

Solutions **Chapter 3: Challenges in Supply Chain Management and Supply Chain Management Accounting**

Review question 3.1:

Management accounting has to fulfill tasks both at the individual company level and at the supply chain level. While the set of MAC tasks and functions does not fundamentally differ between these two management layers, the framework management accounting operates in, all the more does. Problems resulting from cooperations are:

1. Transaction costs are a key motive behind firm collaboration. At the same time, transaction costs need to be measured, controlled, and managed both at the individual firm layer as well as at the supply chain layer. All these management and control activities cause new transaction costs themselves.
2. Transaction costs depend on the specific circumstances and the governance model of a transaction or collaboration.
3. Partner firms in a supply chain pursue different goals. Being individual players in the market, they strive for individual profit maximization. Thus, goal conflicts are likely and opportunism cannot be fully avoided.
4. Individuals possess bounded rationality only. They are limited in their ability to collect, interpret, and adequately process information. They are prone to errors and biases and will usually not be able to identify the “best possible” alternative. Instead, individuals typically look for “good enough solutions”. This is true for all members of an organization, including managers and management accountants.
5. Cross-company cooperation is marked by information asymmetry. Individual supply chain members possess incomplete information only about their partners’ goals and activities. This lack of transparency gives rise to potential agency problems.
6. Many of these challenges are further aggravated when firms engage in multiple supply chains and are therefore part of more than one cross-company collaborative network.

For management accounting this causes several challenges:

- Governance and coordination systems differ considerably between an individual firm and a network of multiple firms. The rules and procedures that define accountability, responsibility, and authority between partners form a general framework, which MAC must adapt to.
- Resource and task allocation, as well as surplus appropriation among partners, cannot be planned and controlled using the same tools that are applied at the single firm layer.
- Asymmetrical or even missing information seriously affects management accounting’s role as a central information hub for decision makers. Uncertainty and potential opportunism play a bigger role than in a single firm; trust might replace other coordination mechanisms that management accounting typically applies within the firm.
- Performance measurement is still a key MAC task, but it is much less clear what needs to be measured and how such a measurement can be implemented in an effective and efficient manner across supply chain partners.

Review question 3.2:

The governance system represents the framework of rules and practices that ensures accountability, fairness, and transparency in a company's relationship with all its stakeholders. Supply chain governance structures and coordination mechanisms differ significantly from those that can be found within a single firm.

Cross-company cooperative relationships can be viewed as intermediary solutions on a governance spectrum that reaches from pure market transactions to complete hierarchy (Gereffi et al 2005). Gereffi et al. (2005) distinguish five different governance structures for global value chains:

1. Markets: spot transactions with low or even no switching costs for the parties

2. Modular value chains: suppliers make products or components following the customer's specifications
3. Relational value chains: interactions are more complex than in modular value chains, mutual dependencies increase
4. Captive value chains: small suppliers are completely dependent on their customer, the switching cost for suppliers is very high
5. Hierarchy: vertical integration (by acquisition or merger) leads to a high degree of managerial control as a primary governance instrument

These five archetypical governance models are characterized by four factors: (1) the complexity of the inter-firm transactions (i.e. the amount and complexity of information required to sustain the transactions), (2) the degree to which these transactions can be codified (e.g. through standardization or automated IT systems), (3) the extent to which suppliers have the necessary capabilities to meet the buyers' requirements (without interference or direction from the buyer), and (4) the degree of explicit coordination and power asymmetry between partner firms (see also table 1.2 in chapter 3).

The effectiveness and efficiency of supply chain management accounting systems depends to a large extent on supply chain governance elements that are beyond its direct influence. But different supply chain governance models lead to different task sets for management accounting:

- In some cases, a single bilateral relationship between one buyer and one supplier might form the core of the entire supply chain. Choosing the right supplier and taking an appropriate make-or-buy decision is key. Sharing relevant cost information between the two parties and agreeing on adequate control systems are central accounting tasks in such an organizational set-up.
- Other supply chains are characterized by serial relationships, leading to a chain of individual supply chain partners, each one performing a dedicated step in the value creation process. In addition to the bilateral activities outlined in case one, the allocation of tasks and responsibilities among partners along the supply chain becomes imperative. Deciding on the most effective degree of vertical integration for each partner can become a complex, challenging accounting task that requires a high degree of information sharing and plan alignment.
- Different from serial relationships, some supply chains are marked by one focal company dealing with a multitude of supply chain counterparts in one direction – either several suppliers or several distributors. Here again, allocation problems arise, but this time the focal company has to properly allocate tasks among several partners that are at the same stage of the value chain, i.e. these partners are potential substitutes for each other. Proper segmentation becomes important as does the determination of an optimal degree of centralization or decentralization, respectively.
- Focal companies might also be confronted with a multitude of partners both upstream and downstream in their supply chain. Management accounting will have to provide adequate information to allow prioritization and alignment of heterogeneous preferences among the multitude of supply chain actors. The availability of reliable and comparable inter-organizational cost information becomes crucial in such a setting.
- A company might find itself in a complex web of cross-organizational relationships that belong to different supply chains. In such a network-type setting, indirect effects (positive and negative “externalities”, synergies and dissynergies) are decisive for success, and management accounting would typically be expected to identify and quantify such effects as far as possible.

