

Management Accounting and Supply Chain Strategy

Hald, Kim Sundtoft; Thrane, Sof

Document Version

Final published version

Publication date:

2015

License

CC BY-NC-ND

Citation for published version (APA):

Hald, K. S., & Thrane, S. (2015). *Management Accounting and Supply Chain Strategy*. Paper presented at 1st International Competitiveness Management Conference, Frederiksberg, Denmark.

[Link to publication in CBS Research Portal](#)

General rights

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

Take down policy

If you believe that this document breaches copyright please contact us (research.lib@cbs.dk) providing details, and we will remove access to the work immediately and investigate your claim.

Download date: 26. Apr. 2024



Management Accounting and Supply Chain Strategy

Kim S. Hald and Sof Thrane

Copenhagen Business School

Department of Operations Management

ksh.om@cbs.dk, sth.om@cbs.dk

Abstract

Research positioned in the intersection between management accounting and supply chain management is increasing. However, the relationship between management accounting and supply chain strategies has been neglected in extant research. This research adds to literature on management accounting and supply chain management through exploring how supply chain strategy and management accounting is related, and how supply chain relationship structure modifies this relation. Building on a contingency theoretical lens as well as literature within management accounting and supply chain management, a research model is developed. The research model highlights two basic forms of fit. First, fit between lean- and agile supply chain strategies, and supply chain management accounting practice. Second, supply chain relationship structure, modelled as the extent to which a firm organizationally integrates activities with customers and suppliers, is a moderating variable and. When misfits occur this may lead to negative performance effects and have implications for the competitiveness of the firm and the supply chain system as a whole. This study makes a contribution to the literature by conceptualizing the elements of management accounting in a context of the supply chain and by relating it to supply chain strategy and supply chain relationship structure. A set of generically different supply chain management accounting postures are proposed and the notion of design/use flexibility of a supply chain management accounting technique proposes.

Keywords: Management accounting, Supply chain strategy, Supply chain relationship

1. Introduction

There has been increased attention as to how dyads and supply networks can be controlled (Lambert and Pohlen, 2001) and how economic decisions related to these structures can be made (Ellram, 1995). The application of management accounting information is related to these key managerial concerns in a supply chain (SC). Management accounting is “the process within an organization that provides information used by an organization’s management in planning, implementing and controlling the organization’s activities” (Anthony and Reece, 1989, p.515), and its major functions are decision making and control (Zimmerman, 2009). In a SC, management accounting techniques and practices are designed to produce information for control and decision making of processes and activities in and between firms in dyads, chains, value streams or networks.

Management accounting between firms directs attention to a more complex set of challenges than traditional firm centered accounting. More organizations have to be involved in supplying and consuming accounting information. The role of the decision maker or controlling principal is not a priori given. The scope of control and decision making problems are much wider and more diverse. In a SC there are multiple principals with both contradictory and aligned interest. On the one hand, cooperating firms have joint interest in maximizing efficiency and profitability of the end product, on the other hand firms have contradictory interest in relation to e.g. pricing decisions. Finally, in a supply network different relational structures such as arm’s length or strategic relationships exist, and these may further be assumed to modify the relation between SC strategy and management accounting. The literature generally suggest that long term, trust based relations may diminish the cooperation problem of contradictory interests (Tomkins, 2001; Zeng and Chen, 2003; Dekker, 2004). Therefore the social architecture and relational context may be an intervening variable.

To date however contributions within SC management exploring management accounting in SCs have mainly been technique oriented. These contributions explore how a specific management accounting setup such as Activity Based Costing (Dekker and Van Goor, 2000) or the Balanced Scorecard (Brewer and Speh, 2000) can be applied in a specific inter-organizational context. They seek to apply or modify already established accounting techniques (Pohlen and Coleman, 2005), or design completely new ones (Shank and Govindarajan, 1992) to support the management of dyads, chains, value streams or networks. Only a few studies provide overview and relate management accounting and SC management (Lalonde and Pohlen, 1996; Ramos, 2004), and none to our knowledge have addressed the relation between management accounting and SC strategy.

Different SC strategies such as lean- or agile strategies are likely to require different types of management accounting practices. The management accounting literature has documented the

effects of strategic choices on the design of management accounting. Govindarajan (1988) found that firms using a differentiation strategy should place less emphasis on sub units' ability to meet budgets compared to firms with a low cost strategy. Simons (1987) found that control systems attributes differ significantly between firms employing a prospector strategy and firms employing a defender strategy. Somewhat surprisingly high performing prospector firms were found to place larger emphasis on management control systems and defender firms were found to use their control systems less intensively. In the context of SC management lean and agile supply strategies are paramount. Extrapolating the findings on the general relation between strategy and management accounting makes it likely that there are significant differences between the use of management control systems for SCs pursuing lean and agile strategies. There is though a lack of knowledge on how SC strategies are related to management control systems and therefore a need for more knowledge on the interface between management accounting and SC management. Specifically the following research question is formulated: How is SC strategy and management accounting related, and how does SC relationship structure modify this relation?

In order to address this research question a conceptual approach is applied (Meredith, 1993). Building on a structured literature review of management accounting and SC literature, connections between SC strategy, management accounting techniques, and the SC relationships they require or support are proposed. Specifically, this research contributes to the literature by proposing a set of relations between SC strategy and management accounting, and by suggesting how SC relationship structure modifies these relations.

The rest of the paper is structured as follows: Section 2 briefly reviews literature on SC strategy and management accounting in SCs. Section 3 lays out the theoretical foundations of the conceptual model. Then in section 4 and 5 an initial understanding of lean and agile SC strategies and management accounting techniques and practices is developed. Section 6 presents postures of SC management accounting practices developed from the integration of SC strategy, SC management accounting and SC relationship structure. Section 7 concludes with a discussion of the theoretical and managerial implications, the limitations, and a description of future research opportunities.

2. Literature review

The literature on SC strategy and management accounting in SCs establishes the theoretical foundation for this research. This review discusses these two streams of literature and relates them to the research question.

2.1 SC strategy

SC strategy has emerged as a theme during the past two decades (Aitken et al., 2003; Christopher and Ryals, 1999; Kristal et al., 2010; Mckone-Sweet and Lee, 2009). SC strategy is concerned with a firm's strategic choices and managerial emphasis related to its SC management practices (Kristal et al., 2010). Previous research has demonstrated how the choice of strategy in a SC has an effect on the competitive positioning and performance of the firm (Kristal et al., 2010; Narasimhan et al., 2008; Qi et al., 2011), and how the choice of SC strategy is related to the creation of shareholder value (Christopher and Ryals, 1999). Understanding SC strategy, how it is constructed, its elements and how it may produce financial and non-financial effects to the firm and the SC is therefore important.

Much of the literature models the choice of SC strategy as ideally based on a range of situational or contextual variables (Aitken et al., 2003; Fisher, 1997; Lee 2002; Christopher et al., 2006). In this view the objective of the SC strategy is to align SC management practices with market requirements to maximize competitiveness. The end goal is to achieve consistency between the customer priorities and the SC capabilities that the SC aims to build (Chopra and Meindl, 2013: 33). However research on SC strategy is ambiguous as to its conceptualization and the precise elements and meaning of a SC strategy.

The contents of the SC strategy itself or its range of choices and its potential scales of managerial emphasis have been conceptualized differently. Some conceptualizations of SC strategy relate it to skills, resources, competencies and capabilities (Kristal et al., 2010; Mckone-Sweet and Lee; 2009). Mckone-Sweet and Lee (2009) classifies manufacturers with similar combinations of SC capabilities into three SC Strategy Groups. Other conceptualizations of SC strategy cluster the strategic choices and managerial emphasis on the major categories of lean, agile and leagile (Nailor et al., 1997; Christopher, 2000; Christopher and Towill, 2000; Towill and Christopher, 2002). We choose to focus on lean and agile SC strategies as they are likely to show considerable variation in the use of management control systems due to their very different focus. Furthermore, the distinction between lean and agile SC strategies is dominant within the SC strategy literature.

This study makes a contribution by relating SC strategy to management accounting practices. In this view, management accounting is seen as a mechanism that enables or constrains the successful execution of SC strategy.

2.2 Management accounting in SCs

Management accounting in the SC is designed to produce information for control and decision making of processes and activities optimizing activity in and between firms in dyads, chains, value streams and networks (Dekker and Van Goor, 2000).

To date only a few studies have provided an overview of the techniques and practices available for exercising management accounting in a SC context (Lalonde and Pohlen, 1996; Axelsson et al., 2002; Ramos, 2004; Seuring, 2006; Bastl et al., 2010). Lalonde and Pohlen (1996) explores techniques for effectively costing in an extended SC and identifies Direct Product Profitability (DPP), Activity-Based Costing (ABC), Total Cost of Ownership (TCO) and Efficient Consumer Response (ECR) as of particular importance in increasing the visibility of logistics costs within the SC. Ramos (2004) discuss the potential for management accounting information in SC management and presents six management accounting techniques arguably holding special applicability for SC management: Activity-Based Costing (ABC); Total Cost of Ownership (TCO), Target Costing and Kaizen Costing; Performance Measurement exemplified by the Balanced Scorecard (BSC) and Value Chain Analysis (VCA). However no attempt is made to relate the presented management accounting techniques to a set of corresponding SC strategies or to their relational context.

