplier, linkages express how the supplier's activities influence the buyer's activities in terms of cost and differentiation, and vice versa. According to Porter (1985) managing linkages in the value chain, which is also the central idea of the concept of *supply chain management*, can be used to reduce costs and to enhance differentiation. A VCA is a structured method to analyze the effects of strategically important activities on the *cost* and/or *differentiation* of the value chain. This method of analysis is supportive in the management of interfirm linkages, by suggesting where in the value chain costs can be reduced or differentiation can be enhanced (Shank and Govindarajan, 1992). In other words, a VCA is a mechanism that facilitates the optimization and coordination of interdependent activities in the value chain, which may cross organizational boundaries.³ Accounting information is an important constituent of VCA.

3.2. Accounting information for value chain analysis

While accounting systems do contain useful data for cost analysis, they often get in the way of strategic cost analysis. (Porter, 1985, p. 63)

Porter's critique of what now are termed 'traditional' accounting systems, refers to the inability of those systems to adequately support a VCA. Traditional management accounting practices are based on the internally oriented concept of *value added*, which hinders firms in taking advantage of the opportunities to coordinate interdependence in the value chain. Shank (1989) argues that a fundamental problem of the value added concept is that it "starts too late and it stops too soon" (p. 51). By starting cost analysis at the point of purchase, possibilities to exploit linkages with suppliers are missed, and by stopping the cost analysis already at a completed sale, possibilities to exploit linkages with customers are missed. The value added perspective focuses on (maximizing) the difference between the firm's purchasing costs and selling price. Thereby it ignores linkages in the wider value chain, such as the causes of this purchasing price, the costs of activities related to the product, and the consequences of the product for the buyer's activities. Accounting systems that do account for costs that are caused by buying at a certain supplier, such as costs of ordering, delivery, quality and administration, are called *Total Cost of Ownership (TCO) systems* (Carr and Ittner, 1992). Compared with the scope of a VCA, however, TCO systems analyze only the effects of buying at a supplier on the buyer's costs and no wider value chain perspective is taken, in which costs of both buyer and supplier are included and analyzed. A VCA, in addition to the buyer's

³ Often in the literature it is not made clear what a VCA exactly refers to, whether it is an internally oriented analysis of the activities within the firm, or an externally oriented analysis of the activities *across firms* in a value chain. This paper focuses only on the latter type of analysis, i.e. the analysis of linkages between firms' activities across the value chain.

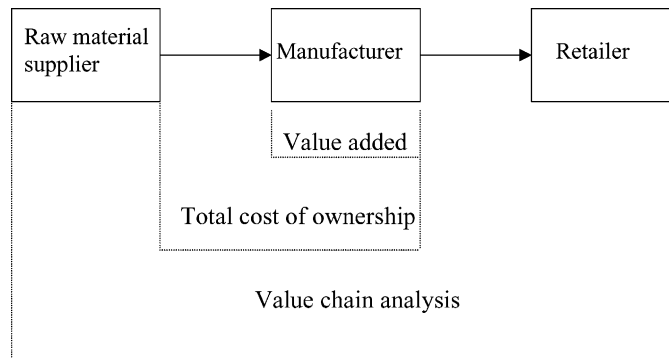


Fig. 1. A comparison of the value added, Total Cost of Ownership and value chain analysis concepts for a three-firm value chain.

costs, takes account of the activities and costs of other firms in the value chain (i.e. suppliers and buyers), and recognizes the interdependencies of these activities and costs.

The differences between the concepts of value added, TCO and VCA, in terms of scope of analysis, can graphically be illustrated for a three-firm value chain, consisting of a raw material supplier, product manufacturer and retailer, as in Fig. 1.

Hergert and Morris (1989) addressed the problems mentioned by Porter in more detail, and concluded that traditional accounting systems have several deficiencies for supporting strategic planning. For performing a VCA they identified three important deficiencies of traditional accounting systems. First, they do not focus on critical activities, but on responsibility centers. Second, they do not account for interdependence between subunits (such as activities), while cost and performance of one subunit often depend on the costs and performance of other subunits. Third, they offer a poor reflection of the economics of performing an activity and do not accumulate data about the drivers of costs.

Around the publications of Porter (1985) and Hergert and Morris (1989) several management accounting innovations have been introduced into the literature, of which in particular *activity-based costing* and the concept of *Strategic Cost Management* are important to the problems above. ABC offered a solution for some of the problems of performing an internal VCA, as it assigns costs to activities and identifies the specific drivers of those costs. Shank (1989) and Shank and Govindarajan (1992, 1993) developed the concept of Strategic Cost Management, in which accounting information is used for developing and supporting a firm's strategies. This concept in literature later was embedded in the notion of *strategic management accounting*, which consists of analyses of different strategic dimensions of the firm, such as competitor analysis, strategic positioning analysis and analysis of the value chain in which the firm operates (Lord, 1996). SMA proposes methods in which management accounting information can be useful to support decisions related to these different strategic dimensions. The exploitation of linkages with suppliers and buyers, by performing a VCA, is thus explicitly positioned as an important constituent of SMA.

3.3. Performing a value chain analysis

Shank and Govindarajan (1992, 1993) described how to perform a VCA. In their conception, a VCA explicitly takes account of the interdependence between activities of buyers and suppliers. In the analysis

the value chain is decomposed into strategically relevant activities, and costs, revenues and assets are assigned to these ‘value activities’. For each activity the cost drivers are identified that cause its economic behavior. These steps enable the firm to analyze the behavior of costs and the sources of differentiation. When the analysis includes multiple firms across the value chain, insight is gained into how buyers’ and suppliers’ activities are interrelated in terms of cost and differentiation. To develop a sustainable competitive advantage, the last step is to use the outcomes of the analysis to control cost drivers better than competitors do or to reconfigure the value chain. In principle, Shank and Govindarajan argue, competitive advantage can be achieved either by reducing costs, while keeping value constant, or by increasing value, while keeping costs constant.

