Supply Chain Management

Case Study referring to Chapter 2 and Scenario 2.7.2 of "Integral Logistics Management – Operations and Supply Chain Management Within and Across Companies", 5th ed.

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1. Introduction

1.1 Objectives

Today, both structure and implementation of supply chains are essential for competitiveness. Only through comprehensive cooperation and optimization of the transcorporate network of companies can be achieved. This means that the business relationships that exist between the members of the supply chain form the basis for effective and efficient supply chain management. Therefore, the first task of any SCM project must be to analyze and position the business relationships in order to work out a sound basis for future decisions on how to proceed and to demonstrate specific improvement potential. Thus, the case study has the following intended learning outcomes:

- To practice a comprehensive approach
- To know different kinds of business relationships and to classify them correctly
- To disclose and to recognize relations of effects in network structures
- To apply simple tools for the graphical analysis of a complex situations
- To find approaches for optimization considering the bullwhip effect

1.2 Submission

Please use the designated space for each task. We expect a professionally worked out solution report as a basis for the top managements decision-making. We further expect a clear reasoning in complete sentences, i.e. not just with keywords, and not handwritten. This also applies to additional pages. We suggest the use of a spreadsheet calculation program. .xls objects are embedded in this word-document. If you work with the .pdf document, select the whole table, export and save the selection as an excel workbook.

2. Evaluate Company Relationships in the Supply Chain

2.1 Situation

The IGEA Company is a furniture company known mainly for its successful cash-and-carry furniture retail business. Faced with enormous cost pressures, IGEA management has decided to explore the possibility of forming a supply chain. Internal company improvement measures simply do not promise more than marginal cost savings, and prices paid to suppliers cannot be lowered any further without risking losing some suppliers, which would mean that IGEA could no longer offer some of its products.

IGEA managers have read a study that you published on cost savings achieved through transcorporate supply chain management. They believe that the savings they could achieve would give them an edge over their main competitor, the INFERNIO Company. IGEA will therefore head the supply chain project, taking on the role of integrator. Due to its dominant position on the market, IGEA succeeds in convincing its main suppliers and some of the affiliated sub-suppliers to join them in taking this transcorporate step.

You are commissioned to conduct an analysis of a supply chain in the wood and furniture industry. Figure 2.9.2.1 shows the interrelationships among the companies concerned.

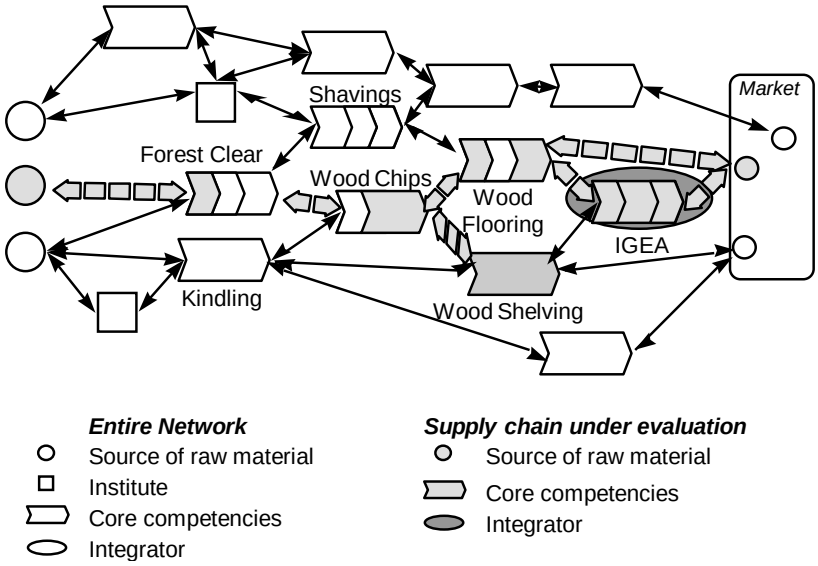

Fig. 2.9.2.1 A supply chain in the wood industry (compare Fig. 2.3.7.1).

The companies highlighted in gray will be integrated into the new supply chain described below. As of now, five companies have agreed to form the supply chain:

- Forest Clear Co.
- Wood Chips Co.
- Wood Flooring Co.
- Wood Shelving Co.
- IGEA

For the following analyses and considerations, however, it is important not to lose sight of the other, existing company relationships, since it might make sense to include additional companies as partners in the cooperative project or to sever some of the existing company relationships (for example, Kindling Co., Shavings Co., and other possible companies).

