Improving the Supply Chain Efficiency at Sydmeko Industri AB

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This article is an extract of a Master Thesis in Engineering Logistics written at Lund Institute of Technology, Lund University. The thesis was conducted at Sydmeko Industri AB in Arlöv. The aim was to map and analyze the material flow in order to improve the supply chain efficiency. Moreover, the aim was to study the organization to produce a proposal for the design to create a future flexible organization.

Key words: Change management, material planning system, process orientation, product analysis, logistics, production philosophy.

Background
Today's companies live in an environment with increasing competition with price cutting, high quality, and with fast fluctuations in the market. A short product development time, an efficient material flow and a flexible manufacturing process, all to a low cost is a necessity in order to be competitive. Sydmeko’s product family grows continuously and is during permanent development. The company has good experiences from product development and know how to introduce new products on the market. Additionally, they have created close co-operations with a number of their suppliers. However, Sydmeko has not yet studied the material flow or calculated optimum order quantities, safety stocks or batch sizes. In the near future Sydmeko expects a big increase of the annual sale volume (200 % year 2006) and hence a significant higher production volume than today. Therefore, this area becomes even more interesting for the company to analyze. Additionally, in a couple of years an important part of the personnel will be replaced due to retirements and a change in the design of the organization is expected.

Problem formulation
The objective with this master thesis is, on the basis of this background, to give answers to the following questions;

• How should the future material flow be designed in order to, on a satisfactory way, meet the future requirements on production volume and time of delivery?
• How should the organization be designed in order to be able to handle future growth?
Method
This master thesis is based on a system approach since the author agrees in the approach’s view of the reality; it is objective and consists of depending components. The author considers that each part in the material flow is a link in a chain, where each link is depending (to different extents) of the remaining links in the chain. The author's objective was the inductive approach. Due to the fact that earlier acquired experiences and knowledge along with people probably would influence the author, this approach didn’t seem realistic to entirely assume. The work was carried out as a case study, however only one case was studied; Sydmeko Industri AB. The material flow was studied, analyzed and described in detail in order to give such a comprehensive information picture as possible. Both primary and secondary data have been used, where, to a large extent, the primary data has been collected with interviews and the secondary data via literature studies.

Theoretical Framework

Mapping and lead time analysis
The method Supply Chain-mapping can be used to create an overview of the material flow.\(^1\)
To analyze the lead time and study how the time for every process is used is important. Each activity in a process can be classified as value-adding time, non-value-adding time and waste. It is critical to see the difference between these categories to be able to understand how to improve a logistical process. The easiest way to reduce the production time without affecting the quality is to reduce non-value-adding time and waste.\(^2\)

The Kraljic model
Kraljic’s portfolio model is to be used as a basis for classifying and setting purchasing strategies for the company. The model categorizes the articles into four categories according to their financial relevance and the complexity of supply market.\(^3\)

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\(^1\) Christopher M. Logistics and Supply Chain Management. (1998)

\(^2\) Ljungberg A, Larsson E. Processbaserad verksamhetsutveckling. (2001)

\(^3\) Shary P, Skjött-Larsen T. Managing the Global Supply Chain. (2001)
The Bensaou model

The Bensaou model classifies the buyer-supplier relationships into four different categories depending on the degrees of specific investments from the buyer respectively the supplier.4

<table>
<thead>
<tr>
<th>High</th>
<th>Low</th>
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<tbody>
<tr>
<td>Captive Buyer</td>
<td>Market Exchange</td>
</tr>
<tr>
<td>Strategic Partnership</td>
<td>Captive Supplier</td>
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</tbody>
</table>

Figure 2. The Bensaou model

Market Exchange: Highly standardized products, based on simple and mature technology. Several suppliers are capable of delivering these products.

Captive Buyer: Complex components with some customization, based on well-known technologies. Only a few large, well-established suppliers.

Captive Supplier: Highly complex products based on proprietary technology. The buyer often keeps two or more suppliers.

Strategic Partnership: The technical complexity of the products is high and the suppliers’ components are highly customized.5

Material Planning System

The R,Q-method is an ordering-point system, where the parameter R is the reordering-point and the parameter Q corresponds to the order quantity.