Several authors mention the use of an ABC analysis as a basis for performing a VCA (Guilding et al., 2000; Mecimore and Bell, 1995; Shank and Govindarajan, 1992, 1993). When based on ABC-principles, the problems of accounting systems for performing a VCA, as discussed by Hergert and Morris (1989), are solved. The cost and cost driver information resulting from the analysis can be used, as suggested by Porter (1985), to optimize and better coordinate the performance of activities across the supply chain. For example, a VCA may lead partners to conclude that supply chain costs will be reduced when the supplier delivers products in another form, improving the efficiency of the buyer’s receiving and stock keeping activities, or when activities are aligned with firms in the supply chain who can perform them more efficiently (Dekker and Van Goor, 2000).

In their description of the VCA methodology, Shank and Govindarajan assume the analysis is performed by one firm, looking beyond its boundaries to its buyers and suppliers in the value chain (they call this ‘taking an external perspective’). In interfirm relationships, however, a VCA can also be performed *jointly* by buyers and suppliers in the supply chain. For this purpose, the cooperating firms need to share cost and performance information. This was the case in the VCA practices of Sainsbury’s and its suppliers, as will be discussed in Section 4. Such a joint analysis of the value chain integrates cost data of multiple firms, leading to a broader scope than an internally oriented VCA, and a higher accuracy of cost data than when the analysis is performed by one firm taking an external perspective (and making assumptions about the other firms’ activities and costs). Such a joint analysis, however, requires the willingness of both buyers and suppliers to participate in a VCA. This willingness may arise when a buyer and supplier are convinced that managing the supply chain is more effectively achieved in cooperation compared to seeking individual optimization by acting individually or using power. However, this cooperation may often not be accomplished, due to appropriation concerns arising from sharing information and acting jointly in the supply chain.

3.4. *The hazards of value chain analysis in interfirm relationships*

While potentially providing many benefits, interfirm relationships may as well entail many risks. As set out earlier, the need to design appropriate governance structures in interfirm relationships to safeguard against opportunistic behavior, has been studied mainly from a transaction cost economic perspective (Anderson et al., 2000; Dekker, 2003; Gietzman, 1996; Gulati and Singh, 1998; Van der Meer-Kooistra and Vosselman, 2000; Williamson, 1985). This perspective maintains that, to adequately cope with transaction hazards, the governance structure used to govern an interfirm relationship needs to be adapted to the characteristics of the transaction taking place. Here the discussion will concentrate on the specific hazards that may arise as a consequence of jointly performing a VCA. When performing such an analysis, and when acting on its outcomes, collaborating firms may be concerned about the following

three issues:

1. The exchange of sensitive information.
2. A fair division of cost and benefits.
3. The appropriation of investments to be made in specific assets.

With respect to the first issue, the possibility of jointly performing a VCA depends on firms' willingness to share information with other firms in the value chain. When buyers and suppliers open their books to each other and exchange cost and performance information, concerns may arise about their bargaining position and about information spillovers to competitors. Therefore, they will not exchange private information before they are confident that this information will not be used against them.

When firms are willing to exchange information and the VCA indicates that changes in current processes will improve value chain performance, the second and third concern may arise. With respect to the division of costs and benefits, Tomkins (2001) maintains that collaborative decisions need to be taken based on two levels of analysis. First, the investment must earn an adequate rate of return for the risks associated with the project. Second, the partners need the prospect of receiving a fair share of the benefits, before they are willing to participate in the project (see also Seal et al., 1999). In addition to realizing a sufficient rate of return, when investments need to be made in specific assets, which have little value outside the relationship, the investing firm needs to be confident that this investment will not be appropriated by the other (Williamson, 1985).

These three concerns thus require the cooperating firms to have confidence that opportunistic behavior will not occur. This confidence may come from the presence of trust, which, for example, has been built during previous interactions (Gulati, 1995). However, if the level of trust is insufficient, the firms need to implement formal controls to gain this confidence, before they are willing to participate in a VCA and act on its outcomes. Such controls may take a variety of forms, such as contractual agreements on profit and cost sharing, ordering quantities and length of the relationship, confidentiality agreements for information exchange, and joint investments in equipment, creating a mutual hostage situation. For instance, in the strategic alliance on railway safety equipment mentioned earlier, the supplier shared detailed product cost information, trusting the buyer's goodwill, while the division of costs and benefits of the alliance was arranged by a formal financial incentive system (Dekker, 2003).

3.5. *Empirical evidence on VCA*

Empirical evidence on the use of VCA in practice, both in intrafirm and interfirm settings, is limited. It is not clear whether firms perform VCAs and if they do so, whether they perform them in the way that Shank and Govindarajan describe. It has even been argued that, because of the lack of empirical evidence on SMA, including VCA, this may be just 'a figment of academic imagination', with little relevance or interest in practice (Lord, 1996, p. 364). Tomkins (2001) also expresses his doubts about the extent to which companies use cross-organizational cost management (p. 163). Chenhall and Langfield-Smith (1998) and Guilding et al. (2000) provide survey evidence on the adoption of SMA practices, including VCA practices, by large firms in Australia, New Zealand, the United Kingdom and the United States. However, these adoption rates are based on global descriptions of the VCA method, and no insight is gained into what these practices actually consist of. In addition, these results only account for firms' use of an internally oriented VCA, not an analysis of activities across the wider value chain involving more firms. No empirical evidence has been published in the literature on the use of VCA across firms in a

value chain. The next section presents a field study of the use of such a VCA by the UK retail company J. Sainsbury's and a large group of its major suppliers.

