Difficulties and obstacles in achieving an efficient and well functioning Supply Chain Management

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Abstract

The concept of Supply Chain Management (SCM) has been developed the last 10-15 years as a response to globalisation (increased market pressures), and the emerging ideas of just in time (JIT) manufacturing. As a result, the focus has changed from an internal to an external view, and the important objective has become to integrate and manage the supply chain (SC) as an integrated enterprise. However, many of the companies that have focused on SCM have experienced different extent of return and success. In this paper we will discuss different theoretical approaches, such as organisational collaboration (Transaction Cost Theory and Agency Theory) and business environment (Network Theory), in order to explain and understand these difficulties. The paper also discusses the experiences and applications of SCM in different Norwegian manufacturing industries. Our experiences from working with different business sectors show that there are similarities in how the actors in dynamical SCs react on the same common problems.

Introduction

For the last 10-15 years many companies have adapted the SCM concept, and launched different programmes/projects in order to integrate both their customers and suppliers. Very few of these projects have been true to the SCM concept (in the meaning of attempting to integrate and co-ordinate the whole SC), and the focus has mostly been on integration of a few selected customers and suppliers. Secondly, difficulties and obstacles have occurred in the integration phase; it has not been as easy as it seems to integrate and co-ordinate throughout the SC. According to Simchi-Levi et

al. (2000) this is due to the fact that a SC is a dynamic system that evolves over time, and that different actors in the SC have different and conflicting objectives.

Supply Chain Management

Throughout the 1980's and 1990's the concepts of customer and supplier integrative relationships gained renewed attention. Business in general began to develop extremely close relationships with selected clients, sometimes termed strategic customers, and significantly more emphasis was placed on improving working arrangements with suppliers (Bowersox *et al*., 1999). This trend with increased collaboration throughout the SC, could be explained as a result of three factors (Browne et al., 1995):

- Manufacturing takes place in a global context where local markets are subject to global standards
- Manufacturing systems are required to develop and operate environmentally benign products and processes
- The business and organisational structures, within which manufacturing operates, are under increasing stress

The driver behind such collaboration was the desire to extend the control and co-ordination of operations across the entire supply process, replacing both the market and vertical integration as the means of managing the flow process (Schary and Skjøtt-Larsen, 2001).

SCM can be defined as (Christopher, 1998): "*The management of upstream and downstream relationships with suppliers and customers to deliver superior customer value at less cost to the SC as whole"*. Each company in a SC is dependent on each other, and yet, paradoxically by tradition does not co-operate very closely with each other. SC competitiveness can be achieved through chain integration and process re-design that decrease waste through unnecessary activity, reduction of stocks as well as faster response times (see figure 1).

According to Schary and Skjøtt-Larsen (2001) the three major components of a SC are: Activities, organisations and processes. The activities can be seen as the foundations of the SC. The entire process of product flow involves a series of actions and activities that

add value and change the characteristics of the product flow. Organisational units, both internal and external, perform activities.

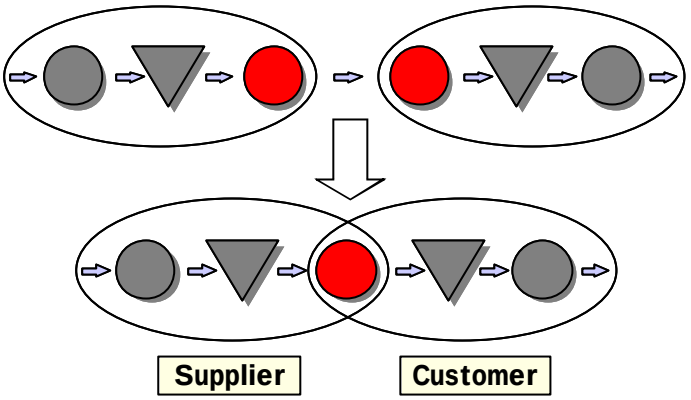

Figure 1.: Supply chain integration

These organisations thus become a reservoir of resources for the SC and take responsibility for the performance of these actions. The actual operations include individual processes that manage and link activities and also become part of larger sets of co-ordinated activities (Schary and Skjøtt-Larsen, 2001).