Review question 3.3:

Economists and management scholars have coined the term “relational rent” for surpluses that are created through cooperation. Relational rent has been defined by Dyer and Singh as “a supernormal profit jointly generated in an exchange relationship that cannot be generated by either firm in isolation and can only be created through the joint idiosyncratic contributions of the specific partners” (Dyer/Singh 1998, p. 662).

Relational rent (or synergies from collaboration) can be generated, for instance, through exchange of knowledge (creating new insights that would not have been possible before), combining complementary

resources, lowering transaction costs, or joint investments in special assets

Review question 3.4:

Input-oriented profit sharing, i.e. allocating surpluses in proportion to the number of resources invested proves to be unrealistic:

First, supply chain partners will expect compensation not only for resources invested but also for risks and responsibilities assumed – which are not necessarily in line with resource commitments.

Second, an exact measurement of partners' resource commitments for a specific collaborative activity or task is very difficult and error-prone. In business practice, for instance, firms also contribute intangible resources (such as know-how) that are very difficult to measure in monetary terms. In addition, companies also deploy resources to protect themselves against competitive imitation or replication of value-creating activities by third parties. If supply chain partners engage in such activities, they inevitably consume resources that cause cost. It can be very difficult to decide whether cost incurred for such "defensive" activities contributes to the supply chain's overall success and therefore should be taken into account at all.

Third, supply chain partners usually have no interest in ensuring a "fair" distribution of surpluses. On the contrary, each supply chain partner will typically try to maximize its own share in the relational rent generated, no matter how close the cooperation might be. Agency problems and opportunistic behavior are common in supply chain relationships. Consequently, an allocation of the surplus based on the amount of invested resources will most probably be biased by hidden action or hidden information in a supply chain relationship.

Resource commitment, therefore, is not a suitable allocation basis for surplus appropriation, because it provides wrong incentives for supply chain partners and is prone to agency problems. Instead, surpluses should rather be distributed in proportion to value created. It is important to note that "value" in this context is not measured by value of inputs, but denotes the value perceived by final customers (i.e. benefits). If and as long as final customers perceive an increase in value, they will be prepared to pay a higher compensation (price) for the more valuable (beneficial) market offer. If a supply chain partner's activity increases value, it deserves being compensated through a higher share in surpluses generated. A calculation example can be found in chapter 3.

Review question 3.5:

Supply chain partners will try to maximize their own benefits from the cooperation – without risking a break-up of the cooperation as such. Firms will keep an eye on their supply chain partners' ability to reap a share in relational rent. If value captured disproportionately exceeds the contribution to value creation for a particular firm, other firms in the supply chain will experience "value chain envy" (Mol et al. 2005). They will try to increase their own share, for instance through vertical integration (expanding own tasks and activities at the expense of the supply chain partner).

Review question 3.6:

Firms develop a variety of different governance structures to preserve their interests against opportunistic behavior from other parties. As it turns out, one of the most effective and efficient mechanisms of information exchange in supply chains is trust. Trust can be defined as the confidence of one party in a two-way relationship that the other party will not exploit its vulnerabilities. The expectation of honesty and mutual benevolence can help reduce transaction costs and the costs of sharing information. It can be an effective substitute for much costlier alternative governance structures such as complex formal contracts or institutionalized control mechanisms. Information exchange and collaboration performance can be significantly improved if supply chain partners have reached a sufficient level of trust. Supply chain management accountants, therefore, must support trust-building between partners and implement appropriate mechanisms of "trust monitoring".

Review question 3.7:

Describe the importance of information flows in a supply chain and explain the “bullwhip effect”.

Information has a pivotal role for performance and business success. This holds true for cooperative settings as well. Information management is also a central trait of cooperative behavior and has a strong influence on cooperative performance:

- Secure sharing of information between supply chain partners prevents leaking of proprietary information to competitors outside the collaboration.
- Information exchanged between supply chain partners must be accurate and free of errors to enable joint planning and decision making.
- Higher information readiness and timeliness allow faster response times across different supply chain levels.
- In general, a higher willingness to share information (increasing information availability across all supply chain levels) has proven to be a driver of supply chain performance.

