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CONSIGNMENT STOCK IN GROUP TRADE

- Sales and delivery processes of Bayer
Schering Pharma Oy



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CONSIGNMENT STOCK IN GROUP TRADE - Sales and Delivery Processes of Bayer Schering Pharma Oy

Opinnäytetyö tehtiin Bayer Schering Pharma Oy:n (BSP Oy:n) toimeksiannosta. Tavoitteena oli kuvata nykyiset myynti-toimitus -prosessit ja arvioida konsignaatiovarastoon perustuvan mallin hyvät ja huonot puolet nykyisiin vientiprosesseihin verrattuna. Prosessikuvausten tulisi selventää työntekijöiden vastuita ja heidän toimiansa vaikutusta prosessiin.

Konsignaatiovarasto on logistinen toimintatapa, jossa toimittaja omistaa tavarat asiakkaan varastossa. Tavarat myydään vasta, kun asiakas myy ne edelleen tai käyttää ne tuotantoprosessissaan. Kustannussäästöt ovat merkittävimpiä konsignaatiovarastosta asiakkaalle aiheutuvia etuja. Toimittajan edut liittyvät puolestaan asiakassuhteen lujittumiseen. Konsignaatiovarasto parantaa toimitusketjun toimintaa ja vähentää varastoon sidottua pääomaa.

Kirjallisuudesta on löydettävissä kaksi eri tulkintaa konsignaatiovarastokäsitteestä. Toisten tutkijoiden mielestä konsignaatiovarasto liittyy kiinteästi toimittajaohjautuvaan myynti-toimitus - prosessiin, kun taas toiset käsittelevät konsignaatiovarastoa erillään toimittajaohjautuvuudesta.

Aihetta on lähestytty kvalitatiivisesta näkökulmasta. Empiiristä materiaalia kerättiin haastattelemalla työntekijöitä, ottamalla osaa kokouksiin ja lukemalla yrityksen dokumentteja.

Uuden myynti-toimitus -prosessin implementointi on suuri ja kallis projekti. Tällaisen projektin aloittamista voidaan perustella vain siitä aiheutuvilla selvillä eduilla. Tällaisia etuja ei saataisi konsignaatiovarastosta BSP Oy:n konsernikaupassa. Siihen on useampia syitä. Konserniyhtiöillä on yhteinen taloudellinen intressi, eikä tytäryhtiöiden välisen asiakassuhteen lujittaminen ole tarpeen. BSP Oy:n myynti-toimitus -prosessit konserniasiakkaille ovat jo toimittajaohjautuvia. Pelkästään se parantaa toimitusketjun toimintaa. Konsignaatiovarasto ei ole tarpeen.

Ulkoisten asiakkaiden suhteen tilanne on eri. Asiakkaat saattaisivat olla kiinnostuneita leikkaamaan kustannuksiaan. Konsignaatiovarasto myös vahvistaisi Bayerin asemaa toimittajana.

ASIASANAT:

konsignaatiovarasto, logistiikka, toimitusketjun hallinta, tuotantotalous

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This final thesis was commissioned by Bayer Schering Pharma Oy (BSP Oy). The target was to describe the current sales and delivery processes and to assess advantages and disadvantages of a CS based process compared with the current export processes. Process descriptions should clarify employees' responsibilities and effects of their actions on the process.

Consignment stock (CS) is a logistics practice, where the supplier owns the inventory at the customer's warehouse. Goods are not sold until the customer sells them further or uses them in a manufacturing process. Generally, a customer's benefits are related to cost savings. A supplier's benefits are related to strengthened customer relations. CS improves performance of a supply chain and reduces the amount of capital tied to inventory.

Two readings of the CS concept can be found in literature. Some researchers see that CS is always built on vendor managed inventory (VMI) practice, while others discuss CS without VMI.

The final thesis has a qualitative approach. Empirical material was collected by interviewing employees, by taking part in meetings and by reading company documents.

The implementation of a new sales and delivery process is a big and expensive project. Clear, profitable benefits have to be seen, if such a project is started. Implementing the CS practice in BSP Oy's group trade would not provide such benefits. There are many reasons for this. A group has a common financial interest and strategic actions for strengthening customer relationship between subsidiaries are not needed. BSP Oy already has VMI practice in place with all of its group customers. VMI alone improves supply chain performance, CS is not needed.