4. The use of VCA by J. Sainsbury's⁴

4.1. Research design

This section discusses the results of a case study into the use of a cost model by the UK retail firm J. Sainsbury's (from now on Sainsbury) and suppliers to support their supply chain management practices. The model was used for analyzing the costs of activities of Sainsbury and a group of its suppliers to identify opportunities to reduce supply chain costs and was based on principles similar to those of VCA. The selection of this field study site resulted from coincidence, as the existence of the model was identified as a result of a presentation by a company representative about the use of ABC information for SCM practices. Because of the lack of evidence in the literature about the use of VCA in practice, it was decided to take the opportunity to examine this real-life VCA practice. Case studies are especially useful for researching phenomena about which little empirical evidence is available, to find answers to how and why questions about these phenomena (Yin, 1994). Based on company data already available and existing literature about interfirm relationships, supply chain management and ABC an interview protocol was developed to structure the data collection process into three different topics: (1) company information, (2) the management of relationships with suppliers and in particular SCM practices, and (3) the cost model. The data was collected at the end of 1998 and in the beginning of 1999 at Sainsbury's Department of Logistics, where the cost model was developed.⁵ The validity of the observations described in this paper thus relates to that time period.⁶ Particularly a Logistics project manager, who was involved in developing the model and was the contact person for the participating suppliers, was a valuable information source. In addition to interviewing, other data sources included an on-site demonstration of the model, company documents describing the goal and content of the project, company presentation slides of the development and use of the model, annual reports and publications in which Sainsbury was subject of analysis (Eqos case studies, 2001; Frances and Garnsey, 1996; Wheatley, 1998). As no empirical analyses of the use of VCA practices in an interfirm setting have been published before, the presentation of the case study requires a detailed description. Details relate to the initiation, goals, design and use of the cost model for supporting SCM practices. The ensuing discussion in Section 5 attempts to come to a higher level of theorization, by providing an explanation for the observations.

⁴ The case description and discussion were approved for publication by Sainsbury's Logistics department.

⁵ Unfortunately, the author had only limited access to the organization, and the data collection remained restricted to the department of Logistics. This also precluded data collection at suppliers, to look at their view of the relationship and information exchange with Sainsbury, as one reviewer suggested. Therefore, no information could be collected about specific relationships with suppliers, which limits the insight into relational issues, such as an individual supplier's trust and concerns about appropriation.

⁶ Contact with Sainsbury in August 2002 pointed out that since the study the situation has evolved and that the firm does not longer focus on VCA in the same way as described in this paper. Sainsbury notes that the information gained and lessons learned from the VCA project were incorporated in their '7 in 3' strategy, in which the firm attempts to recover their leading position, by recovering seven years of progress in three years. A large part of this strategy consists of a major depot network renewal program.

4.2. Supply chain management at Sainsbury

When measured in market share, Sainsbury, at the time of the study, ranked as second largest super market chain in the UK, after Tesco (Wheatley, 1998). In 1998 the company had over 23,000 different products on its shelves from approximately 4,000 suppliers. Based on the type of products these suppliers delivered, Sainsbury classified them into six different networks: *produce, main ambient, slow moving ambient, bulky goods, chilled and frozen*. Around 1993, Sainsbury decided to change its way of working with suppliers, which was based on power and had resulted in adversarial relationships. Instead, it was decided to focus on developing mutually cooperative relationships, which were needed as a basis to jointly improve supply chain performance. The general idea behind this change of attitude was that the supply chain should not be perceived as a source of costs, but, if managed effectively, could become a potential source of competitive advantage, by decreasing supply chain costs and improving supply chain performance (Wheatley, 1998). These changes took place in a period during which UK retailers intensively reorganized their business processes, and introduced new information systems into the supply chain to reduce the waste of resources and to improve the coordination of activities (Frances and Garnsey, 1996). In 1998, for instance, Sainsbury launched a comprehensive management information system on the internet, called *Sainsbury Information Direct (SID)*, to coordinate activities with suppliers. SID included a diverse set of tools for information exchange, such as web-EDI, joint promotion planning, performance measurement systems, and communication systems, while new applications were continuously being developed (Eqos case studies, 2001). Before this period of reorganizing activities in the supply chain, Sainsbury had little contact with suppliers about the functioning and performance of the supply chain.

At the time of the study, Sainsbury's SCM efforts were performed by the Department of Logistics. For managing the supply chain, three types of suppliers were distinguished, primarily based on the *volume* that they delivered, but also on the *strategic importance* of their products to Sainsbury. The 24 key suppliers together accounted for approximately 30% of all products sold by Sainsbury, and were referred to as 'core suppliers'. In 1996 Sainsbury and these suppliers formed the *Supply Chain Development Group (SCDG)*, which initiated activities for improving the supply chain. As these suppliers had a major impact on the supply chain and also had sufficient resources for carrying out large projects, the most important supply chain improvement projects were performed with them. Yearly, senior managers of SCDG firms would come together in a 'strategic forum' to exchange information, to present the changes they were implementing in their supply chain, and to keep up personal contacts. In addition, individual members of the group met to discuss developments in the supply chain and to initiate improvement projects, such as the development of collaborative planning systems, which were subsequently worked out in detail in joint project teams. The SCDG used the SID system for exchanging information with members about projects that were being conducted, such as reports, results, and opinions.

The second type of suppliers distinguished for SCM practices were referred to as 'middle-large suppliers', with whom individual actions for improvement normally would have had too little impact to justify the costs of those actions. However, when treated as a group, significant improvements could be realized with them (i.e. a critical mass was required). For instance, this was the case with 'cross-docking'. When using cross-docking, suppliers do not deliver directly to each Sainsbury's regional distribution centers (RDCs) anymore, but instead deliver to a primary consolidation center (PCC). In this PCC, deliveries of different suppliers for each RDC are bundled, and are then transported by Sainsbury to the RDCs. This practice can result in large efficiency gains, as each supplier can reduce its number of deliveries from many to one, while Sainsbury transports only once to every RDC. However, for cross-docking to

be beneficial, a large group of suppliers that frequently delivers orders of a reasonable size is required. Deliveries from middle-large suppliers were of such a size that they did not deliver full loads at the RDCs, and therefore were well suited for cross-docking. Because the number of middle-large suppliers at Sainsbury was growing, the impact of this group on total supply chain cost and performance was also increasing.

The third type of suppliers distinguished for SCM practices were referred to as ‘small suppliers’, which often delivered a small number of products in low volumes. Specific actions to improve supply chain operations with small suppliers would have had little impact on costs and performance. Therefore, these suppliers primarily were involved in general initiatives for supply chain improvement, such as the internet-based ‘web-EDI’, that Sainsbury developed for all suppliers, as a cost reducing alternative for the costly normal EDI-systems. This web-EDI improved information exchange by enabling suppliers to receive orders and production planning forecasts, and to send invoices by the internet.