2.2 Business Relationships

You will need the following details of some of the company relationships in order to conduct your analysis and identify potential improvements:

*Business relationship **Nr. 1** between Forest Clear Co. and Wood Chips Co.:* Forest Clear, based in Finland, is known for its bold dealings with its customer, the Wood Chips Co. Delivery agreements are very short term, which necessitates frequent, tough negotiations. Still, the excellent quality of the Forest Clear material forces Wood Chips to continue doing business with them. However, delivery delays are becoming more and more frequent, to the point that this is now affecting Wood Chips' own fill rate. The chief buyer at Wood Chips has invested many hours in meetings with the wood supplier in an attempt to improve the situation, but Forest Clear is resistant to showing its cards. The Forest Manager does not encourage visits, and the company will not reveal their long-term product and capacity planning. Although Forest Clear had been asked repeatedly to develop a concept for eliminating the problems, they have produced no proposals.

*Business relationship **Nr. 2** between Wood Chips Co. and Wood Flooring Co.:* The relationship between Wood Chips and Wood Flooring is very tense. The delivery reliability of Wood Chips, as sub-supplier of high-quality boards, is seriously deficient, which is having an extremely negative effect on Wood Flooring's own service level. For this reason, Wood Flooring is often forced to procure products from another sub-supplier, Shavings Co., which entails considerable additional costs and effort. Another factor is the tense relationship between the chief buyer at Wood Flooring and management at Wood Chips. Due to the very large volume of material purchased, Wood Flooring has not been able to find another, equivalent supplier. In addition, because it procures such vast amounts of material, Wood Flooring has a strong enough position in the market that it can often dictate prices. In addition, naturally, over the years, it has frequently exploited this advantage. Blanket contracts with a 5-year duration thus contain a 2.5% discount annually, based on forecasted productivity increases and a learning curve on the part of the supplier. This is another reason why Wood Chips does not want to work with Wood Flooring.

*Business relationship **Nr. 3** between Wood Chips Co. and Wood Shelving Co.*: Wood Shelving and Wood Chips enjoy a very friendly and constructive business partnership. Wood Shelving is one of Wood Chips' most important customers, and Wood Chips is willing to respond promptly and without complications to any special requests. The business relationship has advanced to the point where monthly product management meetings at Wood Chips are attended by a purchaser from Wood Shelving, who reports on forecasts and trends in the sales market. For delivery, 1- to 2-year contracts are concluded. There are problems, however, with operational order processing. Orders are made by fax and by mail, but also by telephone, which results in a lot of redundant data, and no one is sure what the correct figures are. The business relationship is supported by the geographical proximity of the two companies (within 20 miles of each other).

*Business relationship **Nr. 4** between Wood Shelving Co. and IGEA Co.:* IGEA is known for its readiness to invest very heavily in new technologies. For instance, IGEA has already set up an EDI system with its main suppliers. As soon as a certain number of products are rung up at the cash registers or withdrawn from stock, automatic orders are placed with suppliers. The order quantity is then subtracted from the agreed-upon blanket order purchasing quantity. In selecting its suppliers, IGEA also has strict criteria: suppliers have to satisfy IGEA's environmental concept, but they also have to meet high quality standards. Wood Shelving Co. has been able to meet these initial demands, but it is experiencing big difficulties in fulfilling the quantity demanded and adapting to the strong fluctuations in the demand. The consequences for Wood Shelving are serious earnings losses, which have led to overtime and special shifts as well as enormous quantities of inventory. The two companies have engaged in heated discussions and mutual recriminations. Due to the unpredictable fluctuations, they have mandated a task force to examine of the problem. Despite the frequent bottlenecks, IGEA wants to continue doing business with Wood Shelving. The product quality is high, and the company shows positive cooperation when it comes to new projects.

*Business relationship **Nr. 5** between Wood Flooring Co. and IGEA Co.:* Wood Flooring and IGEA also have a mutual information exchange program. Because demand does not fluctuate and sales

processing of these higher quality products are stable, the exchange of forecast information and planning is optimal. Advertising campaigns are planned cooperatively, and the two companies split the necessary costs as well as the additional earnings. However, as the product assortment of IGEA has a low demand for such high quality products, the companies cooperate mainly for short-term product or project partnerships of convenience. For this reason, Wood Flooring is also very active in the international market. Due to its flexibility, it is highly esteemed as a business partner.

Other company relationships, *which are not being considered in the start phase of the new supply chain project (shown in white):* Kindling Co. and Shavings Co. have only recently entered into IGEA's supply chain conglomerate. They partially supply to Wood Chips and Wood Flooring, but there are efforts underway to have them supply directly to Wood Shelving Co. IGEA has initiated this and wants to further expand its role as an integrator in the entire network.