The situation might be different in trade with external customers. Customers might be interested in cutting down their costs and consignment stock practice would also strengthen Bayer's position as their supplier.

KEYWORDS:

consignment stock, industrial management, inventory management, logistics, supply chain management

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1 INTRODUCTION

1.1 Background and target

Bayer, like all big international companies, is under a constant change. BSP Oy introduced the SAP system for all company functions at the beginning of 2009. This remarkably affected the company's organizational structure and business processes. Sales and delivery process of the domestic prescription drugs business changed as well as the export processes. There was a need to describe the new processes.

The group's interest is the primary target when decisions are made in big international companies, while single parties have to make compromises. However, interests of all parties have to be known so that a good compromise can be made. There have been initiatives to introduce a new sales and delivery process in Bayer's group trade. There was a need to clarify interests of BSP Oy regarding this process change.

The target is to describe the current sales and delivery processes and to assess advantages and disadvantages of a consignment stock based process compared with the current export processes. The assessment is made from BSP Oy's point of view. Interests of the whole Bayer Group are taken into account to a certain extent.

1.2 Bayer

1.2.1 History

The history of the Bayer Group started in year 1863 when the general partnership "Friedr. Bayer et comp." was founded in Barmen, Wuppertal, Germany. The company was originally a manufacturer and seller of dyestuff. Between 1881 and 1913 Bayer developed into a chemical company with international operations. Possibly the best known Bayer product, Aspirin®, was launched in 1899. The historical events during the first half of the twentieth century (World War I and II and the Great Depression) caused economical upturns and downturns. While Leverkusen developed to a key production location, company mergers and name changes also took place during this era.

From the beginning of the 1950's until mid 1970's Bayer's research and development bore fruit. Inventions were made and new products were developed and the company fast expanded abroad. The United States and Latin America were in the focus at first.

During the last few decades some of the main trends at Bayer have been investments to research and development functions, expansion through company acquisitions, environmental protection, sustainability and globalization (Bayer 2009).

1.2.2 Bayer Group

The Bayer Group is an international corporation with an annual turnover of almost 33,000 million EUR. The number of employees is over 108,000 worldwide. The company headquarters are located in Leverkusen, Germany. The Group is divided into three main divisions: Bayer HealthCare, Bayer MaterialScience and Bayer CropScience. MaterialScience manufactures and sells raw materials for industry. These materials are used for example in car parts, mattresses and free-time shoes. Bayer CropScience works with crop protection, environmental products and biotechnical applications. Bayer HealthCare is the largest among the three divisions. In HealthCare's portfolio there are over-the-counter medications (Consumer Care), equipment for monitoring diabetes treatment (Diabetes Care) and prescription drugs (Bayer Schering Pharma) (Bayer 2009). Bayer Schering Pharma AG's headquarters are located in Berlin.

Bayer Schering Pharma (BSP) has six production plants all over the world. They are located in Germany, Brazil, Finland and Spain. Inside the Group they are often referred to as Supply Centers (SC).

1.2.3 Bayer in Finland

BSP Oy is a Finnish subsidiary of Bayer Schering Pharma. It focuses on the international business of prescription drugs. The domestic prescription drug business approximates only 10% of BSP Oy's turnover. Both research and development and production functions are located in Turku. The product plant serves the global

pharmaceutical market with products exported to over 100 countries. Supply Center Turku specializes in polymer-based drug delivery technology but manufactures tablets and capsules as well. The best known product is MIRENA®, a hormonal intrauterine system with 5-year contraceptive efficacy. Other well-known products are JADELLE® contraceptive implants and BONEFOS® bisphosphonate for supportive therapy of cancer (Bayer 2009).

BSP Oy is part of an international supply chain. Many vendors are Finnish but raw materials, equipment and services are purchased from suppliers located in other European countries and the United States as well. The main customers are BSP's subsidiaries all over the world. Some customers come from outside the Bayer Group and charitable organizations are the most important ones.