Hence, this study contributes to the literature by conceptualising the elements of management accounting in a context of the SC and by relating it to SC strategy and SC relationship structure.

3. Theoretical background and research model

Building on a contingency theoretical lens, we adopt the notion that performance and effectiveness of a given system depends on the appropriate “fit” of factors that can allow the right responses to the given situation in which it is located (Zeithaml et al., 1988, p.40). Another assumption is that the effectiveness of the system studied can be achieved in more than one way, but that each way is not equally effective under all conditions. Certain responses are more appropriate than others, depending on the situation. Thus, our approach suggests that the effectiveness of the system depends on the appropriate matching of contingency factors with system design choices that can allow appropriate responses to the environment.

This research is in particularly interested in the relations between SC strategy, SC management accounting and SC relationship structure (Figure 1). From previous research these variables are related, and it is relevant to explore their relationship (Zeng and Chen, 2003; Tomkins, 2001). Together these variables constitute the elements of an aligned SC management practice specifically focused on postures of management accounting as one instance of a SC management component (Cooper et al., 1997). SC management accounting can thus be understood as a response variable developed in response to strategic SC contingencies. This view implies that a major SC management task is the development of postures of SC management accounting practices to support a firm’s strategic choices and managerial emphasis related to its SC management practices.

For the purpose of identifying and understanding postures of SC management accounting practices a distinction between SC management accounting techniques and SC management accounting practices is made. Building on Flameholtz and Das (1985)'s integrative framework of organizational control the technique and its specific design and use comprise the SC management accounting practice. A SC management accounting technique is the set of standard principles and procedures guiding users in collecting and manipulating cost or performance information to develop input for SC decision making or control purposes. Literature suggests that some techniques hold special applicability for SC management (Lalonde and Pohlen, 1996; Ramos, 2004).

In order to execute the SC strategy effectively, the firm requires SC practices to enact it effectively (Qrunfleh and Tarafdar, 2013). SC strategy is understood and conceptualized as a firm's strategic choice and managerial emphasis related to its SC management practices and this in turn is related to SC decisions that are going to be made or to the specific SC control problems that is going to be addressed. Lean and agile SC strategies will be used to conceptualise SC strategy in this paper, and are discussed widely in the literature as two generically different clusters of managerial emphasis and SC management practices (Nailor et al., 1997; Christopher, 2000).

SC relationship structure is a moderating variable, and this implies further that the design of postures of SC management accounting should include considerations of the nature and limitations that exist in the already in place SC relationship structure. SC relationship structure is modelled as the extent to which a firm organizationally integrates activities with customers and suppliers (Frolich and Weterbrook, 2001).

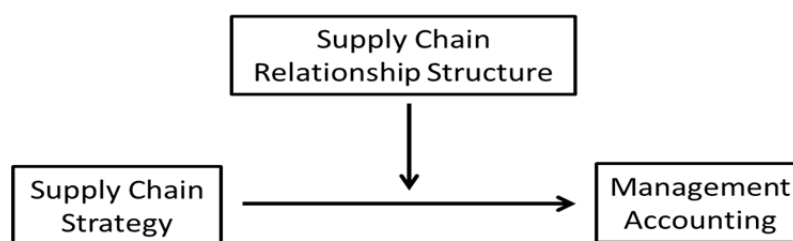


Figure 1: Forms of Fit explored

4. SC strategies – lean and agile managerial emphasis

SC strategy is concerned with a firms strategic choices and managerial emphasis related to its SC management practices. In order to execute the SC strategy, the firm requires SC practices to enact the SC strategy effectively (Qrunfleh and Tarafdar, 2013). Ideas of leanness or agility as a way to construct different SC strategy archetypes are widespread (Goldsby et al., 2006; Towill and

Christopher, 2002). Lean management emphasizes the pursuit of process efficiency and at creating cost efficiencies in the SC by effectively managing cost and focusing on improving quality. Agility refers to effective, flexible accommodation of unique rapidly changing customer needs (Christopher 2000; Christopher and Towill, 2000, Lin et al., 2006), while minimizing the back-end risks of supply disruptions (Lee, 2002). Thus literature discusses lean and agile SC strategies based on a set of different characteristics or managerial emphasis related to SC management practices.

4.1 Managerial emphasis of Lean SC strategies

In a lean SC cost reduction is the first priority and strategies are aimed at creating the highest cost efficiencies (Lee, 2002; Qi et al., 2009). The major objective of a lean SC strategy is thus to reduce cost and enhance efficiency through the identification and elimination of non-value-added activities in both inter- and intra-organizational processes. This implies that suppliers are selected based on cost and quality performance (Borgstrom and Hertz, 2011; Qi et al., 2009), and that scale economies or mass production are pursued and optimization techniques deployed to get the best capacity utilization (Qi et al., 2009; Lee, 2002: 113). Information linkages should be established to ensure the most efficient, accurate, and cost-effective transmission of information across the SC (Lee, 2002). According to Qi et al. (2009), the SC structure seldom changes in a lean SC, and in order to eliminate waste and achieve lower cost, adopters of lean strategy may implement long-term supplier relationships where continuous improvement and kaizen is extended to work in inter-organizational structures (Cooper and Slagmulder, 1999, 2004). In this view there is a need to maintain a long and rigid relationship with a small number of suppliers. This however is contested by some authors. Christopher for instance argues that it seems that the tendency has been for the benefits of lean thinking to be restricted to the factory (Christopher, 2000).

4.2 Managerial emphasis of Agile SC strategies

According to Christopher (2000), to be truly agile a SC must possess four distinguishing characteristics. First, the agile SC is market sensitive which corresponds to an organization's ability to hear the voice of the market and to respond directly to it (Lee, 2002). It uses market knowledge and a virtual corporation to exploit profitable opportunities in a volatile marketplace (Nailor et al., 1997). Second, the agile SC is highly information based and uses information technology to share data and promote flows of information with suppliers and customers (Lee, 2004). Third, an agile SC is integrated across organizations. Suppliers are selected based on their performance on flexibility and responsiveness (Qi et al., 2009). There is a focus on collaborative relationships with suppliers (Lee, 2004), joint product development, common systems, and transparency of information. Even joint strategy determination, buyer-supplier teams, and open-book accounting (Christopher, 2000:

39). Fourth, an agile SC is oriented towards the network and a key ability is to leverage the respective strengths and competencies of network partners to achieve greater responsiveness to market needs. Apparently however, also for agile SC's there are some controversies in the literature as to the specific relational structure needed. Qi et al. (2009) argues that in an agile SC there is a need to maintain short and flexible relationships with a large number of suppliers. Christopher (2000) on the other hand argues that one of the keys to achieving agile response to fast-changing markets is the quality of supplier relationships.

From our discussion above it can be concluded that the lean SC and the agile SC follow different performance objectives and are organized differently – they apply a different set of strategic choices and managerial practices. Specifically from the literature this study identifies five managerial emphases that may be used to discuss the conceptual difference between lean and agile SC strategies: Strategic attention; Performance objectives; Nature of the market; Role of information and nature of SC processes and network structure (table 1).

Management Accounting and Supply Chain Strategy

| | LEAN SC Strategies | AGILE SC Strategies |
|---|---|---|
| Strategic attention | <ul style="list-style-type: none"> • Reduction of cost. • Enhancement of efficiency. • Identification and elimination of non-value-added activities in processes. • Employing continuous improvement techniques across the chain. • In its narrow scope there is a focus on optimization of intra-organizational processes. • In its wider scope there is a focus on joint optimization of inter-organizational processes in cooperation with suppliers and downstream customers. | <ul style="list-style-type: none"> • Responding to changing market requirements. • Designing flexibility and responsiveness into processes. • Sensing/identifying the voice of the market and responding directly to it. • Exploit profitable opportunities in a volatile marketplace. |
| Performance objectives | <ul style="list-style-type: none"> • Cost. • Capacity utilization. • Quality. | <ul style="list-style-type: none"> • Flexibility. • Responsiveness. |
| Nature of the market | <ul style="list-style-type: none"> • Downstream markets are represented as customers requesting more value in the form of increased levels of quality for less cost. • Important to transmit/pull cost and quality pressure upstream. | <ul style="list-style-type: none"> • Downstream markets are represented as highly dynamic and pluralistic in their nature. • Important to sense and respond to changes. |
| Role of information | <ul style="list-style-type: none"> • Information linkages should be established to ensure efficient, accurate, and cost-effective transmission of information across the SC. • The role of information is mainly to control non-value-adding activities and curb cost. | <ul style="list-style-type: none"> • Highly information based • Uses information technology to share data and promote flow of information with suppliers and customers. • The role of information is one of coordination, market sensing, and of developing new knowledge by connection information. • Visibility and transparency to the market. |
| Nature of SC processes and network structure | <ul style="list-style-type: none"> • SC processes are relative stable in nature. • Production is repetitive with continuous flow. • SC network structure seldom changes. • SC network is understood as a mechanism for the transmitting of cost and quality requirements upstream in the SC. | <ul style="list-style-type: none"> • SC processes are dynamic in nature. Frequent re-designs are occurring. • Production is adapted to specific market requirements. • SC network structure is dynamic in nature. • SC network is understood as a pool of resources. • Important to identify SC partners from where competencies can be leveraged for the achievement of responsiveness to market needs. |

Table 1: The managerial emphasis of Lean and Agile SC strategies

5. SC management accounting techniques and practices

A key question and one closely related to the research question is what are the management accounting implications of a lean respective an agile SC strategy? In order to answer this question a first step is to understand the basic nature of the identified SC management accounting techniques and their accompanying practices.