Houlihan (1986) has summarised the characteristics of SCs as:

- The SC is a complete process for providing goods and service to final users
- Membership includes all parties, including logistics operations from initial material supplier to final user
- The scope of SC operations include procurement, production and distribution
- Management extends across organisational boundaries to include planning and control over operations of other organisational units
- A common information system accessible to all members makes co-ordination possible between organisations
- Member organisations achieve their own individual objectives through the performance of the SC as a whole

Both the definition and the characteristics of the SC place great emphasis on the integration of the different components in the SC. Integration stresses the co-ordination of a network of separate operations to achieve common objectives in a material and product flow. Information sharing and operational planning are the keys for the

successful integration of the SC. The goal is to get everyone in the SC onto a common platform of logistics transactions and information systems for greater interorganizational "seamlessness" or transparency. This integration can result in significant faster system response times to volatile changes in marketplace events and patterns of demand (Boyson *et al*., 1999).

Case description

During the last few years SINTEF and NTNU have carried out a range of logistic projects with Norwegian companies in different business areas. The aim for the projects has been to integrate SCs. To understand and substantiate the observations we have made, we have chosen to present two of the cases we have been working with.

Case company A

Company A is a manufacturer of frozen label food products located in Norway, and supplies the whole of Scandinavian. The production is 200.000 items per production-day, and this makes company A the biggest manufacturer of this type of frozen products in Scandinavia. Company A source both locally and nationally, with typically small suppliers that sees company A as their main customers, and globally, on the spot market. On the customer side, the Norwegian market is dominated by four companies that control more than 98% of the food retailer market (Borch and Stræte, 1999). These retailers have traditionally based their sale on low costs and restricted assortment.

Two years ago company A conducted an analysis of its SC, which concluded that:

- Company A, and its SC, is well functioning and efficient and can been seen upon as state-of-the art in Norway.
- There is a need for integration of processes, both internal and external, and
- The planning process can be improved (there is a need for a new planning tool).

As a result of this analysis, the company and its suppliers launched a SC project, which aims to transform the SCs into an extended enterprise characterised by:

- Transparency – the suppliers can see the demand for their products all the way though the SC

- Real time information sharing – Company A and suppliers share production plans, transport plans, inventory levels, forecasts, and performance indicators in real time
- Vendor Managed Inventory – the suppliers take over the responsibility for their customers' raw material inventory

The project was forced to focus backwards in the SC, because of the market situation in the food retailer market. The competition between the four retailers is very fierce, and they are extremely cautious not to share information in fear that the other retailers should get access to this information (Company A supplies frozen food to all four). In this situation Company A chose four of its most crucial suppliers for the SC project, and the integration process is now in progress. For all the four suppliers Company A is their biggest customer, and they are to a large extent willing to meet the requirements claimed by Company A.

Case B

In case B we have studied a complex SC in the commodities business sector. In the case there are two producers producing different products, one wholesale dealer and two competing retailers. The project has focused on the grey part of the value chain as illustrated in figure 2.

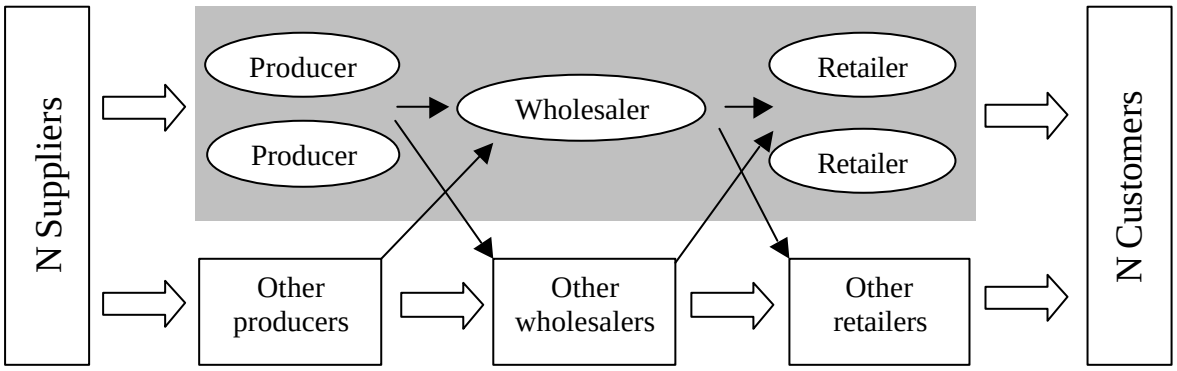

Figure 2.: Case B

The wholesaler is the largest wholesaler in this business sector in Norway, with a market share over 50% of products sold to the retailers. The wholesaler buys products from

many producers with both different and similar products. Both of the producers in case B owns a big marked share within respective marked of products sold in Norway.