The other Bayer company in Finland, Bayer Oy in Espoo, is the marketing company for all the Bayer Group's products in Finland. Bayer employs over 700 people altogether in Finland.

1.3 Structure

Literature review consists of sections 2 and 3. Discussed themes in section 2 are a consolidated corporation as a company form, taxation of a consolidated corporation and transfer pricing. Basic concepts and trends of logistics and ERP systems are discussed briefly in section 3. More attention is paid to inventory management, vendor managed inventory practice and consignment stock practice.

Sections 4 and 5 form the practical part. Processes related to import and domestic market are discussed in section 4. Section 5 is about export processes. Research methods are described in the beginning of section 4. Conclusions are made in section 6. The appendices are excluded from the public version due to confidential contents.

2 CONSOLIDATED CORPORATION

A consolidated corporation or a group of companies is the most important organization type of business, when the importance is measured with the volume of the business, e.g. turnover. International companies are regularly consolidated corporations. The total turnover of the companies in Finland was 262 billion EUR in the year 2000. Consolidated corporations accounted for 239 billion (91%).

The importance of consolidated corporations seems to decrease if it is measured with paid corporate taxes (about two thirds) or value added taxes (41%). However, these tax figures include only the taxes paid by the biggest consolidated corporations. (Ranta-Lassila 2002, 1-2)

2.1 Consolidated corporation as a company form

Differences in the legislation, language and culture often result in foundation of a new subsidiary when a company expands its functions to another country. (Ranta-Lassila 2002, 2) The definition of business responsibilities may also be simpler when the separate operations have been located in the separate companies. Responsibilities for financing and profitability can be seen clearer in the long term if the company is a consolidated corporation and not a single big company with many departments and branch offices. (Ranta-Lassila 2002, 3)

Personnel recruitment and motivation related matters support the choice of a consolidated corporation structure. The position of a chief executive officer of an affiliate company can be in practice far more interesting and sensible than a position of a department manager. (Ranta-Lassila 2002, 3)

The significance of employees' incentive programs has risen during recent years. A consolidated corporation form enables separate incentive programs for the subsidiaries. These kinds of programs are established, for example, when a stock exchange listing of a subsidiary is planned. (Ranta-Lassila 2002, 3)

A consolidated corporation structure helps to delimit the responsibilities towards external organizations like creditors. When a risky new business is started, it may be wise to establish a new company to run the business. Still, the parent company is often the guarantor of the subsidiaries' commitments. The company structure does not delimit the responsibility in those cases. Credit rating is important for companies as it strongly affects the loan terms, e.g. interest. The companies may try to secure their credit rating and better loan terms by taking care of their subsidiaries' commitments when needed. (Ranta-Lassila 2002, 3) The company image may also be a reason to take the responsibility for some commitments even though it would not be necessary by law.

Transparency and openness are important matters for the companies listed on the stock exchange. A structure formed by several smaller companies may be more transparent and easier to understand than a structure of one big company.

A consolidated corporation is a flexible organization structure in company acquisitions. (Ranta-Lassila 2002, 4) Company acquisitions have played a big role in Bayer's strategy and the consolidated corporation structure has doubtlessly made the acquisitions easier to execute.

In some business sectors operating as one company without subsidiaries may be the best choice even for the big international companies. Banking is a good example of this. The solvency rules restrict the banks' lending volume. (Ranta-Lassila 2002, 2) Bigger banks can give bigger loans and therefore can attract big customers, as well.

2.2 Taxation of a consolidated corporation

A consolidated corporation is one financial entity but the subsidiaries may perform financially very differently. Even if some companies are making profit, the total performance of the consolidated corporation can be unprofitable. The financial statements of group companies are combined to consolidated financial statements when the books are closed. If this is not allowed in the corporation taxation, a consolidated corporation may have to pay taxes also when it is making losses. (Ranta-Lassila 2002, 10-12)

A consolidated corporation is not liable to pay taxes in any country (2002). Different methods are used in different countries to cater for the special status of consolidated corporations. A group's joint taxation is one model used in many countries, such as Germany, France, Spain and the USA. A consolidated corporation is handled as one fiscal entity. One of the group's companies, for example the parent company, is taxed not only for its own profit but also for the profit of the group's other companies. A different model to cater for consolidated corporations in the taxation is used in Finland and Sweden. The group's profitable companies can pay group contribution to the others to even out the group's performance. Every company is taxed separately. This model also requires money transfers between the companies of the group, which is not required in the other model. (Ranta-Lassila 2002, 10-12)