In addition to this increased contact with suppliers, contact with competitors, such as Tesco and Safeway, on supply chain issues was intensified as well. It is possible that changes in the supply chain result only in benefits when other retailers cooperate in the initiative, for example because a minimum scale is required. For instance, the use of a new technology in RDCs, by which crates are traced electronically (see also [Wheatley, 1998](#)), would only result in supply chain improvements when several retailers would adopt this technology. Otherwise the investment and the suppliers’ different ways of working with retailers would be too costly and ineffective. Acknowledging this dependency on competitors, Sainsbury would tell them *what* they were doing or were planning to do (the electronically tracing of crates), in order to persuade them to also adopt the idea for improvement. However, Sainsbury would not tell them *how* the company was doing it (the actual implementation and integration into its systems), as this type of knowledge was perceived as a competitive advantage. SCM thus does not only refer to collaborations between buyer and supplier per se, but can also require a cooperation with, or a contribution of, competitors.

Before these changes in the supply chain, Sainsbury had little insight into the costs and performance of supply chain activities and the effect of suppliers’ performance on Sainsbury’s performance, as these were not measured. Due to the lack of information and little contact with suppliers, supply chain cost and performance were difficult to manage. In 1996, Sainsbury’s senior management decided to focus on improving supply chain control by better managing the interdependence with suppliers. An important means to realize this was the development of a cost model to perform analyses of (part of) the value chain.

4.3. A cost model for value chain analysis

4.3.1. The initiation and goal of the model

Until 1996, the only insight that Sainsbury had into the costs of the supply chain were the yearly distribution costs. This information provided little basis for coordination and control of interdependent activities in the supply chain. The Logistics project manager expressed this lack of control as follows:

It wasn’t really a supply chain measure of performance. You certainly couldn’t say well, this level of performance in the supply chain is going to cost us this amount of money. We didn’t know what the costs were. You know, we didn’t know where the cost fell within the supply chain.

To support their SCM efforts, Sainsbury’s senior management requested the Logistics Department to develop an ABC model of the supply chain, as ABC was perceived as a ‘key enabler’ of such practices

(see [Coopers and Lybrand, 1996](#)). The specific request was:

To provide senior management with a greater understanding of the total supply chain process in order to improve decision making and deliver a clear understanding of the interrelationship of costs and the activities that drive them. [Sainsbury presentation]

The rationale for building this model was to be able to analyze the costs of activities in the supply chain with suppliers in order to reduce costs and to better monitor and control costs. More specifically, by performing activity and cost driver analyses it was expected that insight could be gained into the supply chain costs and the interdependence of supply chain cost and performance, that ideas could be generated to reduce costs and that cost effects of changing supply chain activities could be assessed. The analysis of ‘linkages’ in the supply chain thus had to be a central element of the model.

4.3.2. The design of the model

In developing the model the following definition of the supply chain was used:

All activities involved in moving the product from the end of the supplier’s production line onto the supermarket shelf. [Sainsbury presentation]

These boundaries of the supply chain thus encompassed part of the value chain, including the supplier’s activities, Sainsbury’s distribution activities, and Sainsbury’s retail activities. Sainsbury graphically visualized the structure of its supply chain by the flows of products that went through it, as in [Fig. 2](#).

Suppliers thus could deliver to PCCs, to RDCs or directly to the stores. When a supplier delivered to a PCC or RDC, then Sainsbury took care of further distribution in the supply chain to the stores. The activities in the supply chain were thus characterized by *sequential interdependence*, of which the related coordination challenges are to ensure a fit between the points of contact. The design of the cost model reflected this supply chain structure. It contained different sections reflecting the activities performed at different stages of the supply chain. The different sections were called “suppliers”, reflecting the suppliers’ activities, “distribution”, reflecting Sainsbury’s distribution activities performed in the PCCs and RDCs, and “retail”, reflecting Sainsbury’s retail activities related to the supply chain. Each of these sections contained around 20 standard activities, which were possibly (but not necessarily) performed in the supply chain with a supplier. The scope of the cost model graphically can be presented as in [Fig. 3](#).

The VCA model thus did not reflect all value chain activities, as it included only both Sainsbury’s and the suppliers’ activities related to moving the products through the supply chain to the stores’ shelves.

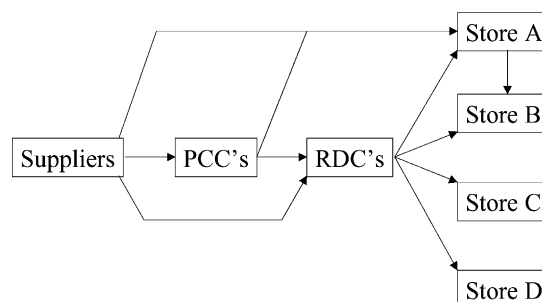


Fig. 2. The structure of Sainsbury’s supply chain (PCC: primary consolidation center, RDC: regional distribution center).

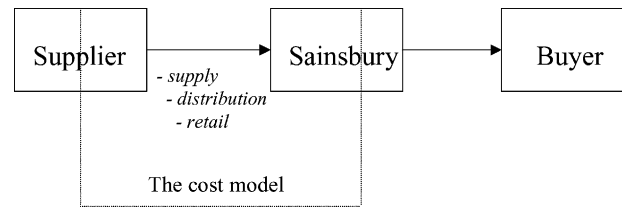


Fig. 3. The scope of Sainsbury's cost model.

A cost driver was identified for each activity. For all suppliers a standard categorization of activities and cost drivers was used, because when compared to each other they performed fairly similar activities. The argument for using a standard categorization of activities was set forward by the project manager:

We find that some suppliers would do some activities, not other activities, but all the activities that they want to do are in there. Like unloading, all the suppliers have to unload. Picking, all the suppliers have to pick, whether they pick by board automatically in a big automated warehouse, or whether they pick manually by walking around, they all pick. The difference is that the cost would be different, and the make up of the cost would be different. So, you know, one supplier's cost would be almost solely equipment maintenance and running, whereas another one's has got labor in there, and those associated costs. That's what we're looking for really, we're looking for the difference.