Both retailers are doing business with other similar wholesalers. They are also trading directly with suppliers overseas. The reason for this is that they often get better offers and conditions when discussing terms directly with the suppliers. The retailers are not pleased with the wholesaler, and the largest firm is considering starting its own wholesaler enterprise. This "power struggle" is maybe affecting the "optimal solution" for the SC.

An interesting observation made regarding the wholesaler organisation concerns who is in charge of the daily managing of logistics. The sellers are responsible for the ordering of the goods and co-ordinating the transport of the goods. They are also responsible for the follow-up of orders and transportation.

The wholesaler has chosen the two suppliers (producers) and the two customers (retailers) for the SC project. The main focus for the project is:

- Improve the systems and reduce costs for ordering delivering in the value chain
- Improve logistics performance
- Reduce the need for stocks in parts of the value chain
- Develop systems for better ordering and deliveries

The main challenges observed in the project so far are:

- The price policy and discount system practised to day make it difficult to develop a efficient system for ordering
- Which actor in the SC should manage the transport?

These are examples of two important topics, which have to be agreed upon by the parts in the SC before good logistic solutions can be implemented.

Findings from case studies

Whilst working with case A and B and other projects we have observed a few typical hindrances for effective SCs, and reasons why such hindrances occur.

Typical hindrances for effective SCs are:

- Different interests among the actors in the SC
- Overlapping roles and tasks in the SC
- To many small transactions in the SC

Typical reasons why such hindrances occur are:

- The actors wish to control the parts regarding their environments
- Different price policy and discount systems according to the transaction
- Autonomous actors with separate economical targets and targets for performance
- Lack of incentives for rational behaviour in the SC

Empirical discussion of Supply Chain Management

When reading theoretical books about SCM, we tend to get the feeling that "the SCM is one actor" that is planning, acting and behaving as one actor; the companies in the value chain are supposed to do "what is best economical for the total value chain". Our experiences from working with SCs in different business sectors in Norway are that there seems to be a lack of incentives for such rational behaviour in the SC. The companies in the SCs are autonomous actors, who want to control over their own company. This often leads to the fact that the actors in a SC have overlapping roles and tasks in the SC. For instance do they have unnecessary many stocks in the SC. Both the producers, wholesale dealers and the retailers (in case B) are doing marketing, and they are all making quotations for the same end-customers. The result is an ineffective way of doing business in the SCs.

One reason for the actors wanting to achieve control may be the lack of trust among the actors in the SC. The different companies in the SC don’t naturally see their role and place in the SC. Therefore they are behaving as autonomous actors, which results in sub-optimisation of the behaviour and economical results in the SC.

Another reason may be that there are different interests among the actors in the SC. A producer wishes that a retailer sells as many products as possible of his/her product. A retailer will often sell a similar product if profit is better. The wholesaler is in competition with other wholesalers, and will therefore offer a broader assortment of similar products.

A hindrance for effective flow of goods and information in the SC that we have observed, is the practise of different policy and discount systems according to the transaction. Almost every time a retailer wants to order from the wholesaler, they are discussing prise. And it is not unusual that the retailer is calling another person working in the same wholesaler organisation retrying to get a better offer, if she/he is not satisfied with the first offer. The reason why such behaviour is practised, is that the sellers working in the wholesaler organisations are allowed to discuss price and make discount agreements. Instead of having a fixed price policy with a few sellers, there are working a lot of sellers in the wholesaler organisation. Fixed pricing of the goods is an absolute condition for introducing an electronic order solution in the SC.

Theoretical discussion of Supply Chain Management

In discussing experiences and applications of SCM we have chosen to apply transaction cost theory, network theory and agency theory. In our opinion these theories offer various explanations and approximations of similar and central elements in SCM. We will use these theories to explain why it can be difficult to make successful integration and co-ordination of SCs.

Transaction Cost Theory

Transaction cost theory (TCT) offers an explanation of the nature of transactions and the possible savings companies can achieve through smart and effective co-ordination of transactions between the actors in the SC. TCT has its origin with Coase's classical paper "The nature of the firm" published in 1937, and is basically a way of explaining the costs of doing activities internally versus the cost related to buying the same goods or services in the market. Similar to network theory, transaction costs oppose the neo-classical view, regarding the firm as independent from its surroundings. Coase (op. cit.) states that there would be no collaboration in a market with very low transaction costs. The best price and product will always be found in the marked. Likewise, there would be no collaboration in markets with extremely high transaction costs. In such markets, the only reasonable actions would be in-house production (Coase, 1952 in Williamson, 1985). The firm will always be able to produce the product at lower cost than what would

be found in the marked. Viewing transaction costs in this way might help to understand the difference in network structure between different lines of businesses.