2.2.1 Neutrality of taxation

Consolidated corporation is taken into account broadly in the different countries. The neutrality of taxation is the goal for the public authorities and the legislators. In an optimal situation the taxation should not affect the company's decision making. Companies would act as they would in a world with no taxes. (Ranta-Lassila 2002, 33)

The concept of taxation neutrality has three different aspects. First, the taxation of separate companies should be equal to the taxation of a consolidated corporation. The company should neither benefit nor suffer based on its juridical structure. The company form should not be a tool of tax planning. (Ranta-Lassila 2002, 11)

The second aspect is capital export neutrality. Simplified, it means that a company does not decide the location of its investment based on the taxation but based on the lowest production costs. The third aspect, capital import neutrality, means that profit of a domestic and a foreign company is taxed equally. The concurrence of capital export and import neutrality would require equal tax systems and tax rates in different countries. As this is not the situation, either goal has to be emphasized. (Ranta-Lassila 2002, 34-35)

2.2.2 Assessment of taxation in companies' decision making

The real world does not comply with the taxation neutrality and there is an on-going tax competition between the countries. According to Ranta-Lassila (2002, 39), the importance of tax incentives has risen in the companies' decision making.

The companies can compare either tax rates or effective tax ratios when they evaluate the attractiveness of different countries. Comparing the tax rates is fast and easy, but it gives a one-sided picture as the tax base and possible tax incentives are not taken into account. The effective tax ratio gives an all-round picture of the countries' taxation as the tax base and tax incentives are considered in the calculations. The problem of the usage of the effective tax ratio is the difficulty of calculations. There are different models to calculate tax ratios and the results can vary remarkably depending on the used calculation model. (Ranta-Lassila 2002, 36)

The European Union (EU) and The Organisation for Economic Cooperation and Development (OECD) have paid attention to harmful tax competition. They both have made taxation guidelines in order to prevent harmful competition. (Ranta-Lassila 2002, 43)

2.2.3 EU aspect of company taxation

Freedom of movement of persons, services, goods and capital is guaranteed in the EU. The companies can freely choose where they want to locate inside the Union and domestic and foreign companies should be treated equally as Ranta-Lassila notes (2002, 134).

Evening out the companies' profit inside a consolidated corporation is in practice usually not possible, if the companies are located in different countries. The reason for this is the countries' need to secure their tax income. However, it seems to be against the equality requirement. (Ranta-Lassila 2002, 135)

The EU Commission has set a target to create a tax system, which takes into account the international consolidated corporations. There are three options for the system. In a

Home State Taxation system, a consolidated corporation is taxed based on the laws of its home country. In a Common Consolidated Tax Base system, new taxation norms are made. The third option is to create a European Corporate Income Tax. It would include common tax rate and tax base and the taxes would be paid at least partly to the EU. (Ranta-Lassila 2002, 139,142)

2.3 Transfer pricing

Transfer pricing means pricing of transactions between two companies that belong to the same consolidated corporation. Ultimately, transfer pricing is about dividing tax income between two or more countries. (Karjalainen & Raunio 2006, 17)

Transfer pricing has become one of the most important tax related themes in international companies. In recent years, laws related to documentation of transfer pricing have come into operation in different countries. In Finland this took place on 1.1.2007. As a result, challenges in transfer pricing have become even more current for companies. (Karjalainen & Raunio 2006, 11)

OECD has played an active role in enacting regulation for consolidated corporations' transfer pricing. OECD's Transfer Pricing Guidelines for Multinational Enterprises and Tax Administrations have become an international standard of transfer pricing. Transfer pricing principles are quite equal all over the world. Countries' legislation is usually in line with OECD's guidelines but national legislation is not dependent on the guidelines. (Karjalainen & Raunio 2006, 11, 18)