The total cost per time unit for ordering and storing is expressed as

\[ C = \frac{Q}{2} \cdot h + \frac{d}{Q} \cdot A \]

where

\( C \) = total cost per time unit
\( A \) = cost per order
\( h \) = storing cost
\( d \) = demand per time unit

The optimal order quantity \( Q^* \) can be deduced from the total cost formula and is named Wilson’s formula.

\[ Q^* = \sqrt{\frac{2Ad}{h}} \]

The safety stock quantity can be calculated on the basis of the parameter \( \text{SERV}_2 \) and denotes \( ss \). \( \text{SERV}_2 \) corresponds to the percentage of orders delivered directly from stock.

The reordering-point is the sum of the demand during the lead time \( (x_L) \) and the safety stock \( (ss) \),6

\[ R = x_L + ss \]

4 Christopher M. Logistics and Supply Chain Management. (1998)
6 Axsäter S. Lagerstyrning. (1991)
**Process orientation**

The process approach focuses on the entirety. A process based organization is not only processes and process management; it is an integrated entirety consisting of process-, resource- and work management combined in a mutual, modern sight on leadership.

A process is a repetitively used network of consecutively linked activities that use information and resources for transforming “object in” to “object out”, from identification to satisfaction of customer’s needs.

Each process in an organization consists of a number of smaller processes, which can be divided into three categories; main processes, support processes and management processes. An identification and mapping of these processes is necessary to enable a process based organization.

In a process based organization the leadership assignment is divided into three functions; process owner, resource owner and team leader.

It is the process owner’s responsibility to continuously develop and improve the process as an entity. The resource owner is responsible for resources and competences. The function’s assignments include planning, maintenance and development of the resources. The team leader assumes the operative responsibility for the resources allocated to the process.⁷

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**Change Management**

Kotter has developed an eight-stage process for how to succeed with a major change:

1. Establish a sense of urgency.
2. Creating the guiding coalition.
3. Develop a vision and a strategy.
4. Communicate the change vision.
5. Empowering employees for broad-based action.
7. Consolidating gains and producing more change.
8. Anchoring new approaches in the culture.⁸

**Analysis and proposal**

**Suppliers**

The suppliers of Sydmeko were analyzed and categorized into four different categories according to Bensaous model. The result is shown in Figure 3 below.

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Companies categorized as “Captive Supplier” have all done investments to meet Sydmeko’s needs. The recommendation is to develop these relationships further, which should benefit both parties in the future. The relationships both with Polytec and with FlexFlock are important for Sydmeko. These companies are classified as “Captive Buyer” and Sydmeko would benefit from an enhanced relationship. Especially shorter and more accurate lead times would make the material planning easier. There is no evidence for an enhanced relationship with the companies classified as “Market Exchange” companies.

Components
Figure 4 and 5 below show the percentage distribution of the components between the four different categories in Kraljic’s model.

![Figure 4. The Kraljic model for product ML285](image)

![Figure 5. The Kraljic model for product MLC310](image)

Components classified as “Leverage items” stands for about 65% of the total purchasing cost. Achieve low prices and short lead times for these components are crucial to increase the profitability. For this reason, “Leverage items” is the category Sydmeko should focus on. The “Bottleneck items” can only be delivered by a few companies and good relationships with these companies are important. Components classified as “Non-critical” have low economical relevance and are often standard products. This category is less important for the company and Sydmeko should not put much effort into these relationships. No strategic articles were found.

Material planning system
The business system Pyramid and its material planning system-module is available for Sydmeko. However, this module is at the present time not in use. The author requests to resume the use of the MPS-module as soon as possible. An implementation of the system with the calculated optimal order quantities, reordering points and safety stocks would probably lead to significant reduced ordering and storing costs. In the case Sydmeko, the costs could be reduced with 20-30%.

A lead time analysis over the articles produced in Sydmeko’s production facility showed that a decrease of the current batch sizes would result in lower storing cost. A change from current to calculated optimal batch sizes would result in a reduced storing cost with up to 70%.
The design of the organization
The recommendation for the organization is a process based business with one process owner, one resource owner and one team leader. Two main processes have been identified; “create business” and “provide products”. The process owner’s assignment is to focuses on these; develop and improve them. The resource owner at Sydmeko will be responsible for the resources and competences. It will even be the resource owner’s responsibility to perform some of the support processes. Manage the MPS-system is one of these support processes. The team leader is in charge for the effectiveness in the production facility. It is also the team leader’s responsibility to make the personal work together as a team.

References