Thus, even though differences could have existed between suppliers' operations, the model allowed all activities they performed to be included. The model used and integrated cost and activity information of both Sainsbury and suppliers, and thus could be considered to be a VCA model. The costs (referred to as 'resources' in the model) consisted of the supply chain related costs of suppliers, PCCs, RDCs, stores, and Sainsbury's head office. The costs of both parties were allocated to the activities and cost drivers in the model. This exercise led to an insight into the costs of activities in the supply chain. As the model did not relate costs to cost objects (e.g. products), but only to activities, it could be considered to be a form of *Activity Cost Analysis* (ACA) (Gosselin, 1997).⁷ This was acknowledged by the project manager, who commented that:

Its not really true ABC as such you know, we haven't got the profit sides and everything all that in there, which is a different kind of fish. Purely really, these are a list of activities, and these are the costs that are attached to those activities.

The model was designed to analyze activity costs from different perspectives: by *supplier network* (as discussed before), by *geographical region* (Sainsbury distinguished six regions where activities were performed), and by *store category* (Sainsbury classified its stores as *super store*, *medium*, *small* or *product*). Sainsbury perceived the model to be fairly simple and of a high level of aggregation. As this level of detail was sufficient for realizing the model's goals, more detail was not considered necessary. Table 1 summarizes the structure of the model.

⁷ Gosselin (1997) distinguishes three levels of activity management (1) *activity analysis* (AA), which does not account for costs; (2) *activity cost analysis* (also called *cost driver analysis*), which allocates costs to activities and cost drivers; and (3) *activity-based costing*, which allocates costs of activities to cost objects, such as products and services.

Table 1
The structure of the cost model^a

Model section			
Supplier	PCC	RDC	Retail
Level of analysis			
Network	Location	Location	Location
Activities	Network	Activities	Store category
Cost elements	Activities	Cost elements	Activities
	Cost elements		Cost elements

Each element in the cells reflects the level of aggregation of the cost data and enables costs to be analyzed from different perspectives. For example, the PCC costs can be analyzed at the level of specific cost elements (e.g. labor), the activities they relate to (e.g. picking), the supplier network they relate to (e.g. produce) and the location they relate to (e.g. North).

^a PCC: primary consolidation center, RDC: regional distribution center.

4.3.3. *The content of the model*

To be able to analyze the supply chain costs, cost and cost driver data were required from both Sainsbury and suppliers. At the time of the study, the model contained 2 years of actual cost and cost driver data of Sainsbury and 36 suppliers. The suppliers that participated in the model were mainly the larger (or 'core') suppliers, with whom much work in improving the supply chain was already going on. These suppliers were involved first because of the large volume of joint supply chain activities, leading to larger benefits. In addition, the joint SCM activities already taking place signified the suppliers' willingness to participate in this type of initiatives. The number of suppliers providing data was expected to increase, as several suppliers at that time were collecting the required data or were investigating the possibilities for data collection.

Suppliers were free to choose whether or not they would participate in this initiative. When they decided to participate, they were required to deliver cost data and cost driver quantities to Sainsbury for feeding the supplier section of the model. In particular for the first participating suppliers this exchange of sensitive private information was an important issue, because of potential opportunistic use of the information (this is discussed in more detail in [Section 5](#)). The suppliers had to collect the data themselves. In order to assist them with this effort and to secure consistency of data across suppliers, a three page document described to new participating suppliers the data required for the model, including activity definitions. The reason for not providing a more detailed manual for data collection was that this would have deterred suppliers from participating, as it would have signaled high complexity and a time consuming data collection process. In addition, Sainsbury assisted suppliers by informing them about how they had collected the data. However, new participating suppliers received no direct assistance in data collection, as this would have cost Sainsbury a significant amount of time and resources. Only in the development phase of the model did Sainsbury participate in data collection at a few suppliers, to learn which information would be required and how it could be collected.

Participating suppliers thus were responsible for providing reliable data. As it was not in their interests to provide unreliable information, Sainsbury did not perceive this to be a risk for the reliability of the model. In addition, when analyzing the data it was easily noticed when a supplier's data deviated significantly from the other suppliers' data. When this happened, it was usually the result of an error during data collection or input. Suppliers were free to provide the data in different formats. Some suppliers provided general ledger data, and related cost driver quantities, leaving Sainsbury to do the cost analysis. For other suppliers, however, the data collection process was a stimulus for performing an ABC analysis for internal

purposes. Some suppliers, for instance, were already thinking of undertaking an internal ABC study, and the need to collect data for the cost model induced them to start that process. These suppliers generally provided cost data in a format that could be fed directly into the model. As has often been the case with the development of internal ABC models (see e.g. Gosselin, 1997), Sainsbury found that during the data collection process suppliers often realized benefits by identifying possibilities for (individually or jointly) improving processes, simply as a result of a better insight into their processes and costs. This was also Sainsbury's own experience during the development of the model.

Sainsbury's *Supply Chain Finance Group* maintained the cost model. Quarterly, the model was updated with Sainsbury's cost and cost driver data. Suppliers provided new data once a year for updating the model. In addition, when a supplier implemented important changes in its processes, it needed to provide new data, to update the model.

4.3.4. The use of the model

After each model update supply chain cost data was available on the activity and cost driver level. This data was used to perform cost analyses by the different network, region and store types. The participating suppliers received part of the results of these analyses, including their own activity costs, Sainsbury's activity costs related to their activities, and the average activity costs of the supplier network that they were part of. More specifically, the Logistics project manager commented that:

They see the proportion of our costs that plot to them. So they won't see our entire structure. [...] they'll see their costs as it goes to ours that we spend moving their stuff through the supply chain, plus an average cost for that network, so they can see how they do against the average as it moves through our network. They won't see the resource element of it, but they'll see it once it is split down into activities. So they'll actually see the activities and cost object side of it. So they'll see the cost as it goes through the distribution network, also the costs as it goes into our different stores.

Sainsbury's *Logistics Operations* department was the main user of the supply chain cost information. They used the outcomes of the cost analyses to initiate discussions with suppliers about the cost performance of the supply chain and its processes. These discussions were used to generate ideas to reduce costs, which was the main purpose of the cost information. To support these discussions and to identify opportunities for cost reduction three types of analyses were made: *benchmark analyses*, *strategic what-if analyses* and *trend analyses*.