Arm's length principle is the most essential concept in transfer pricing. Prices in trade between consolidated corporation's companies should be the same as they would be in trade between two independent parties on an open market. The arm's length principle is applied by comparing either terms of a transaction such as price, or results such as profit to terms and results of trade between independent parties. In practice, applying the arm's length principle is often problematic as enough information about similar cases is not available. Sold products can be so specialized that similar ones do not exist. Also parts of a final product or raw materials that are not sold on the market can be sold within a consolidated corporation. As companies of a consolidated corporation

have a common interest, they can share projects that would not be shared between companies independent on each other. (Karjalainen & Raunio 2006, 46-47)

Parties and their roles should be determined when transfer prices are discussed. The parties' roles have an essential significance on how big their profits should be. The party, who bears more risk and has a bigger effect on final product's price, should also gain a bigger profit. (Karjalainen & Raunio 2006, 49)

Different methods can be used to determine correct transfer prices, of which the comparable uncontrolled price method (CUP) is the principal method. It should be used when possible. In CUP, the price charged in trade between companies of a consolidated corporation is compared to a price charged in trade between individual companies. In CUP, transfer pricing is viewed on level of revenue and a case can be viewed either from seller's or buyer's point of view. Usage of CUP is often prevented by lack of reference data and there are also other methods such as resale price method (RPM). Using this method starts from a price for which a product that is bought from a company within a consolidated corporation is sold to an external company. Transfer price is calculated by reducing resale price margin from this price. In RPM, a case is viewed on level of margin on sales and from buyer's point of view. (Karjalainen & Raunio 2006, 65-77)

Transfer price determines a price of a transaction made between two companies of a consolidated corporation. Companies have different roles. Some roles include many different responsibilities and functions while some are quite simple. Correctness of transfer prices can be tested from either company's point of view. It is sensible to choose the company, whose operations are simpler. Fully-fledged manufacturer's operations and risks are so varied, that in practice, correctness of transfer pricing is generally tested from trade partner's viewpoint. It can be assumed, that if a price is correct from other party's viewpoint, it is also correct for the other. (Karjalainen & Raunio 2006, 63, 100)

3 LOGISTICS

3.1 Basic concepts

Waters (2003, 14, 17) determines logistics the following way: “Logistics (or supply chain management) is the process of planning, implementing and controlling the efficient, cost-effective flow of raw materials, in-process inventory, finished goods and related information from point of origin to point of consumption for the purpose of conforming to customer requirements.”

All companies move materials and deliver products to their customers. Therefore, all companies also have logistics operations. Materials can be either tangible or intangible and products can be either goods or services. Most products are a combination of a good and a service while either part is dominating. (Waters 2003, 4, 7)

Planning, sourcing, manufacturing a product, and delivering to customers are typical operational processes for a company. (Gümüs et al 2008, 502) Operations are at the heart of a company. Operations take different inputs, such as people, raw materials and information, and convert them to outputs such as products, profit and waste. Activities in a supply chain can be divided to upstream and downstream activities, when a supply chain is looked at from a single company’s point of view. Actions before the company are upstream activities and after the company downstream activities. (Waters 2003, 4, 8)

Material flow is the point of interest in logistics. When materials are moved from a vendor to a company, it is inbound logistics. Material movement inside a company during its operations is material management. Term outbound logistics is used for material movement from a company to a customer. Vendors and customers belong to tiers. The first tier vendors and customers are the ones with whom a company has direct business. Second tier vendor is “vendor’s vendor” and second tier customer is “customer’s customer” etc. (Waters 2003, 6, 8)

Logistics is a necessary and expensive function in a company and has a strong impact on financial performance of a company. Well performing logistics can nevertheless

create added value for the product. The added value can be place utility or time utility. Logistics has added place utility when a manufactured product is delivered to a place where it is needed. Time utility is added when a product is delivered at the right time. (Waters 2003, 18-21)

3.2 Trends

Three main themes can be suggested if an overview is taken of the trends in the logistics world. First, lean logistics is an analytical and systematic approach. All the wasted effort is tried to remove from the chain, whether it is time, material, movement or other resources. Second, agile logistics concentrates on customer service. Flexibility and quick response to changing demands are characteristic for this approach. The third trend is integration. Companies do not operate alone without connections to other parties but in a net of relationships. Barriers between companies should be as low as possible so that the entire supply chain's performance can be improved.