5.1 Activity Based Costing (ABC)

ABC in its original form measures indirect costs caused by complex transactions. The main elements of ABC are resources, activities and cost objects (van Damme and van der Zon, 1999, p. 74). The value of ABC is its ability to link the performance of particular activities to the resources consumed by those activities (Cooper and Kaplan, 1991). While traditional full cost models allocates costs based on volume drivers, ABC focuses on measuring the costs caused by the diversity and complexity of processes.

Although ABC was originally developed to an organizational context (Cooper and Kaplan, 1988), it is suggested to work equally as well in a SC (Dekker and Van Goor, 2000). Using ABC in a SC leads to a better understanding of what drives indirect costs in processes crossing firm boundaries. Costs can potentially be assigned to all relevant SC sub-systems such as products, brands, services, facilities, customers, distribution channels, suppliers and supply channels (Pohlen and Coleman, 2005, p. 52). During the last twenty years ABC have been demonstrated to be applicable to a range of different SC decision making problems (Pohlen and LaLonde, 1994; Dekker and Van Goor, 2000; Goldsby and Closs, 2000; Pohlen and Colman, 2005; Everaert et al., 2008). First, ABC can provide a mechanism that can calculate cost to the firm of using different suppliers or supplying different customers, and such accounting information in turn can be used in for instance price negotiations (Everaert et al., 2008, p. 187). Furthermore ABC can provide information enabling a comparison of the value of activities to cost of activities, thus visualizing cost cutting opportunities through skipping non value adding activities and through minimizing the use of costly activities in the dyadic relationships connecting the firm with its immediate partners. ABC enables the organizations involved to compare directly the costs of activities (Dekker and Van Goor, 2000, p. 47). This in turn provides the opportunity to re-allocate activities and resources. Re-allocation of resources across entities recognises that costs incurred in one part of the chain can be compensated elsewhere in order to reduce total SC costs. In order for such sharing and re-allocation to work, it requires effective cost/profit re-distribution mechanism that will eliminate the involved parties' concerns for opportunistic behavior (Wouters, 2006).

5.2 Total Cost of Ownership (TCO)

TCO is designed to quantify and communicate total costs in activities and related costs generated by external purchasing in their interaction with a specific supplier. It is thus a SC management accounting technique dedicated to the focal buying firm looking towards its interaction with its immediate suppliers. Specifically, the TCO system is closely related to ABC (Hurkens et al, 2006, p. 28) and works in four overall steps. First, all the activities related to interaction with suppliers is identified and defined. Second, cost is assigned to the identified activities. Third, cost drivers are defined. Finally, and as an individual step related to each of the analyzed suppliers, it is identified how the supplier generates activities and thus cost to the focal buying firm (Degraeve and Roodhooft, 1999, p. 5).

The main function of TCO is to provide new insight into the "true costs" of sourcing and procurement from a focal company perspective (Ellram, 1995, p. 4). It recognizes that the purchase price is often only a fraction of the total cost needed to make a component or service available for production. Other types of transaction or indirect cost such as ordering costs, cost of bad quality and delivery costs are involved in the acquisition, possessing, use and subsequent disposition of a good or service (Ellram and Siferd, 1998, p. 56). The main function of TCO is thus to quantify this broader definition of "true costs" of sourcing and procurement from a focal company perspective (Ellram, 1995, p. 4), and subsequently make the result available for decision making and/or control purposes.

TCO have been demonstrated to be applicable to a range of different SC decision making and control problems (Ellram and Siferd, 1993, 1998; Ellram, 1994, 1995; Degraeve and Roodhoof, 1999; Ferrin and Plank, 2002; Hurkens et al., 2006). In four different but coherent contributions Ellram (1994, 1995) and Ellram and Siferd (1993, 1998) specifically investigated the purpose of using TCO techniques and identified four overall applications: Selection of suppliers and allocation of volume between existing suppliers; ongoing performance measurement and feedback to suppliers; providing data useful to the focal buying firm in purchase negotiation situations and on a strategic application level to model the outsourcing decision or identify potential for re-engineering and improvement of processes internally and at suppliers.

5.3 Value Chain Analysis (VCA)

VCA adopts a wide scope of cost analysis. This method to analyze the value chain for strategic improvement was introduced by Porter (1985) and further developed by Shank and Govindarajan (1992). Basically the whole chain running from raw material to end-users is included in the analysis (Shank and Govindarajan, 1992, p. 180). In VCA 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 that cause its economic behavior are identified. Thus compared to TCO, VCA is designed to include multiple firms in the cost analysis. VCA, in addition to the buyer's costs, takes into account activities and costs of other firms in the value chain (i.e. suppliers and buyers), and recognizes the interdependencies of these activities and costs (Dekker, 2003).

VCA is used to analyse, coordinate and optimise linkages between activities in the value chain, by focusing on interdependence between activities. Depending on the scope and definition of the value chain, insights are gained into how the activities of the included functions or firms are interrelated in terms of cost and differentiation. Insights produced by VCA can be used to control cost drivers better and for value chain reconfiguration purposes.

5.4 Target Costing (TC) and Kaizen Costing (KC)

TC is designed to manage costs related to product development processes in the enterprise and across enterprises in the SC (Monde and Hamada, 1991). KC applies the same principles as TC but is designed to manage cost related to the manufacturing phase (Modarress et al., 2005). TC and KC are thus strongly related and when they work between firms they help support the same decision making and control problems and requires/fosters the same types of SC relationships. Japanese car manufactures and in particular Toyota has successfully been pioneers in the use of TC/KC (Cooper and Slagmulder, 1999, 2004). Such a process focus means that it communicates end customer market pressure in the form of target prices and value on products/services and component costs upstream in the SC and focuses on continuously identifying opportunities for reducing end product/service prices (Maskell and Baggaley, 2004). The procedures of functional analysis and value engineering are often treated as being part of the TC. Here cost is designed out of the product by setting the value of individual features of the product and compare the value with the actual costs. These procedures help reduce the non-value-adding product/service functions and ensure that production of the product/service is adjusted to the competitive situation in the market and market requirements.

In a survey based study Ellram (2000) examined why organizations undertake TC and classified answers into five categories: Cost reduction; cost disclosure/understanding; continuous improvement/competitiveness; early purchasing and supplier involvement; and improving design and accountability. The use of TC has both a control object and a decision support purposes. Costs across the value chain can be better coordinated and controlled and TC also creates the basis for making more informed decisions about whether a given product or service variant is viable in the market, and can be produced/delivered through all stages of the SC.

5.5 SC Performance Measurement (SCPM)

SCPM is concerned with the quantification, grouping and subsequent communication of non-financial performance indicators related to SC activity and process performance. Depending on the breadth and depth of the processes SCPM include in its scope it will have as its object control of suppliers, relationships or the wider SC/network. Therefore literature on SCPM can naturally be classified into these three streams, depending on the structural complexity assumed.

The first stream assumes that it is the current or potential performance of suppliers that needs to be assessed in order to optimise the performance of the focal buying company. It sees suppliers as distinct from internal activities and processes, but contrary to intra-organizational performance measurement techniques it recognises the influence and impact of activities located outside ownership borders. However, it sees no apparent need to coordinate and share cost and profit between firms. Communication is unidirectional and concerned with aligning suppliers (agents) interest with focal firms (principal) objectives (Prahinski and Fan, 2007). The second stream argues that the narrow focus on assessing supplier performance to improve buyer performance is inherently erroneous. Instead, the system in which performance needs to be assessed is the relationship (Lamming et al., 1996; O'Toole and Donaldson, 2002; Giannakis, 2007). Such performance measurement frameworks develops the concept of a relationship as an entity, joining two firms together for the purpose of a mutually beneficial business transfer (Lamming et al., 1996, p. 176). The third stream claims the inadequacy of both perspectives. The traditional narrow perspectives on performance measurement of inter-organizational supply it argues *“may limit the possibility to optimize supply chains, as management does not “see” supply chain wide areas for improvement”* (van Hoek, 1998). Instead, these contributions argues that the system which performance needs to be assessed and improved is the entire SC (Beamon, 1999; van Hoek, 1998; Brewer and Speh, 2000; Lambert and Pohlen, 2001; Chan and Qi, 2003; Bititci et al., 2005) and claims that viewing a chain of cooperating organizations as one entity *“provides opportunities for improvements not possible if each were analyzed separately”* (Holmberg, 2000, p. 853).