2.3 Your Task

Position the five business relationships listed above and enter your results into the portfolio shown in Figure 2.9.2.2. Evaluate the individual companies' potential development opportunities and development strategies within this supply chain. Indicate the trend (using an arrow) that best describes the future directions of each company. Write a one-page explanation of the positions and the corresponding trends of the customer-supplier business relationships. Include possible future business relationships with Kindling Co. and Shavings Co.

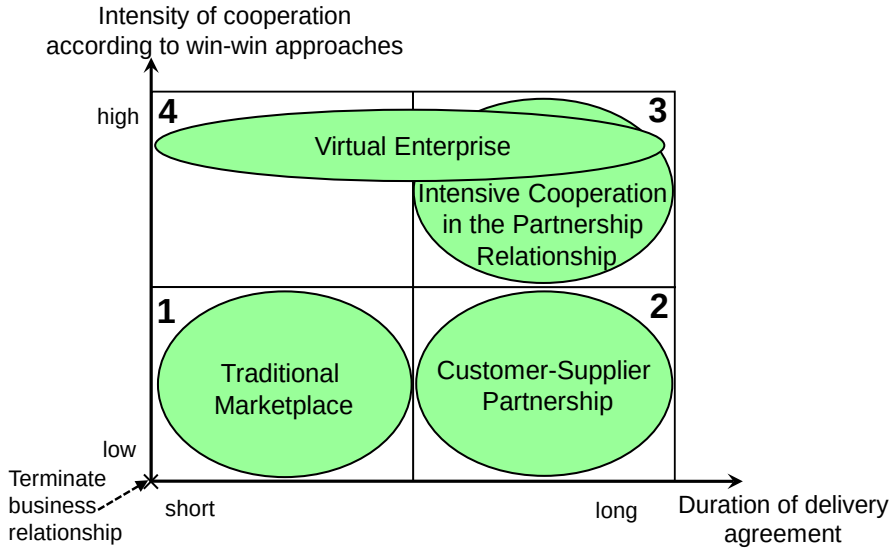

Fig. 2.9.2.2 Classification of company relationships in the supply chain.

3 Analyzing and Improving the Supply Chain

Preliminary investigations made clear that cooperation between Wood Chips Co., Wood Shelving Co. and IGEA offers a large savings potential. Therefore, a closer investigation of the supply chain with these three companies is next on the agenda. The aspects “material flow” (items, demand forecast and actual quantities in the course of time) and “stock inventory” (amount in the course of time) should be looked at more closely.

Thus, in task 3.1, you should identify the products with the highest potential for improvement in a pilot project. Then, in task 3.2, analyze demand forecast, actual material flow and inventory levels of these products over time and at the different companies of the supply chain, in order to identify special patterns or trends. Finally, building on this analysis, examine in task 3.3. cause and effect chains and draw up measures for planning an optimized supply chain, respecting existing and desired partnership relationships between the companies.

Task 3.1

Investigate the product range of IGEA. IGEA made available the following Excel table 3.1.

Procurement Figures

Item No.	Article Name at IGEA Shelving Division	Demand Forecast Actual Year	Price per Article [CHF]	Actual Demand Previous Year	Order Channel	Supplier
1	Shelves Pilly beech 100	31875	84	45365	EDI / BO	Shelving Co.
2	Shelves Pilly black 100	25000	84	0	EDI / BO	Shelving Co.
3	Shelves ISO 30 black	20000	52	0	Fax / BO	Wood Flooring Co.
4	Shelves ISO 50 beech	13636	58	9876	Fax / BO	Wood Flooring Co.
5	Extra shelf white	40000	3	36999	Fax	Wood Chips Co.
6	Extra shelf beech	23750	4	25698	Fax	Wood Chips Co.
7	Shelves ENDO	8333	31	4258	Fax	Wood Chips Co.
8	Shelves Pilly balck 80	7143	73	4253	EDI / BO	Shelving Co.
9	Shelves ENDO short	8000	10	0	Fax	Wood Chips Co.
10	Extra shelf ENDO	10000	5	255	Fax	Wood Chips Co.
11	Shelves Pilly white 30	32500	21	27896	EDI / BO	Shelving Co.
12	Shelves Pilly 60 white	57692	68	40000	Fax / BO	Wood Flooring Co.
13	Extra shelf birch	18750	4	13666	Fax	Wood Chips Co.
14	Shelves Pilly beech 80	24286	73	12536	EDI / BO	Shelving Co.
15	Shelves ISO 100 white	34545	115	18659	Fax / BO	Wood Flooring Co.
16	Shelves ENDO long	3125	42	1542	Fax	Wood Chips Co.
17	Shelves ENDO black	10000	5	12545	Fax	Wood Chips Co.
18	Shelves RINO	8667	16	569	Fax	Wood Chips Co.
19	Shelves ISO 80 white	3000	21	2533	Fax / BO	Wood Flooring Co.
20	Shelves Pilly 100 white	53333	79	75000	EDI / BO	Shelving Co.