Information management already proves to be a challenging task within a single organization. In a supply chain setting, however, it is even more difficult, because:

1. Numerous technical and structural information barriers exist between supply chain partners. IT systems are not compatible, sources of information are unclear or not revealed between partners, and reporting routines do not match across companies.
2. Information is asymmetrically distributed between partners. Although cooperating with each other, supply chain partners are reluctant to share proprietary information. Information, therefore, does not readily flow between partners. Asymmetries build up and information is hidden from other partners.
3. No uniform rules for analyzing and interpreting information are available. supply chain partners apply different definitions for similar phenomena, which leads to misunderstandings and erroneous decisions across supply chain levels.

Human decision makers are characterized by bounded rationality. Nevertheless, they tend to look for information for their decision making. Missing, ambiguous or unclear information will lead to uncertainty: decision makers are not sure about the causes of observed situations or events, about possible consequences of decision alternatives, or about the conditions influencing the decision. Uncertainty has been found to be one of the most important moderating effects in supply chain performance and comprises market, technological, and environmental uncertainty.

One of the most well-known examples of the negative effects of uncertainty in supply chains is the so-called bullwhip effect. It describes the effect by which slow-moving consumer demand at the downstream end of the supply chain creates large swings in production for the suppliers at the other (upstream) end of the supply chain. Small changes in end-customer demand lead to much larger changes in demand (and production) at upstream layers in the supply chain. As a consequence, inventory levels are increased, forecasts are unjustifiably changed, and production schedules vary largely.

Review question 3.8:

Performance in a business context is usually seen as synonymous with “financial success”: businesses want to generate financial surpluses. Supply chain management, in turn, is a discipline and a corporate function that is concerned both with operational aspects (such as inventory levels, quality of service, replenishment times, etc.) and with financial aspects (such as capital tied up in inventories, or transaction cost). Much of what supply chain management is concerned about is not directly measurable in monetary units but is expected to have indirect (positive) effects on a company’s financial performance. Therefore, performance measurement in a supply chain context is often focusing on operational performance. However, how a specific improvement in operational performance (e.g. a 10% reduction in replenishment times) translates into financial performance is difficult to say.

Review question 3.9:

In a supply chain context, we can take two perspectives when measuring performance. We can assess supply chain performance by focusing on individual firm performance (micro perspective). In contrast to this, we can try to measure performance at the supply chain level (macro perspective). This distinction is not only a matter of finding appropriate indicators but touches the very heart of supply chain management: How is the performance of the entire supply chain linked to performance levels reached by its individual members? Can individual firm performance levels be taken as valid proxies for the entire supply chain performance or is the firm – supply chain performance link more complicated? Can, for instance, increased performance of one member maybe even lead to a decrease in supply chain performance? And could the supply chain's performance improve, although individual firm performance levels do not?

Supply chain performance measurement must acknowledge that there might be significant "performance spillover effects" between supply chain partners. These spillover effects can be positive (i.e. amplifying each other) or negative (i.e. attenuating each other). Spillover effects can work both from the individual firm to the entire supply chain as well as from the supply chain level to the individual firm level - opening the way, for instance, for "performance free-riding", i.e. profiting as an individual firm from improved supply chain performance without contributing to it.

Research shows that supply chain performance is often tackled at the individual firm level only (Kache/Seuring 2014). This is justified, if and as long as one considers spillover effects to be small and mostly positive. Since the joint performance of multiple entities in a supply chain is difficult to measure, focusing on individual firm performance and inferring supply chain performance from there is the easier approach. However, as mentioned above, the performance of the network of multiple partners as such is hardly the sum of every single entity's performance.

Exercise 3.1:

Supply chain governance mechanisms typically comprise, but are not limited to the following elements:

- Contractual arrangements
- Information technology / IT systems
- Information sharing agreements and processes
- Joint decision-making processes
- Trust
- Cooperative norms

In the given situation, the following coordination mechanisms see appropriate: contractual arrangements as main instrument (frame contracts), possibly complemented by industry benchmarks and standards (where available). In addition, trust as coordination mechanism with the existing supplier will simplify the relationship and make it more efficient (not yet possible with the new supplier).

The following factors can serve for allocating purchase quantities: purchase prices + related cost (e.g. transport, insurance, etc.), risk profile of both suppliers, reliability of supply, but also reliability of demand for suppliers (own company perceived as stable and reliable customer, no erratic call-offs, cancelled orders, etc.)

Information should be exchanged to the extent that this is necessary to support an effective and efficient relationship. The following information should be exchanged between the trading partners:

- order- and shipping-related information
- forecasts (demand from own company, available quantities from suppliers), to avoid the bullwhip effect
- customer feedback and quality issues
- cost information (leading to OBA) only once relationship has solidified (earlier with existing supplier)

The manufacturer should measure and monitor all typical performance dimensions such as product quality, quality of service, delivery reliability, prices, etc.