Management Accounting and Supply Chain Strategy

| | ABC | TCO | VCA | TC/KC | SCPM |
|--|--|--|--|---|--|
| Proposed objects of optimization? | Can be anything from processes within the focal firm to the complete SC/ network, depending on the specific design. | Focal firm | The complete SC/ network. | The dyad or the chain/network | Can be anything from processes within the focal firm to the complete SC/ network, depending on the specific design. |
| Proposed objects of control/ decision making? | Concerned with decision making. ABC is flexible and decisions can take both a small and large SC scope into account. | Concerned with decision making or control in relation to suppliers' activities and how they impact focal firm performance. | Concerned with decision making. It is flexible in its definition of scope. But the complete SC/ network is often argued to be included in its SCA-model. | <ul style="list-style-type: none"> • TC concerned with decision making in the product development phases. • KC concerned with the control of cost for continuous improvement. | Depending on the breath and dep't of the processes SCPM include in its scope it will have as its object of control of suppliers, relationships or the wider SC/network. |
| Which accounting information is to be supplied? | <ul style="list-style-type: none"> • Activities performed to source, produce and deliver. • Resources consumed by activities. | <ul style="list-style-type: none"> • Activities performed by suppliers that affect the focal firms total purchasing costs. • Resources consumed by the focal firm, and caused by suppliers. | Costs, revenues and assets assigned to 'value activities'. | <ul style="list-style-type: none"> • Target prices for specific components and functions of the product. • Current production cost across boundaries of firms. | <ul style="list-style-type: none"> • Different types of key performance indicators, depending on the specific design of the PMS. • Available inside the firm, or only via SC partners, depending on scope. |
| Which criteria are to be optimised? | Total cost consumed by activities in the SC system modelled in the SC design. | Focal firms total purchasing costs. | Linkages between activities in the value chain. | Total production cost reduced to a level under the attainable market price. | Financial and non-financial performance of activities in the SC system modelled in the SC design. |
| Who are involved in the supply of accounting information? | This depends on the scope of the designed model. External actors are involved when system scope includes their activities and resources. | Most TCO models can be designed using only transaction data which is available in the focal firm. | All SC actors. | Depending on scope first tier or multiple tier supplies must be involved and provide info. on their production costs. | This depends on the scope of the designed model. External actors are involved when system scope includes their activities and resources. |
| How and who are making calculations and translations? | Done by the focal firm (channel captain) or jointly in cross-enterprise teams. | The calculation of total cost is discussed as performed by the focal firm (channel captain) | Jointly at the strategic level across firms. | Done by the focal firm (channel captain) or jointly in cross- enterprise teams. | PMS are updated by the focal firm (channel captain) or jointly by several organizations in the SC. |
| How are feedback communicated to control objects? | Not directly applicable. Information from ABC systems though can also be used for control purposes e.g. via a TCO model. | Multiple feedback and reward mechanisms are proposed (e.g): <ul style="list-style-type: none"> • Communicated in price negotiations. • Communicated in periodic supplier evaluation systems. | Not applicable. | In cross-functional or cross-organizational teams. | Multiple feedback and reward mechanisms are proposed (e.g.): <ul style="list-style-type: none"> • On-going evaluation and signalling feedback to the performing actors. • Jointly discussions on where and how to improve. |
| What decisions are made? | <ul style="list-style-type: none"> • Reengineering of processes. • Identifying opportunities for increased productivity. • Resources allocated in the SC. | <ul style="list-style-type: none"> • Supplier selection and volume allocation. • Identify potential for re-engineering and improvement of suppliers' processes. | How activities of the included functions or firm are interrelated in terms of cost and differentiation. | <ul style="list-style-type: none"> • Which products and components to produce. • Cost, functional, quality trade-offs. | <ul style="list-style-type: none"> • Identification of activities or processes in need of improvement. • Supplier de-selection. • Resource allocation. |

Table 2: SC management accounting practices.

6. Postures of SC management accounting

In the previous section the identified SC management accounting techniques and their accompanying practices were discussed and analyzed individually. However, the analysis indicates that the relation between SC strategy and SC management accounting practices might be supported by more than one technique. In this research a posture of SC management accounting is defined as a particular way of dealing with SC management accounting that is aligned with SC strategy and SC relationship structure. Thus based on the research question and the research model developed in section 3, postures of SC management accounting can potentially be identified using two main relations or forms of fit.

First, a lean or an agile SC management accounting posture is the relation between lean and agile SC strategies and the corresponding SC management accounting practices. This form of fit is concerned with the question: What are the SC management accounting implications of a lean and an agile SC strategy? A lean SC strategy is concerned with the identification and the elimination of non-value-added activities in processes, the enhancement of efficiency and the reduction of cost. Downstream markets are represented as customers requesting more value in the form of increased levels of quality for less cost and market pressure is an important coordination mechanism in the SC (table 2). The managerial emphasis of lean SC strategies thus implies a cost and efficiency focused SC management accounting posture, and this makes most of the cost accounting techniques discussed earlier in this paper relevant. An agile SC strategy is concerned with designing flexibility and responsiveness into processes in order to respond to changing market requirements. Downstream markets are represented as highly dynamic and pluralistic in their nature and it is important to sense and respond to changes in market requirements quickly and selectedly. The role of information is one of coordination, market sensing, and of developing new knowledge by connection information and resources in the SC network. The managerial emphasis of agile SC strategies thus implies a flexibility and responsiveness focused SC management accounting posture and this makes different forms and formats of SC performance measurement relevant.

Second, there is the moderating impact of SC relationship structure on the relation between SC strategy and SC management accounting practice. In this research SC relationship structure is operationalized as the extent to which a firm organizationally integrates activities with customers and suppliers (Frolich and Weterbrook, 2001). From section 4 we conclude that lean and agile SC strategies may be thought of as working across different SC relationship structures or adopt different approaches to SC integration. Likewise and based on the analysis in section 5 it can be

concluded that some SC management accounting practices would fit better to some SC relationship structures than others. Five mutually exclusive groups can conceptually represent the major different SC relationship structures or integration strategies firms can undertake in relation to their suppliers and customers (Frohlich and Westbrook, 2001). Figure 1 summarises the SC management accounting postures that can be identified when combining the two main forms of fit.