The three themes can seem opposite to each other at first but they are not mutually exclusive. Lean, agile and integrated logistics can be designed. (Waters 2003, 34)

Consignment stock, which is the core of this final thesis, is strongly based on integration. There needs to be trust between companies and the employees have to believe in a possibility of a win-win situation so that integration is possible. Building of a partnership or a strategic alliance can begin, when trust has been built. Vendor managed inventory and consignment stock are special types of partnership between companies.

Sometimes vertical integration can be the best way to make organizations work together. Vertical integration means that a company owns different parts of the supply chain. For example, a manufacturer can buy a part of its wholesalers stocks. (Waters 2003, 49) Vertical integration also exists in the Bayer group as manufacturing, sales and marketing functions exist in the group.

3.3 ERP systems

Information technology has had an enormous effect on logistics as on all company operations. Enterprise Resource Planning (ERP) systems link the companies' operations together from purchasing to production and further to sales and accounting. This decreases the amount of manual work. It also increases possibilities to follow the company's performance. The bigger the companies are, the more complex are the systems. Modular structure is a way to increase flexibility of a system. Instead of one big module, software is based on many smaller modules, which are then combined to create the whole system. The modules can be installed and run separately but they all extract information from the same source. (Helo, 2009) Companies' ERP systems can be designed to share some information when integration between companies is developed. It is easier for companies to plan their actions when they have real-time information about their customers' needs and suppliers' delivering capabilities.

The development of ERP software began in the 1970s. At first, software was developed for big industrial companies and only a part of a company's operations were included in the software. The first applications were made to automate calculations of material resource planning. The development of IT has made possible the strong growth of the software business and nowadays various solutions are available for small and medium-sized companies as well as for big international groups. (Helo, 2009)

ERP system's cost has several factors such as the size of the software, investment on hardware, consultants' and analysts' fees, implementation time and training. Large international companies (well over 1000 employees) are likely to spend between \$50 million to \$500 million for an ERP system. From 60 to 80% of this sum consist of services and training. The part of the actual software is relatively small. A full implementation of the system takes several years. Generally, ERP systems are expensive and time-consuming and require changes in every department of a company. For example, SAP and Oracle offer ERP software for big companies.

ERP systems allow easier global integration. Barriers related to currency and language can be bridged automatically, so data can be integrated across international borders. ERP systems eliminate the need to update and repair many separate computer systems. ERP systems allow managers to focus on improving processes. Time for a

process analysis is saved because the system contains all necessary information. Even complex reports are available in seconds. An ERP system can reduce costs and improve operational efficiency. These benefits can lead to more satisfied customers, which is sought by every company.

3.4 Inventory management

There are a couple of major actions within a supply chain, such as procurement, inventory management, warehousing and transport. (Waters 2003, 225) A closer look is taken at inventory management.

Stocks and inventory are often used concepts in logistics literature. Waters (2003, 252) determines them the following way: "Stocks are supplies of goods and materials that are held by an organisation. They are formed whenever the organisation's inputs or outputs are not used at the time they become available. An inventory is a list of things held in stock." There is a trend towards lower stocks. Some lines of business aim at eliminating stocks, while some just want to control them properly. According to Waters (2003, 254) "the main purpose of stocks is to act as a buffer between supply and demand. They allow operations to continue smoothly and avoid disruptions." Stocks can be also taken if price discount is given for large orders or if transport costs are optimal for some specific amount. Stocks also have a speculation aspect. Goods can be bought in stock if rise in price is expected.

There are three types of stock. Company's total stock consists of raw materials in a company's warehouse, materials tied-up to work in process and finished goods. Spare parts and consumables such as fuel and paper are additional types that do not fit well in those three groups. (Waters 2003, 255) This final thesis focuses on stocks of finished goods.