Benchmarking was used to compare suppliers' activity costs with the average of their network. In addition, cost comparisons were made between networks, regions and store types. By clustering suppliers into different networks the most important differences between their operations were eliminated, as suppliers within a network performed fairly comparable activities. As argued by the project manager:

I think, the fact that we break down into [supplier] networks covers most of our basic differences, because essentially the operation is the same for all suppliers. We're not looking at their production side, that's not included, there's a lot differences in their production side. But from once it has been made, they are going through pretty much the same processes. You know, they all forecast, they all produce picking lists, they all pick, they all load vehicles and they all transport. Below that level there are differences, but those are what we look at afterwards.

The most important measure for the benchmark analysis was the cost per cost driver (i.e. the cost driver rate), as this measure could be compared directly with other suppliers. For this purpose, it was

important that activities were defined accurately and that suppliers did not interpret the content of activities differently. The benchmark analysis revealed the suppliers' relative performance against the network average. When a supplier deviated significantly from the average, the Logistics Operations department would initiate a discussion with the supplier to find out the cause(s) of the difference, by analyzing the underlying activities, and to assess whether and how performance could be improved. In addition, as suppliers in different networks faced no competition, comparing the costs of their activities and analyzing the differences in their operations could be used to transfer efficient supply chain practices across networks. The model was not used to directly compare the performance of suppliers in the same network with each other, as this could lead to concerns at suppliers about opportunistic use of the cost information. Comparisons were made only with the network average. Only when two suppliers in the same network agreed on a direct comparison, the model would be used for that purpose. In addition to benchmarking costs within and across supplier networks, costs of comparable activities between geographical regions and store types were benchmarked.

Strategic what-if analyses were performed to analyze the effects of changes in the supply chain on supply chain costs. When, for example, as a result of a benchmark analysis, Sainsbury and a supplier developed ideas or scenarios for improving supply chain processes, the model was used to calculate the expected changes in costs of each scenario. In these scenarios the expected changes in cost drivers were used as input for the analysis, and the outcome consisted of the expected change in supply chain costs. All projects that were initiated for improving the supply chain were evaluated by a strategic what-if analysis.

Trend analyses were performed to monitor the development of supply chain costs over time, and to intervene when necessary. These analyses were made quarterly, after updating the model.

4.3.5. *An example of a supply chain analysis*

An example of a benchmark and a strategic what-if analysis that were performed relates to the use of plastic crates for chilled products. Before the model was developed, Sainsbury and a large supplier discussed about the use of these crates to improve the efficiency of product handling activities. As the cost consequences of adopting these crates were unknown to the supplier, Sainsbury was not able to persuade the firm to adopt them. After developing the model, it was used to calculate the supply chain costs related to suppliers using the crates and the costs of the non-adopting supplier. The differences that came out of this benchmark analysis revealed a clear cost advantage for the adopting suppliers. The next step was to analyze what changes would occur in the supply chain activities, if the supplier were to adopt the plastic crates. By feeding the consequences of these changes into the model, a strategic what-if analysis could be performed to calculate an indication of how much supply chain costs could be reduced. Using the model, Sainsbury was able to show the supplier the cost consequences of adopting the crates, which made subsequent negotiations about the adoption much easier.

4.3.6. *Decision making and negotiations*

When an idea for improvement had been identified, and Sainsbury and the supplier agreed to work it out in more detail, Sainsbury would treat this idea as an investment proposal. The proposal was then transferred to the management accountants, who calculated an expected rate of return. When the expected return was adequate, the proposal was accepted for further negotiations with the supplier. A change in the supply chain would not necessarily result in (equal) benefits for both Sainsbury and the supplier. On the contrary, it often would result in an asymmetrical division of investments, costs and benefits. For instance, while the adoption of plastic crates was expected to result in a cost reduction for the supply chain as a whole, it was

predicted to result in increasing costs for the supplier, while the benefits of enhanced efficiency would be reaped mainly by Sainsbury. This resulted in an allocation problem among the parties for the cost and profit consequences of the supply chain changes and for the investments to be made. This allocation problem needed to be resolved in negotiations, otherwise the party being left with a disadvantage, in the example the supplier, would not be inclined to adopt and implement the change. In these negotiations, Sainsbury used the investment proposal for agreeing on an acceptable division of costs, benefits, and investments. The solution to this allocation problem could take various forms. A possible solution in the negotiations with the supplier about adopting the plastic crates was that Sainsbury would invest in the required handling equipment for the supplier. Another solution was that Sainsbury would agree on a price increase for the supplier's product, which for Sainsbury would be more than offset by the efficiency gains.

5. Discussion

The cost model described in the previous section was Sainsbury's response to its recognition of the need to manage the interdependence of activities in the supply chain. The impetus for developing the model was senior management's wish to gain a clearer understanding of the interrelationships of costs and their drivers in the supply chain. Their request to develop the model resulted from changes in the supply chain, in which previously adversarial relationships with suppliers were replaced by collaboration and an explicit consideration of the firms' mutual interdependence. These collaborative relationships focused on enhancing supply chain performance by exploiting the firms' interdependence, referred to as *supply chain management*. The principles of VCA were considered useful to support this exploitation of 'linkages' with suppliers.

This case study of Sainsbury's VCA practice leads to a number of questions that will be addressed in this section. First, can the theoretical perspectives outlined in [Sections 2 and 3](#) explain the use of this cost management practice? That is, can the use of the cost model be related to coordination requirements and appropriation concerns in the supply chain? Second, what further effects did the cost model have on Sainsbury's relationships with suppliers? Third, does the description of the cost model comply with the conceptualization of VCA in the literature? And if not, what may the empirical findings *add* to the value chain approach?⁸ Finally, what fruitful avenues for further research does this study point to?

5.1. An explanation of the findings: managing interdependence and appropriation concerns

The theoretical framework suggested that two control problems originate when firms engage in interfirm relationships: the need to manage interdependence and the need to manage appropriation concerns. In Sainsbury's SCM efforts with suppliers these control problems clearly were present and were reflected by three specific issues:

1. The need to assess and improve current supply chain performance, by analyzing and adjusting interdependent activities in the supply chain.
2. The exchange of sensitive cost information.
3. The sharing of costs, benefits and investments that resulted from supply chain changes.