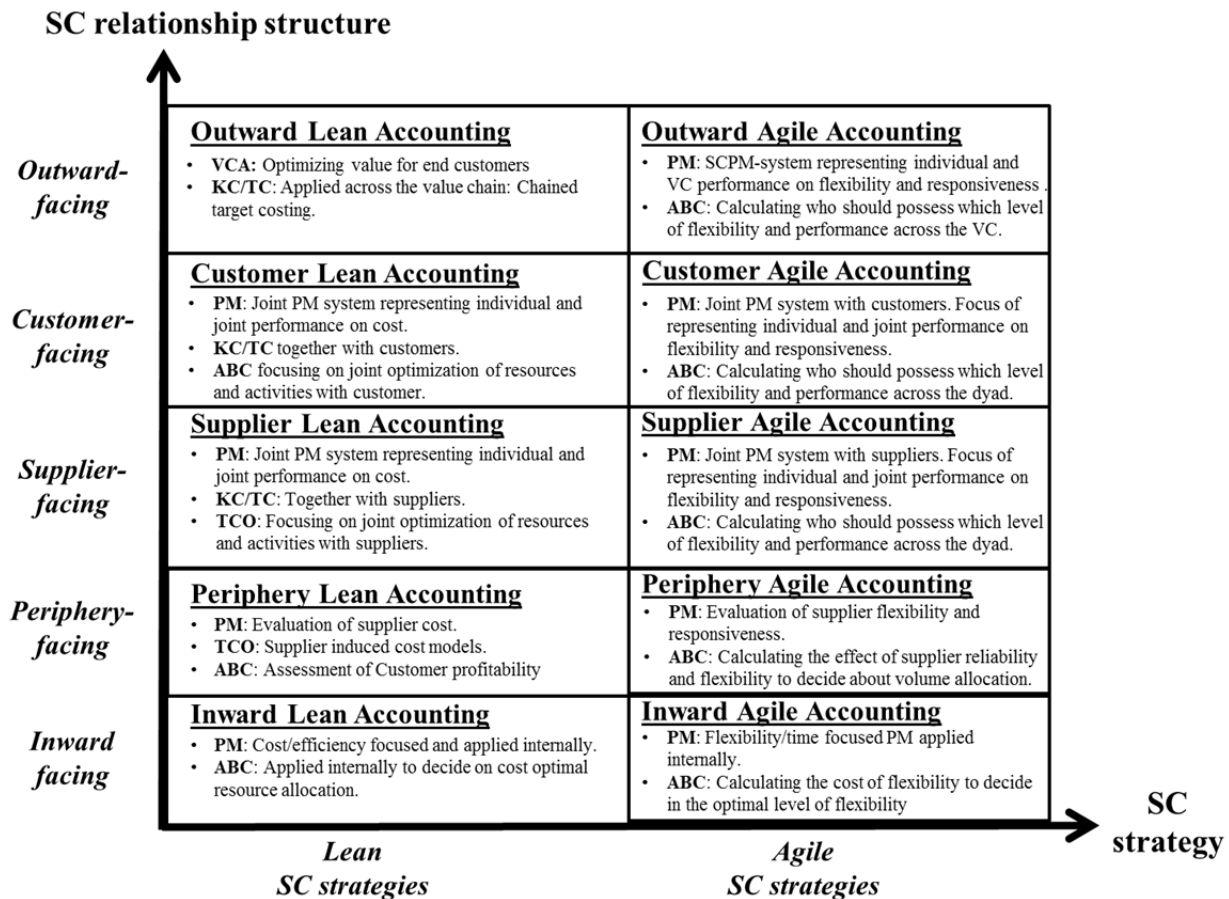


Figure 1: SC management accounting postures.

6.1 Inward-facing lean and agile SC management accounting postures

An inward facing SC relationship structure is one where the firm has no or little recognition of and integration with customers and suppliers. In this posture, firms in their accounting practices address decision making and control problems related to the internal operations of the firm. The firm do not consider resources outside own legal boundaries as available for joint coordination or optimization and a closed system perspective is adopted (Thompson, 1967). The SC management accounting practices clustered in this posture do not provide any decision making support to problems that include outside activities or processes, and further cannot influence entities outside focal firm boundaries since these are not represented as entities in the SC accounting techniques and practices designed and used. Also, and related to the availability of relevant accounting data, this would often

not be a constraining factor, since SC management accounting practices working in this posture do not require data from outside focal firm boundaries for them to operate.

An inward lean accounting posture is oriented towards the identification and elimination of non-value-added activities in internal processes, the enhancement of efficiency and the reduction of cost internally. In this posture activities are coordinated and integrated across functions to secure that all resources work jointly and without slack. For this purpose cost and efficiency focused performance measurement practices may be applicable (Pettersson and Segerstedt, 2013). Also a focus on the elimination of non-value adding activities is warranted in this posture, and here KC practices focusing on continuous improvement to internal processes can be applied (Modarress et al., 2005). In a decision making perspective, typical management problems will consider how best to allocate resources between functions internally and which products to keep on producing with a profit. These decision problems can be supported by ABC models (Cooper and Kaplan, 1988).

An inward agile accounting posture is oriented towards the enhancement of flexibility and responsiveness internally (Gerwin, 2005). Suppliers potential enabling or constraining influence on the achievement of these objectives is not taken structurally into account. Focus is on measuring different dimensions of flexibility e.g. the range of volumes in which the organization can produce profitably (Beamon, 1999). This cost of flexibility may be further calculated via ABC systems to decide on the optimal level of flexibility.

6.2 Periphery-facing lean and agile SC management accounting postures

A periphery facing SC relationship structure is one where the firm has some or a high level of recognition of both customers and suppliers but do not integrate with them to any extent. In this posture, firms in their accounting practices address decision making and control problems related to the internal operations of the firm, as well as related to their suppliers and customers. However in this posture the system that is in focus is the focal firm, and the philosophy, when using management accounting, is to maximize focal firm or shareholder value, although here taking into account suppliers and customer resources, activities and processes. Resources and activities located outside firm legal boundaries are seen as objects available for coordination and this fits with a semi-open system perspective (Buckley, 1967). In the SC management accounting techniques and practices applied in this posture the firm is represented as dependent on resources and activities in the environment (Pfeffer and Salancik, 1978). Resources and activities external to the firm may influence firm performance and focus is on minimizing the potential adverse cost implications and on maximizing the value that can be gained from transacting with customers and suppliers. In order to achieve such objectives external entities are represented as entities in the SC management

accounting techniques and practices applied. This requires data that can represent their performances; however this data is collected on the boundary and in the transactions performed with customers and suppliers. A central concern is how the firm can create incentives for suppliers and customers in order for them to act in a manner aligned with firm goals and strategies?

A periphery lean accounting posture is oriented towards creating transparency of the supplier- or customer induced costs that influence the firm's own cost structure and budgets'. Central questions are: What costs are customers and suppliers causing the firm? How can suppliers or customers help identify opportunities for the elimination of non-value adding activities located internal to the firm? TCO applied as a supplier selection tool, by choosing the supplier with the lowest possible total cost attached to the purchase of a particular component or a service from the supplier would be one example. Another usage would be to use TCO as a coordination tool, however on the premise of the focal buying firm. When the supplier is informed about its total cost, seen from a customer perspective, the supplier has the opportunity to decrease some of this cost. Looking towards its customers the challenge is to identify customer induced costs. The quality, the delivery conditions and services the customer requires has consequences for the total cost. By using ABC focusing on total customer profitability, customers that add more cost than revenues to the firm can be eliminated.

A periphery agile accounting posture is oriented towards the enhancement of flexibility and responsiveness internally (Gerwin, 2005), but represented as potentially enabled or constrained by suppliers. Also, and related to the downstream SC the periphery-facing SC relationship towards customers implies some visibility and market transparency, however this is achieved via data collected from transactions with customers, and not as a cooperative endeavor requesting new data from customers. In order to motivate suppliers to contribute to the enhancement of flexibility and responsiveness internally, performance measurement has some application in this semi-opened posture. Performance measurement may be used as a supplier evaluation mechanism focusing on aspects such as suppliers' delivery lead time, suppliers' delivery reliability and suppliers' delivery flexibility (Beamon, 1999). Data is collected from ongoing transactions, communication is unidirectional and concerned with aligning suppliers (agents) interest with focal firms (principal) objectives (Prahinski and Fan, 2007). Performance measurement practices may also be used as a decision mechanism for resource allocation, providing more volume to suppliers that perform well on these performance dimensions. ABC systems may refine the calculation of effects of reliability, and flexibility and hence inform the decision about volume.

6.3 Supplier-facing lean and agile SC management accounting postures

A supplier-facing SC relationship structure is one where the firm has a high level of recognition of both customers and suppliers and integrates extensively with suppliers. In this posture, firms in their accounting practices address decision making and control problems related to the internal operations of the firm, as well as related to their suppliers and customers. Both customers and suppliers are represented in the SC management accounting practices used in this posture, however suppliers are required to be involved extensively in the design and use, and suppliers must supply important accounting data that is needed in order to coordinate and optimize the wide upstream value chain. Such dependence on accounting information located outside firm boundaries at suppliers requires strong relationships with suppliers. Suppliers are both involved in the supply and consumption of accounting information.

A supplier-facing lean accounting posture is oriented towards integrating with suppliers to create lean supply (MacDuffie and Helper, 1997). For lean supply to be a reality integration must go both ways (Lamming, 1996). Inter-firm kaizen or the search for improvements is an essential part of lean supply and for this purpose cost transparency is important. Customers must share process information, including cost data, with suppliers and accept ideas that come from upstream, as readily as they expect to receive cost information from suppliers and influence their SC partners (Lamming, 1996). For this to work, the customer is dependent on suppliers' willingness to share cost data, and therefore some trust must be in place in the dyadic relationship. Inter-firm kaizen costing and chained target cost management are important elements for this purpose (Cooper and Slagmulder, 1999, 2004). A TCO model developed jointly in order to provide input for decision making on how most cost optimally to allocate activities and resources in relationships with suppliers is also applicable in this posture.

A supplier-facing agile accounting posture is oriented towards integrating with suppliers to create agile supply. Here focus will be directed towards extending flexibility and responsiveness upstream in the SC. Suppliers are invited to participate in improving aspects of flexibility and responsiveness with their customer and a performance measurement system representing joint performance on flexibility and responsiveness may be implemented in this posture. The calculation of joint performance can be further substantiated through the use of ABC systems (Dekker and van Goor, 2000).

6.4 Customer-facing lean and agile SC management accounting postures

A customer-facing SC relationship structure is one where the firm has a high level of recognition of both customers and suppliers and integrates extensively with customers. In this posture, firms in

their accounting practices address decision making and control problems related to the internal operations of the firm, as well as related to their suppliers and customers. Both customers and suppliers are represented in the SC management accounting practices used in this posture, however customers are required to be involved extensively in the design and use, and customers must supply important accounting data that is needed in order to coordinate and optimize the wide downstream value chain. Such dependence on accounting information located outside firm boundaries at customers requires strong relationships with customers. Customers are both involved in the supply and consumption of accounting information.