BO = Blanket Order
EDI = Electronic Data Interchange

Fig. 3.1 Procurement Figures of IGEA

This table allows you to study range of procured products and the suppliers of IGEAs Shelving Division. With the help of the ABC analysis method (Pareto diagram, see section 11.2.2 in the tbook Integral Logistics Management), you can now determine the representative products (A products). Base your selection on the criteria you used to organize the data. *(Your solution should include a diagram and a short rationale.)*

Task 3.2

Select time series for the materials flow of the representative goods. What distinctive features can you recognize? Try to describe the recognizable characteristics both in words and in mathematics (averages, standard deviation, minimum, maximum, other descriptions). How do you substantiate these tendencies? For your analysis, also remember the descriptions of the business relationships resulting from this case study, part 2. The following illustration is intended to help you find an appropriate representation.) *(Your solution should include a diagram, an analysis and reasons.)*

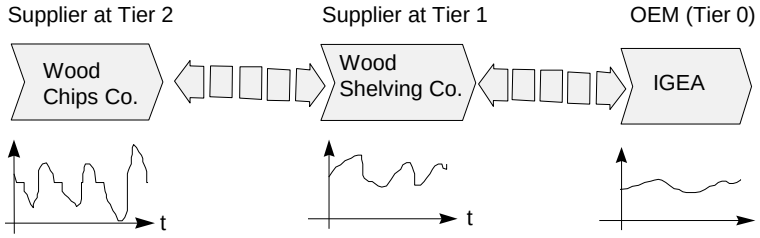

Fig. 3.2.1 Variation of sales figures along the wood supply chain

Data for Task 3.2: The following Excel table 3.2.2 contains data about the flow of goods over time and over several tiers of the wood supply chain (IGEA, Shelving Manufacturing Co. and Wood Chips Co.) for a representative product that could have been identified by an analysis such as in Task 3.1. As a simplification, the lead times are supposed to be zero. *(In an actual SCM study in industry, however, such a simplification would never be correct, because the lead times for the value-added activities will naturally have an effect on the corresponding steps along the supply chain.).*

Sales and production figures for representative product A					
	IGEA		Wood Shelving Co.		Wood Chips Co.
	Sales of product A	Sales forecast	Sales of components for product A	Sales forecast	Sales of chip tray for components of product A
Week	*Number of Products*		*Number of Products*		*Number of Products*
1	560	770	0	0	0
2	430	770	580	0	180
3	550	770	720	0	0
4	760	720	760	1100	890
5	540	550	640	1100	1010
6	310	550	940	1100	1740
7	550	550	770	1100	310
8	580	550	460	440	1020
9	390	660	280	440	180
10	300	660	280	440	710
11	420	660	220	440	100
12	480	280	280	770	940
13	280	280	720	770	680
14	390	280	770	770	1120
15	520	280	950	0	0
16	610	770	750	170	650
17	220	770	290	170	580
18	310	770	150	1100	460
19	440	770	240	1100	410
20	830	550	990	1100	450
21	500	550	540	770	1440
22	220	550	480	770	0
23	540	550	200	280	840
24	630	330	740	280	0
25	550	330	0	280	640
26	540	330	0	280	100
27	420	330	310	170	180

Fig. 3.2.2 Sales figures along the wood supply chain

Task 3.3

Can you estimate the effect of the actual flow of goods for the individual companies and especially for the entire supply chain (factors like storage time, buffer status and administrative expenditures)? How would you remedy the situation? Elaborate some possibilities for an optimized SC planning. Hints: Study carefully the pattern of the demand curves. In addition, may be you can also use results of your study in Task 4 on the Bullwhip effect.

4 The Bullwhip Effect in Supply Chains – A Reminder

Task 4.1: Please describe concisely the bullwhip effect in a supply chain. What are some of the possible outcomes for a company?

Task 4.2: What are the main reasons for this kind of build-up in the supplier chain? Name and explain the reasons, based on clear examples. In which branches are these effects particularly pronounced***?***

Task 4.3: What measures are helpful in reducing the bullwhip effect? Explain in brief, how they counteract the causes of the bullwhip effect.