When to place an order and what the optimal order quantity is, are common questions in inventory management. A suggestive optimal order can be calculated from a formula developed by F. W. Harris in early 20th century. Slightly different variations of the formula can be found in literature such as Müller (2002, 127) and Waters (2003, 260). Waters presents the formula as follows:

Economic order quantity,

$$Q = \sqrt{\frac{2RD}{H}}$$

Where, D = demand (units a year)

R = reorder cost (per order)

H = holding cost (per unit a year)

Sensitivity analysis can be performed to find out, how the costs vary, when the order value is changed. Cost curve in Figure 1 presents the change of costs according to order amount. The curve shows that costs increase by 10% if the optimal order amount is decreased to 64% or increased to 156%. In proportion, the costs increase by 20% if the order quantity is decreased to 54% or increased to 186% of the optimal quantity. The starting values in the EOQ formula are always based on assumptions and approximations. Usefulness of the EOQ formula is based on the fact that the costs are not sensitive to changes in order quantity. EOQ is a good suggestive calculation. (Waters 2003, 264)

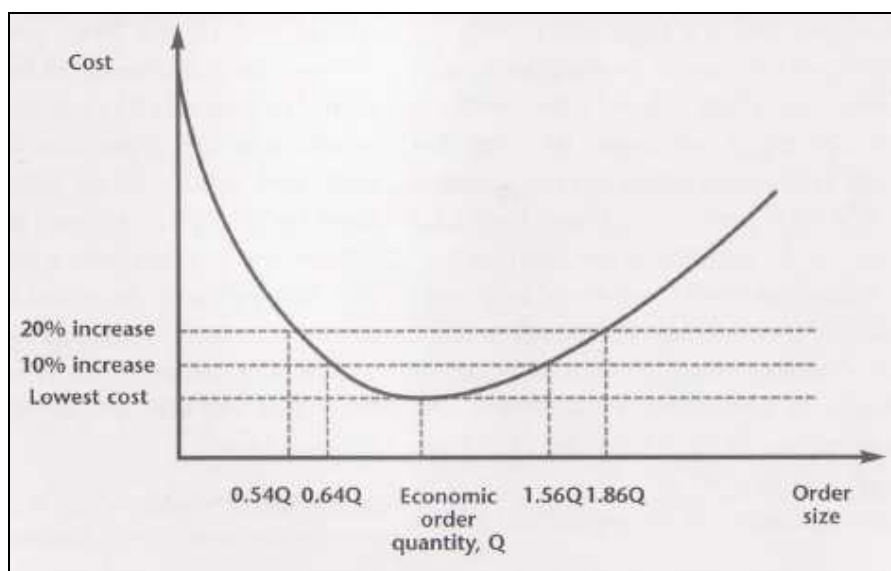


Figure 1. Sensitivity analyses of the EOQ formula, cost curve. (Waters 2003, 265)

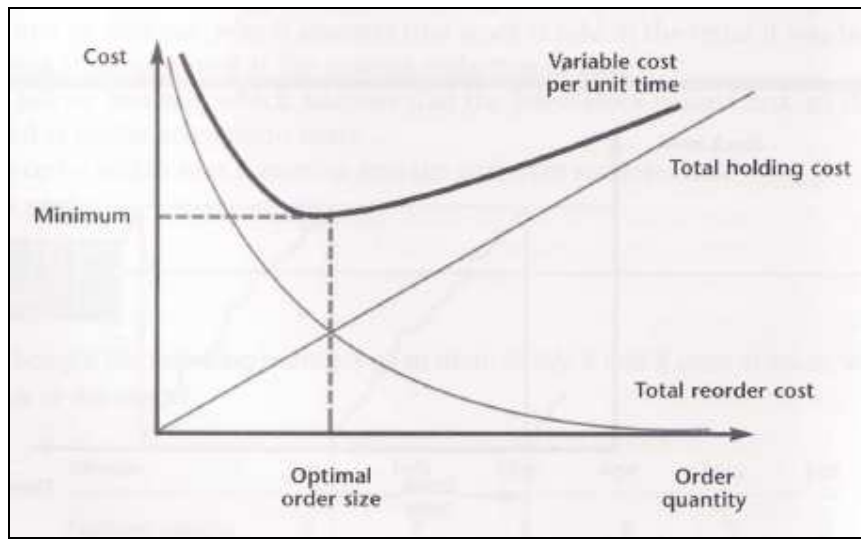


Figure 2. Variation of cost with order size. (Waters 2003, 260)

Figure 2 explains the form of the cost curve. The left side of the curve is steeper than the right side as reorder costs fall rapidly at first, when order quantity increases. The influence of linearly increasing holding costs grows, when the order quantity exceeds the optimum. Therefore, the curve's right side is gentler.