A customer-facing lean accounting posture is oriented towards integrating with customers to create lean distribution. The focus is on minimizing waste in the downstream SC, while making the right product available to the end customer at the right time and location (Reichhart and Holweg, 2007). Supplier initiated cost information sharing and models such as inter-firm KC and TC models promoting joint cost transparency may be applicable in this SC management accounting posture. Also ABC focusing on joint optimization of resources and activities with customer may be applicable (Dekker and Van Goor, 2000).

A customer-facing agile accounting posture is oriented towards integrating with customers to create agile supply. Here focus will be directed towards extending flexibility and responsiveness downstream in the SC. Customers are invited to participate in improving aspects of flexibility and responsiveness and as was the case in the supplier-facing posture performance measurement system representing joint performance on flexibility and responsiveness may be highly relevant. Again ABC systems may further substantiate decision making.

6.5 Outward-facing lean and agile SC management accounting postures

An outward facing SC relationship structure is one where the firm has a high level of recognition of both customers and suppliers and integrates extensively both downstream and upstream. In this posture, firms in their SC management accounting practices address decision making and control problems related to the entire value chain. Resources and activities located outside firm legal boundaries are seen as objects available for coordination and optimization and this fits with an open system perspective (Buckley, 1967). In this posture the objective is thus to optimize the outcome of the entire value chain taking all involved entities into account. Since such outcomes in a SC perspective are linked to the perceived value of end customers, this will be the focus of SC management accounting practices applied here.

An outward lean accounting posture is oriented towards integrating with both customers and suppliers to create a lean value chain. Focus is on identifying opportunities for eliminating non-

value adding activities and lowering the total cost for the entire value chain. TC/KC configures to focus on how product or service designs, product or service functions and feature and price can be optimized taking into account end customer and market expectations is applicable here. By entering into a dialogue with customers about product functions and features and their preferences in general, a target cost and a production target cost for the focal company and its suppliers can be developed. ABC can also be used to determine how a value chain best can allocate its resources across the chain in order for it to reduce costs (Dekker and Van Goor, 2000). However such a decision problem can only be adequately addressed if all the involved customers and suppliers are willing to share process and performance data as well as to some extent adapts or standardizes their internal accounting practices (Kulmala et al., 2002).

An outward agile accounting posture is oriented towards sensing and responding to changes in downstream markets to create flexibility and responsiveness into all stages of the supply chain. SC performance measurement system may be relevant here and representation of individual and value chain performance on flexibility and responsiveness has specific applicability in this posture. Systems may include in their scope three or more firms working together to measure the processes and areas of cooperation they have in common. As a result SC wide areas for improvement can be identified (van Hoek, 1998). However such control practices presupposes that the involved customers and suppliers are willing to share process and performance data. It also assumes that the involved customers and suppliers are willing to invest in and update a common performance measurement system. Therefore clear rules on how joint performance is rewarded and how gains and costs are re-distributed between the involved parties must be established (Wouters, 2006). ABC systems may refine the calculation related to who should possess which level of flexibility and responsiveness across the value chain and how this most optimally can be achieved.

7. Discussion and conclusion

Contributions that provide overview and direction of research positioned in the intersection between management accounting and SC management are few. This research explores how SC strategy and management accounting is related, and how SC relationship structure modifies this relation.

Building on a contingency theoretical lens as well as literature within management accounting and SC management, a research model is developed, highlighting two basic forms of fit. First, fit between the SC strategy modelled as lean and agile strategies, and the SC management accounting practice modelled as the design and use of different SC management accounting techniques (e.g. ABC, TCO, TC/KC, VCA and SCPM). Second, SC relationship structure is a moderating variable

and modelled as the extent to which a firm organizationally integrates activities with customers and suppliers (Frolich and Weterbrook, 2001). In order to understand the identity of SC management accounting practices more fully, distinctions between different postures of practice is made. In each posture the scope of managing, the object of optimization and the relational prerequisites and consequences are different.

Our conceptual research highlights that different “standard” accounting techniques to some extent has inherent in them a certain way of relating to SC management, the different SC relationship structures or the different integration strategies firms can undertake in relation to their suppliers and customers. Specifically, the different postures of SC management accounting identified above and in figure 1, highlights that different SC accounting techniques are applicable to different scopes and complexities of management in the SC. However it also highlights how some techniques are applicable to multiple scopes of managing and that this potential multiple applications depends on both their specific setup or design and their specific use or application. Based on the analysis it can thus be concluded that although a specific technique to some extent may limit its application, techniques are also moldable and this depends on their specific design and use. In order to be able to conceptually discuss such ability to be bent for different scopes and complexities of managing in the wider SC we propose design/use flexibility as a fruitful concept. This concept is in particular relevant to SC management, since SC’s per definition potentially includes several different scopes of managing depending on the level of SC orientation the firm applies (Mentzer et al., 2001). Design/use flexibility, highlights that SC management accounting techniques can sometimes and to some extent be used across different scopes of SC relationship structures and they can sometimes and to some extent be molded to fit either an agile SC strategy or a lean SC strategy. ABC and performance measurement are flexible management accounting techniques in the sense that they, depending on the specific setup and practice can be made applicable to multiple scopes of managing, SC strategies and SC relationship structures. Specifically figure 1 highlights how PM may be flexible in design and use in a SC. In the inward and the periphery facing SC relationship structures PM is narrow in its scope and do not require additional accounting data from outside the firm. In the supplier- and customer-facing SC relationship structures PM adopts a wide system perspective and requires sharing and close integration with external entities. PM may even be flexible across SC strategies, and this depends on the focus of the measures that is included in it as performance representations when it works. Also ABC highlights some form of flexibility. ABC, depending on its specific design and use may be applied as an internal coordination mechanism; it

may be applied to identify profitable customers or it may be designed and used as a relational mechanism where joint optimization of resources and activities with customers takes place.

Another reflexion is warranted. It is related to the potential for misfits that may occur between the elements in the research model. First, there may be misfits between SC strategy and SC management accounting practice. This can be caused either by the selection of an inadequate SC management accounting technique to the specific SC strategy at hand, or by misfits constructed via improper design and use of a suitable technique. When a TCO model is used as a key element in evaluating supplier in a SC system that is governed by an agile SC strategy this may cause unclear and even counterproductive incentives that may lead to negative performance effects for the system as a whole. Another example is a SC performance measurement system designed to include both cost related measures and measures focused on flexibility and responsiveness. In its use, the buyer applying it however only uses the cost measures to make decisions on future partner selection, and this may lead to negative performance effects for the system as a whole when guided by an agile SC strategy. Second, there may be instances of misfit between SC management accounting practice and its relational context. Since links between SC management accounting practice and relations both stem from the supply and the consumption of accounting data, this can be caused either by the unavailability of data or by consumption and communication of improper data. When a selected accounting technique such as TC/KC requires regular and detailed cost structure data which are owned by suppliers, but these suppliers are unwilling or reluctant to supply them due to issues of mistrust and appropriation concerns, this produces an instance of misfit that may lead to negative performance effects for the system as a whole. Another example is a firm that uses a TCO model as input to its detailed price negotiations with its suppliers and based on this knowledge requires its suppliers to cut their prices. This practice may be incompatible with a desire to create long term relationships with these suppliers. It may lead to negative performance effects for the system as a whole. Thus misfit between SC management accounting practice and its relational context can occur when external partners are reluctant or unwilling to share the accounting data or it can occur when the SC management accounting practice consumes and communicates data designed to construct a different type of SC relationship, than the one desired.

The misfit between the management accounting and SC strategy may mean that the management accounting system affects the development of strategy. Research within management accountings suggests that such a reverse relationships - i.e. management control systems affecting strategy – is possible and even desirable. This literature argues that management accounting may inform

strategizing especially when used in an interactive manner (Simons, 1990). More research, conceptual and empirical, are needed to unravel such relationships in a SC context.

Based on our findings, we further propose that future research should focus on the totality of accounting in the dyad, the SC or the network. In such an understanding, accounting techniques used in a certain inter-organizational space will be thought of as a connected whole, as a portfolio of techniques or as a control package (Malmi and Brown, 2008), rather than as multiple and unrelated managerial devices. Such an approach, we argue, is both relevant and necessary, since for instance, when two different techniques are used to measure and manage the same dyad, SC or network they risk create different signals or information that potentially can harm, deteriorate or otherwise affect SC management in unintended ways. Also, SC management accounting techniques can often be used both to monitor the activities and processes and provide information to decision makers. Inside the firm, the problem arise when e.g. sales budgets are used both for making production planning and decisions and for rewarding sales people. In this situation sales managers have an incentive to underestimate the level of sales in order to maximize rewards with subsequent problems for production planning and decision making. In the SC the technique used to make decisions about activities and flows may also sometimes be used for controlling suppliers and dividing profits, and this can create situations of misfit.