Making exchanges generate costs. This is the core of TCT and is what distinguishes it from neo-classical economic theory. TCT seeks to explain the organising of production and trade by exploring the effects of these costs. Whilst there exist a cost of making exchanges there are also the generated costs connected to the organising of internal production. This administration cost seems to increase with the size of the firm. This phenomenon is called diseconomies of scale.

The TCT can explain (Case B) the negotiations about prices and discounts taking place between retailers and the wholesaler. However, to achieve the benefits according to SC Management theory, fixed pricing of the goods is an absolute condition. Fixed pricing is also absolute prerequisite for introducing an electronic order solution in the SC.

Network theory

The network business model was launched in academic circles in the 1960s as a reaction to the classical strategic approach, which regarded firm's resources as independent and enclosed assets (Håkansson and Snehota, 1995). Over the years network theory has strengthened the emphasis on pure vertical integration enclosing horizontal relations as well.

Whilst transaction cost theory focuses upon single transactions, network theory introduces time and seeks to optimise the series of transactions between companies. In this way network theory is emphasising trust, transactions by social norms and the development of personal relationships, see for instance, Håkansson (1982).

According to Thorelli (1986), power is the central concept in network analyses. He recognises at least five sources of power of a network participant: (1) Economic base (e.g. liquidity, access to suppliers), (2) Technology (systems and product and process technology), (3) Expertise (personnel and equipment capabilities), (4) Thrust (reputation, past performance), and (5) Legitimacy (e.g. ownership relationships, contracts).

Network theory is useful to describe situations and episodes (realities) among companies having long or are building long-term relationships in the SC. Having trust to

each other, trust being the key-concept, companies can in this way get access to each others resources or competencies and achieve a co-operative competitive edge. In the cases we have described the companies can change partnerships relatively easily, and the relationships do not build on long term commitment and binding up co-operation.

Thorelli (1986) seems to attach more importance to the power concept than other network schools. Our studies confirm the centrality of power concept in network analyses. However, on the other hand network theory seems generally to be too little normative, and it gives few suggestions for solutions.

Agency Theory

Agency theory is directed at the ubiquitous agency relationship, in which one party (the principal) delegates work to another (the agent), who performs that work. Agency theory focuses on the contractual arrangements between two organisations.

According to Eisenhardt (1989), "Agency theory is concerned with resolving two problems that can occur in agency relationships. The first is the agency problem that arises when (a) the goals of the principal and the agent conflict, and (b) it is difficult or expensive for the principal to verify what the agent is actual doing. The problem here is that the principal cannot verify that the agent has behaved appropriately. The second is the problem of risk sharing that arises when the principal and agent have different attitudes toward risk. The problem here is that the principal and the agent may prefer different actions because of different risk preferences."

Eisenhardt (1989) describes a series of propositions of agency theory. The most important are listed below: (1) When the contract between principal and agent is outcome based, the agent is more likely to behave in the interest of the principal. (2) When the principal has information to verify agent behaviour, the agent is more likely to behave in the interest of the principal. (3) Information systems are positively related to behaviour-based contracts and negatively related to outcome-based contracts, and (4) Outcome uncertainty is positively related to behaviour-based contracts and negatively related to outcome-based contracts.

Our case descriptions confirm that the principal and the agent might have conflicting goals and that the agent will often behave in order to achieve his own interests, or behave opportunistically. Our case studies also seem to verify the series of propositions of agency theory, described by Eisenhardt (op. cit.).

Conclusion

In this paper we have tried to explain the difficulties with the implementation of SCM. We have chosen a triple perspective, a transaction, a network and an agency, approach in order to understand these difficulties. Trough our two cases, we have illustrated the challenges with implementation of SCM.

Regarding to Network theory it requires a trusting and mutual relationship between the actors in a SC to obtain a close and economically useful relationship. We have emphasised that such relations arise as consequences of long-term thinking, based on mutual thrust. In theory about dynamic value chains this aspect seems to be omitted.

The companies in the SCs are autonomous actors. They wish to control their own company. This often leads to that the actors in a SC having overlapping roles and tasks in the SC.

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