⁸ Thanks are due to a reviewer who raised this question.

5.2. The coordination of supply chain activities

Sainsbury's concerns about improving supply chain performance originated from its recognition of the poor cost control in the supply chain. The firm wished to develop mechanisms to better coordinate its supply chain interdependence with suppliers. One of the mechanisms developed was the supply chain cost model. The interdependence of activities included in the cost model can be described as *sequential* (Thompson, 1967). Activities taking place early in the supply chain influenced only the activities taking place later; they were not influenced by them. Thus, activities upstream influenced resource consumption downstream in the supply chain. The model reflected this modest level of interdependence by its sequential ordering of activities and its possibilities to analyze activities' effects on the costs of activities further along the supply chain. The supply chain analyses were used for initiating and supporting SCM practices. Specific analyses performed were *benchmarking* between suppliers, regions and store types to identify opportunities for improvement, *strategic what-if analyses* to quantify the cost consequences of supply chain changes, and *monitoring* of supply chain cost development over time. Thus, the cost model facilitated the joint coordination and control of Sainsbury's and the suppliers' activities. The model outcomes were used to initiate discussions with suppliers about the cost performance of activities and how better managing linkages between activities could influence this performance.

From her case research, Lord (1996) concluded that the results attributed to SMA are nothing more than the logical consequences of effective operational management processes. She argued that when firms focus on cooperative relationships with suppliers, they automatically will reap the benefits of exploiting their linkages. No formal VCA needs to be done for that purpose. She supported this critique with the fact that at the time of her publication no empirical evidence or examples had been published of firms actually using such practices.

This study arrives at an opposite conclusion. The cost model provided an understanding of the economics and interdependencies of supply chain activities, which insight would have been obtained difficult without it. The cost model pointed to areas where initiating projects for improvement would be worthwhile, and only after that would the partners focus on operational management issues, by looking at the processes behind the numbers. As expressed by the project manager:

We look at the high level figures first, and then we can start looking at well, why is this different? Because theirs is made up with these sub-activities and theirs is these sub-activities.

Thus, in this situation, the VCA *added* to an understanding of supply chain performance and of the cost consequences of changes in supply chain operations. This understanding was the basis for specific actions to exploit the linkages in the supply chain. This case study thus demonstrates the central role that accounting can play as a coordination mechanism in SCM. However, the exchange of accounting information required for the analysis and the sharing of costs, benefits and investments resulting from increased performance at the same time led to appropriation concerns.

5.3. The exchange of cost information

Supplying cost information to a buyer can be detrimental for suppliers as it increases their vulnerability to opportunistic behavior. The buyer can easily exploit this knowledge to its own benefit. The information provided to Sainsbury revealed the suppliers' relative efficiency in comparison to other suppliers and provided Sainsbury with a potential advantage in future (price) negotiations. Particularly for the early

participants the fear of information abuse was an important issue. They were concerned that the information enabled Sainsbury to demand efficiency improvements, or even worse, to replace them by more efficient suppliers. The project manager expressed this concern as follows:

Its not the agreement we have with the suppliers in them supplying the data with us. [. . .] we said very specifically that we would not be using it to sort of bash people with it. Its not for that, its to help us develop a supply chain, not to start comparing suppliers, and saying increase your efficiency up to the same level or Sainsbury is getting you out. Because that's obviously one of the concerns suppliers had. You know, the last thing they want is to give us data, very sensitive data, and for us then to say well, you are actually really inefficient, we have to get rid of you.

Thus, although a main purpose of the cost model was to identify suppliers' inefficiencies, this information was not used in an adversarial way. To reduce the suppliers' concerns about information abuse, Sainsbury made clear agreements with the suppliers on how the information would be used (e.g. no direct comparisons between competitors), and how the model outcomes would be used (e.g. joint projects to improve inefficiencies). If Sainsbury would have made opportunistic use of the information, then this behavior would have had a strong negative impact on its reputation in the supplier network. Relationships would have been damaged by the increasing distrust in Sainsbury's intentions, diminishing the suppliers' willingness to cooperate. Consequently, the cost saving potential in the supply chain would have remained unrealized, leaving all parties worse off. The fact that suppliers did share this sensitive information acted as a signal of their trust in Sainsbury's intentions (e.g. 'goodwill trust'), while Sainsbury's reciprocating actions (i.e. not taking advantage of the information), reinforced this mutual bond of trust. In conclusion, Sainsbury's commitments about the use of the information, reputation effects in the supplier network and the suppliers' trust in Sainsbury's goodwill seemed to be powerful mechanisms to manage these concerns.

5.4. The division of benefits, costs and investments

The identification of opportunities for improvement based on the VCA led to a second issue of concern: the profitability of proposed changes, and the division of benefits, costs and investments. The case illustrates how a supplier was not willing to invest in specific crate handling technology due to concerns about the cost consequences and the investment to be made. The cost model showed that if the supplier would adopt this technology, performance for the supply chain as a whole would increase. However, for the supplier to participate it still needed to be resolved how costs, benefits and investments would be shared. This issue was agreed on in further negotiations, which were based on an investment appraisal. Important solutions of such negotiations with suppliers were that Sainsbury would make the investment for the supplier and that the supplier's price would be adjusted (upwards in case of a cost increase) to realize a fair division of the benefits. Thus, in this study existing accounting techniques were needed to arrive at decisions whether to proceed with a supply chain improvement project and how to share its consequences. Tomkins (2001) stressed the need to consider how accounting techniques are used in negotiation processes when there are more complex interactions across organizational boundaries. He argued that firms are only willing to participate in a joint project when the investment earns an adequate rate of return for the risks associated, and when the partners have the prospect of receiving a fair share of the benefits. The specific calculations and negotiations identified in this study empirically illustrate how firms used accounting to arrive at these conditions.