A final observation is warranted. As indicated in table 1, different SC strategies may hold different managerial emphasis on the nature and role of SC processes and network structure. Specifically in the case of a lean managerial emphasis, a set of relative stable SC processes and a SC network structure that seldom changes is in place. On the other hand and in the case of an agile managerial emphasis both SC processes and SC network structure is expected to be highly dynamic in nature with frequent re-designs occurring. These observations may hold implications for SC management accounting practices. When processes and network structures are highly dynamic, the SC management accounting practices designed to control and support decision making for them must be able to change frequently as well. If this is not the case, this may lead to processes and networks that are not properly governed and this may result in negative performance effects for the system as a whole. Based on this reasoning we propose that agile SC management accounting postures in general is constructed based on a set of techniques or combination of techniques that holds a higher level of design/use flexibility. This directs attention to a final instance of misfit: The misfit between the SC strategy and the level of design/use flexibility in the SC management accounting posture. When a SC management accounting posture is not adequately flexible in design/use this may cause repeatedly and excessive investments in new management accounting practices and improperly

governed processes and SC network structures. Alternatively, the control system may affect the structure of the network through defining the entities which are part of what the focal firm considers to be its SC and through developing and favoring certain types of relationships which may affect the overall structure and focus in the SC. More research is also needed on this subject.

It is our goal to encourage future research within the SC community focusing on the general identity and usefulness of management accounting practices and techniques. We propose that such future research could discuss the relational prerequisites and consequences of using management accounting in general and in relation to the individual techniques such as ABC in particular. Furthermore research looking in to the contradictions between control and decision making objectives are warranted. In this paper the focus has mainly been on management accounting as the outcome of SC strategy and SC relational structure, however future research could also think of management accounting as a constructive force. A powerful management accounting that may create SC relationships and one that may be inspirational to new SC strategies.

While the results obtained in this study have clearly indicated the significant relationship between SC strategy, SC management accounting practices and SC relationship structure, several limitations need to be addressed in future research. First, this is a conceptual study and future research should confirm and detail the proposed relations and findings empirically. Second, the research model and the findings is constructed on top of only a limited sample of existing literature, and future research could test the robustness of the proposed relations by addressing each of them in detail through a structured and detailed literature review. Finally we do not claim that our findings can be generalized across all thinkable SC network structures, relational situations and conceptualizations of lean and agile SC strategies.

For practitioners our research has several implications. Practitioners should be careful when selecting accounting practices or techniques to control or provide input to their decision making in the SC. Does the technique selected provide adequate information to be useful for the SC strategy and the problem at hand? What are the relational prerequisites for proper use of the selected technique? What are the relational consequences? Which techniques should be selected for which purpose? What is the interaction between the uses of different techniques? What are their requirements for use? What are the strengths and weaknesses of these techniques in certain SC decisions making or control context? Firms should think their SC accounting practices into a connected hole. Only by doing that, firms and SCs can see which parts of their managerial problems are adequately supported. Firms, we argue should think of accounting techniques as more than merely a technique for solving a control or decision making problem, but also as something that

must be aligned with the firms overall strategy and direction. Does our accounting practice adequately support the SC strategy and the SC relationship structure we want to achieve?

References

- Aitken, J., Childerhouse, P., and Towill, D. 2003. "The impact of product life cycle on supply chain strategy." *International Journal of Production Economics* 85(2): 127–140.
- Anthony, R. and Reece, J. 1989. *Accounting: Text and Cases*, 8th Edn (Homewood,IL: Irwin).
- Axelsson, B., Laage-Hellman, J.L and Nilsson, U. 2002. "Modern management accounting for modern purchasing." *European Journal of Purchasing & Supply Management* 8: 53-62.
- Bastl, M., Grubic, T., Templar, S., Harrison, A., and Ip-Shing, F. 2010. "Inter-organisational costing approaches: the inhibiting factors." *International Journal of Logistics Management* 21(1): 65-88.
- Beamon, B. M. 1999. "Measuring supply chain performance." *International Journal of Operations & Production Management* 19(3/4): 275-292.
- Bititci, U.S., Mendibil, K., Martinez, V. and Albores, P. 2005. "Measuring and managing performance in extended enterprises." *International Journal of Operations and Production Management* 25(4): 333-353.
- Borgstrom, B. and Hertz, S. 2011. "Supply chain strategies: changes in customer order-based production." *Journal of Business Logistics* 32(4): 361-373.
- Brewer, P.C. and Speh, T.W. 2000. "Using the Balanced Scorecard to measure supply chain performance." *Journal of Business Logistics* 21(1): 75-93.
- Buckley, W. 1967. *Sociology and Modern System Theory*. Upper Saddle River, NJ: Prentics Hall.
- Chan, F.T.S. and Qi, H.J. 2003. "Feasibility of performance measurement systems for supply chain: a process-based approach and measures." *Integrated Manufacturing Systems* 14(3): 179-190.
- Chopra, S. and Meindl, P. 2013. "Supply Chain Management, Strategy, Planning, and Operation", Fifth Edition.
- Christopher, M., and Ryals, L. 1999. "Supply Chain Strategy: Its Impact on Shareholder Value." *International Journal of Logistics Management* 10(1): 1-10.
- Christopher, M. 2000. "The Agile Supply Chain. Competing in Volatile Markets." *Industrial Marketing Management* 29(1): 37-44.
- Christopher, M. and Towill, D.R. 2000. "Supply chain migration from lean and functional to agile and customised." *Supply Chain Management: An International Journal* 5(4): 206-213.
- Christopher, M., Peck, H., and Towill, D. 2006. "A taxonomy for selecting global supply chain strategies." *International Journal of Logistics Management* 17(2): 277-287.
- Cooper, R. and Kaplan, R.S. 1988. "Measure costs right: Make the right decisions." *Harvard Business Review*: 96-103.
- Cooper, R. and Kaplan, R.S 1991. "Profit priorities from activity-based costing." *Harvard Business Review*: 130-135.
- Cooper, M. C., Lambert, D. M., and Pagh, J. D. 1997. "Supply Chain Management: More Than a New Name for Logistics." *International Journal of Logistics Management* 8(1): 1-14.
- Cooper, R. and Slagmulder, R. 1999. "Supply Chain Development for the Lean enterprise" New Jersey: The IMA Foundation for Applied Research, Inc.
- Cooper, R. and Slagmulder, R. 2004. "Interorganizational cost management and relation context." *Accounting, Organizations and Society* 29: 1-26.
- Degraeve, Z. and Roodhooft, F. 1999, "Effectively Selecting Suppliers Using Total Cost of Ownership." *Journal of Supply Chain Management: A Global Review of Purchasing & Supply* 35(1): 5-10.
- Dekker, H.C. 2003. "Value chain analysis in interfirm relationships: a field study." *Management Accounting Research* 14: 1-23.

- Dekker, H.C. 2004. "Control of inter-organizational relationships: evidence on appropriation concerns and coordination requirements." *Accounting, Organizations and Society* 29: 37-49.
- Dekker, H.C., and Van Goor, A. R. 2000. "Supply Chain Management and Management Accounting: A Case Study of Activity-Based Costing." *International Journal of Logistics: Research and Applications* 3(1).
- Ellram, L. 1994. "A taxonomy of total cost of ownership models." *Journal of Business Logistics* 15(1): 171-191.
- Ellram, L.M. 1995. "Total Cost of Ownership: An Analysis Approach for Purchasing." *International Journal of Physical Distribution and Logistics* 25(8): 4-23.
- Ellram, L.M. 2000. "Purchasing and Supply Management's Participation in the Target Costing Process." *Journal of Supply Chain Management: A Global Review of Purchasing & Supply* 36(2): 39-51.
- Ellram, L.M. and Siferd, S.P. 1993. "Purchasing: the Cornerstone of the Total Cost of Ownership Concept." *Journal of Business Logistics* 14(1): 163-184.
- Ellram, L.M. and Siferd, S.P. 1998. "Total Cost of Ownership: a Key Concept in Strategic Cost Management Decisions." *Journal of Business Logistics* 19(1): 55-84.
- Everaert, P., Bruggeman, W., Sarens, G., Anderson, S.R. and Levant, Y. 2008. "Cost modeling in logistics using time-driven ABC: Experiences from a wholesaler." *International Journal of Physical Distribution & Logistics Management* 38(3): 172-191.
- Ferrin, B.G. and Plank, R.E. 2002. "Total Cost of Ownership Models: An Exploratory Study." *Journal of Supply Chain Management: A Global Review of Purchasing & Supply* 38(3): 18-29.
- Fisher, M. 1997. "What Is the Right Supply Chain for Your Product." *Harvard Business Review* 75(2): 105-116.
- Flameholtz, E. and Das, T.K. 1985. "Towards an integrative framework of organizational control." *Accounting Organizations and Society* 10(1): 35-50.
- Frohlich, Markham T., and Roy Westbrook. 2001. "Arcs of integration: an international study of supply chain strategies." *Journal of Operations Management* 19(2): 185-200.
- Gerwin, D. 2005. "An agenda for research on the flexibility of manufacturing processes." *International Journal of Operations & Production Management* 25(12): 1171-1182.
- Giannakis, M. 2007. "Performance measurement of supplier relationships." *Supply Chain Management* 12(6): 400-411.
- Goldsby, T.J. and Closs, D.J. 2000. "Using activity-based costing to reengineer the reverse logistics channel." *International Journal of Physical Distribution & Logistics Management* 30(6).
- Goldsby, T. J., Griffis, S. E., and Roath, A. S. 2006. "Modeling lean, agile, and leagile supply chain strategies." *Journal of Business Logistics* 27(1): 57-80.
- Govindarajan, V. 1988. "A contingency approach to strategy implementation at the business-unit level: integrating administrative mechanisms with strategy." *Academy of Management Journal* 31(4): 826-853.
- Holmberg, S. 2000. "A systems perspective on supply chain measurements." *International Journal of Physical Distribution and Logistics Management* 30(10): 847-868.
- Hurkens, K., Valk, W. and Wynstra, F. 2006. "Total Cost of Ownership in the Services Sector: A Case Study." *Journal of Supply Chain Management: A Global Review of Purchasing & Supply* 42(1): 27-37.
- Kristal, M.M., Huang, X., and Roth, A.V. 2010. "The effect of an ambidextrous supply chain strategy on combinative competitive capabilities and business performance." *Journal of Operations Management* 28: 415-429.
- Kulmala, H.I., Paranko, J. and Uusi-Rauva, E. 2002. "The role of cost management in network relationships." *International Journal of Production Economics* 79(1): 33-43.
- LaLonde, B.J. and Pohlen, T.L. 1996. "Issues in Supply Chain Costing." *International Journal of Logistics Management* 7(1): 1-12.

- Lambert, D.M. and Pohlen, T.L. 2001. "Supply Chain Metrics." *The International Journal of Logistics Management* 12(1): 1-19.
- Lamming, R. 1996. "Squaring lean supply with supply chain management." *International Journal of Operations & Production Management* 16(2): 183-196.
- Lamming, R.C., Cousins, P.D. and Notman, D.M. 1996. "Beyond vendor assessment – Relationship assessment programmes." *European Journal of Purchasing and Supply Management* 2(4): 173-181.
- Lee, H.L. 2002. "Aligning supply chain strategies with product uncertainties." *California Management Review* 44(3): 105-119.
- Lee, H.L. 2004. "The triple-A supply chain." *Harvard Business Review*, 82(10): 102–112.
- Lin, C., Chiu, H. and Chu, P. 2006. "Agility index in the supply chain." *International Journal of Production Economics* 100(2): 285-299.
- MacDuffie, J.P. and Helper, S. 1997. "Creating lean suppliers: diffusing lean production through the supply chain." *California Management Review* 39: 118–151.
- Malmi, T and Brown, D. A. 2008. "Management control systems as a package—Opportunities, challenges and research directions." *Management Accounting Research* 19(4): 287–300.
- Maskell and Baggaley 2004). *Practical Lean Accounting – A proven System for Measuring and Managing the Lean Enterprise*. Productivity Press.
- Mckone-Sweet, K., and Lee, Y. 2009. "Development and Analysis of a Supply Chain Strategy Taxonomy." *Journal of Supply Chain Management* 45(3): 3-24.
- Mentzer, J. T., DeWitt, W., Keebler, J. S., Soonhoong, M., Nix, N. W., Smith, C. D., and Zacharia, Z. G. 2001. "Defining Supply Chain Management." *Journal of Business Logistics* 22(2): 1-25.
- Meredith, J. 1993. "Theory Building through Conceptual Methods." *International Journal of Operations & Production Management* 13(5): 3-11.
- Modarress, B., Ansari, A., and Lockwood, D. L. 2005. "Kaizen costing for lean manufacturing: a case study." *International Journal of Production Research* 43(9): 1751-1760.
- Monden, Y., and Hamada, K. 1991. "Target costing and kaizen costing in Japanese automobile companies." *Journal of Management Accounting Research* 3: 16-34.
- Nailor, J. B, Naim, M.M.; and Berry, D. 1997. "Leagility: Integrating the Lean and Agile Manufacturing Paradigms in the Total Supply Chain." MASTS working paper No. 47. Republished in *international Journal of Production Economics* {1999} 62: 107-118.
- Narasimhan, R., Kim, S.W. and Tan, K.C. 2008. "An empirical investigation of supply chain strategy typologies and relationships to performance." *International Journal of Production Research* 46(18): 5231-5259.
- O'Toole, T. and Donaldson, B. 2002. "Relationship performance dimensions of buyer-supplier exchanges." *European Journal of Purchasing & Supply Management* 8: 197-207.
- Pettersson, A. I., and Segerstedt, A. 2013. "Measuring supply chain cost." *International Journal of Production Economics* 143(2): 357-363
- Pfeffer, J. and Salancik, G.R. 1978. *The External Control of Organizations*. Harper and Row, New York.
- Pohlen, T.L., and Coleman, B.J. 2005. "Evaluation Internal Operations and Supply Chain Performance Using EVA and ABC." *SAM Advanced Management Journal* Spring: 45-58.
- Pohlen, T.L. and LaLonde, B.J. 1994. "Implementing Activity-Based Costing (Abc) in Logistics." *Journal of Business Logistics* 15(2): 1-23.
- Porter, M. E. 1985. *Competitive Advantage: Creating and Sustaining Superior Performance*. Free Press, New York.
- Prahinski, C. and Fan, Y. 2007. "Supplier Evaluations: The Role of Communication Quality." *Journal of Supply Chain Management: A Global Review of Purchasing & Supply* 43(3): 16-28.

- Qi, Y., Zhao, X. and Sheu, C. 2011. "The impact of competitive strategy and supply chain strategy on business performance: the role of environmental uncertainty". *Decision Sciences* 42(2): 371-389.
- Qrunfleh, S., and Tarafdar, M. 2013. "Lean and agile supply chain strategies and supply chain responsiveness: the role of strategic supplier partnership and postponement." *Supply Chain Management* 18(6): 571-582.
- Ramos, M.M. 2004. "Interaction between management accounting and supply chain management." *Supply Chain Management: An International Journal* 9(2): 183-196.
- Reichhart, A., and Holweg, M. 2007. "Lean distribution: concepts, contributions, conflicts." *International Journal of Production Research*, 45(16): 3699-3722.
- Seuring, S.A. 2006. "Supply chain controlling: summarizing recent developments in German literature." *Supply Chain Management: An International Journal* 11(1): 10-14.
- Shank, J.K., and Govindarajan, V. 1992. "Strategic cost management: the value chain perspective." *Management Accounting Research* 4: 177-197.
- Simons, R. 1987. "Accounting control systems and business strategy: an empirical analysis." *Accounting, Organizations and Society* 12(4): 357-374.
- Simons, R. 1990. "The role of management control systems in creating competitive advantage: new perspectives." *Accounting, Organizations and Society* 15(1/2): 127-143.
- Thompson, J. D. 1967. *Organization in Action*, New York: McGraw-Hill.
- Tomkins, C. 2001. "Interdependencies, trust and information in relationships, alliances and networks." *Accounting, Organizations and Society* 26: 161-191.
- Towill, D. and Christopher, M. 2002. "The Supply Chain Strategy Conundrum: To be Lean Or Agile or To be Lean And Agile?" *International Journal of Logistics: Research & Applications* 5(3): 299-309.
- van Damme, D.A. and van der Zon, F. 1999. "Activity Based Costing and Decision Support." *International Journal of Logistics Management* 10(1): 71-82.
- Van Hoek, R.I. 1998. "Measuring the unmeasurable" – measuring and improving performance in the supply chain." *Supply Chain Management* 3(4): 187-192.
- Wouters, M. 2006. "Implementation Cost and redistribution mechanisms in the economic evaluation of supply chain management initiatives." *Supply Chain Management – An International Journal* 11(6): 506-521.
- Zeithaml, V. A., Varadarajan, P., and Zeithaml, C. P. 1988. "The Contingency Approach: Its Foundations and Relevance to Theory Building and Research in Marketing." *European Journal of Marketing* 22(7): 37-64.
- Zeng, M and Chen, X 2003. "Achieving cooperation in multiparty alliances: A Social dilemma approach to partnership management." *Academy of Management Review* 28: 587-605.
- Zimmerman 2009. *Accounting for decision making and control*, Boston, [Mass.] London : McGraw-Hill/Irwin, c2009. 6th ed.