5.5. *The effects on relationships with suppliers*

While the purpose of the model was to facilitate the optimization and coordination of activities along the supply chain, resulting in improved supply chain performance, this seemed not to be its only effect. A second important effect of the model relates to the relationships between Sainsbury and the suppliers, which were influenced in three ways. First, the discussion of model outcomes and possible courses of action increased the interaction between the parties. As argued before, no direct action was taken on basis of the results of the analyses. Instead, the data were taken to the supplier, and discussions were initiated about the underlying operations and possible actions to improve these operations. This intensified contact led to stronger social bonds between the firms and an increasing knowledge of each other's intentions, needs and processes. Second, the objectiveness of the cost information eased communication, decision making and negotiations between Sainsbury and the suppliers. As the cost consequences of changes in supply chain operations became transparent, suppliers perceived less risk of ending up with negative outcomes and of having their fair share of the benefits appropriated. Thus, accounting information was beneficial in supporting suppliers' trust in the outcomes of cooperation. Third, Sainsbury found that, compared to other retailers, suppliers would come to them first with new ideas for supply chain improvement, as the effects of these ideas could be evaluated with the model.

5.6. *A comparison with the literature*

This case description of Sainsbury's supply chain cost model is a real-life example of the use of the principles of VCA in an interfirm setting. Compared to the conceptualization of VCA in the literature, however, this application was characterized by a limited range of activities in the value chain, as only supply chain activities were modeled. An analysis of the complete value chain would also include the activities preceding the supply chain logistics of the suppliers (e.g. production and purchasing of raw materials) and those succeeding the logistics of the stores (e.g. sales to customers). Nevertheless, the model did cope with [Hergert and Morris' \(1989\)](#) critique on traditional accounting systems for supporting a VCA. First, it focused on activities in the value chain. Second, it reflected the economics of performing those activities, by accumulating data on the drivers of costs. Third, it accounted for interdependence between activities across firms.

In one way, the description of the model actually *adds* to the value chain approach as currently conceptualized in the literature. Sainsbury not only used the cost model to analyze costs at the level of the individual supply chain, but also performed analyses at higher levels of analysis by benchmarking suppliers with the supplier network level. The model thus described a number of value chains, which were compared with each other within and across different supplier networks. This comparison enabled Sainsbury to manage not only the supply chains with individual suppliers, but also to manage the efficiency of the larger supplier network by 'negotiated adjustments' (cf. [Tomkins, 2001](#)).

5.7. *Some directions for further research*

The current study points to several pathways for future empirical research. First, the clear benefits of the cost model for the participating firms and the benefits of VCA discussed in the literature induce the question whether such practices are more widely used in practice. This question needs not only to focus on the use of VCA in interfirm relationships, but also on firms using an 'external perspective', as

proposed by [Shank and Govindarajan \(1992, 1993\)](#), and on firms using VCA only for internal purposes. Recent surveys by [Chenhall and Langfield-Smith \(1998\)](#) and [Guilding et al. \(2000\)](#) indicate that firms are adopting VCA, at least for internal purposes. A logical next step could be to use this internal cost and performance information to better coordinate activities in the supply chain, as is also proposed in stage models of ABC implementation (e.g. [Mecimore and Bell, 1995](#)).

Second, research on VCA adoption may focus on the obstacles hindering firms to (jointly) perform such analyses, such as firms' appropriation concerns as identified in this study, but also other factors, such as the information needed. For instance, [Seal et al. \(1999\)](#) discuss problems with collecting ABC information for supply chain analyses and argue that "even if they provide cost information at all, most suppliers will tend only to provide information based on traditional costing" (p. 309). Similarly in this case, at the start of the project most participating suppliers did not have the ABC information required for feeding the model. By pro-actively managing the information requirements from suppliers, Sainsbury overcame this problem. Thus, considering which obstacles firms meet when they are planning to perform a VCA and how they solve these problems seems to be a fruitful direction for future research.

Third, the scope of the VCA model studied was fairly limited, as only supply chain activities were included, which were characterized by sequential interdependence. Theoretically, a VCA spans the entire value chain, including activities such as marketing, research and development and production. Future research is needed to investigate how focusing on a broader segment of the value chain and on activities characterized by higher levels of interdependence influence the (possibilities to) use of VCA in interfirm relationships.

Finally, the cost model was not the only accounting mechanism Sainsbury used to support its SCM practices. The internet-based information system *Sainsbury Information Direct*, for instance, included several mechanisms for information exchange, such as non-financial performance data, to coordinate and control supply chain activities. Future research could focus on how such a complex structure of coordination mechanisms fulfills firms' needs to manage their interfirm interdependence in the wider value chain.

6. Conclusion

This paper sheds light on how firms attempt to manage interdependence in the value chain using cost information and which obstacles they may encounter in these efforts. The VCA practice identified at J. Sainsbury went beyond the idea of just one firm taking an 'external perspective' to analyze the activities in the value chain, as is described in the management accounting literature. Costs were managed cooperatively with suppliers by integrating cost data across the supply chain. This integrated cost data was used for three specific purposes. First, it was used to analyze the cost performance of supply chain activities, both at the individual supplier level, as well as at the supplier network level. This information was used in communications with suppliers to analyze the causes of this performance and to generate ideas for improvement. Second, when such ideas had been generated, the cost model was used to calculate the cost consequences of changing supply chain operations. This information subsequently formed the basis for an investment proposal, which was used in negotiations with suppliers about supply chain changes. Third, the cost model was used to periodically monitor the development of supply chain costs over time.

Sainsbury's use of accounting information for initiating discussions with suppliers on supply chain improvements clearly differed from the use of accounting for coordination in a hierarchical setting,

where one party can use information for developing directives for another. In contrast, even when the cost information pointed to obvious directions for improvement, the parties first had to negotiate and agree on such projects before any actions were undertaken. Although Gulati and Singh (1998) pointed to the importance of *hierarchical* control mechanisms for managing interfirm relationships, this case study revealed a different use of the cost information for interfirm coordination, which was in joint communication, cooperation and negotiation between the partners.

As this case study reflected both the need to manage coordination requirements and appropriation concerns in interfirm relationships, organizational theory and transaction cost economics were found useful perspectives to provide an explanation of the case observations. It is expected that, due to sensitivity of the data involved and the fear of other use than it is intended for, these cost management practices for interfirm coordination will only occur in interfirm relationships in which partners, by having sufficient trust or control, are confident about each other's intentions.

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