The stock level starts to decrease after a shipment as a company utilises the goods it has in stock. At some point before the stock level has dropped to zero, a replenishment order needs to be placed. This level is called the reorder point. A supplier needs a specific time after the order has been placed to deliver the goods to the customer. This period is called lead time as shown in Figure 3. The lead time has to be known. If an order is placed too late, a customer runs out of stock. If an order is placed earlier than needed, the customer's stock level rises little by little, assuming that the order quantity is always the same.

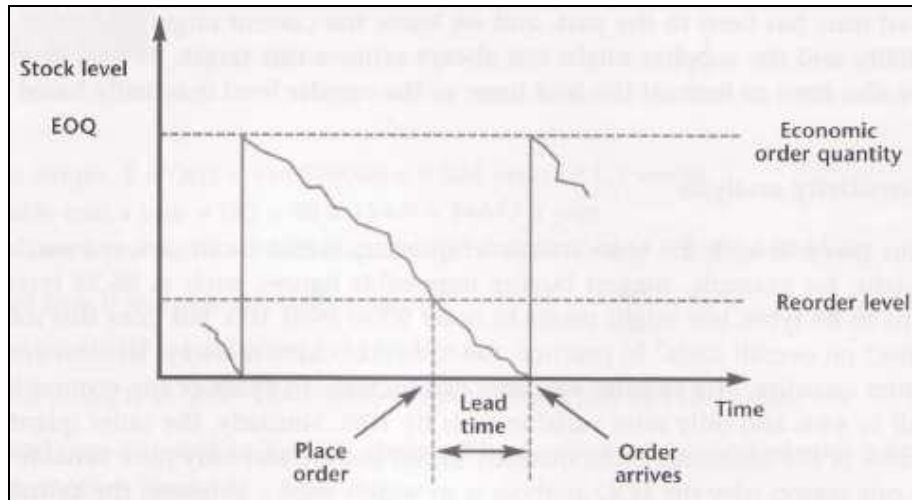


Figure 3. Reorder level and lead time. (Waters, 2003, 263)

A stock cycle is the time period between two deliveries. Figure 4 presents a situation where the supplier's lead time is longer than stock cycle. In that case, the reorder point is already during the previous stock cycle. The reorder level is still the same.

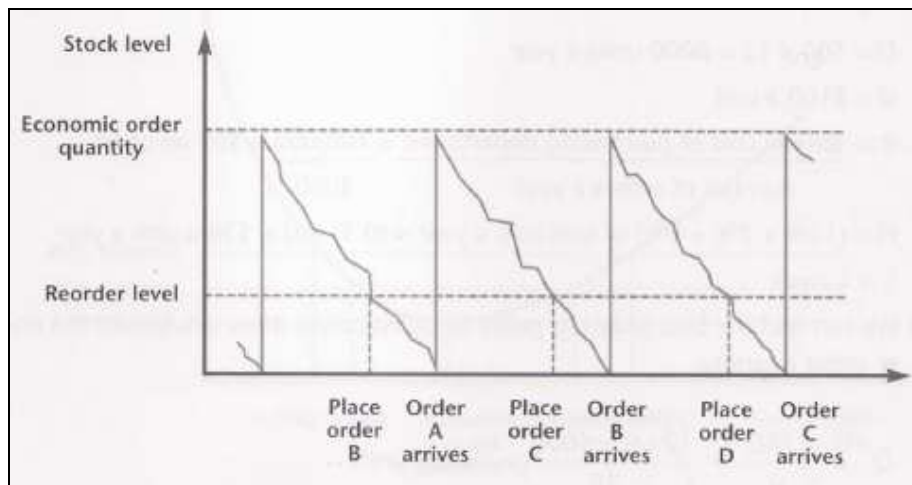


Figure 4. Reorder point when lead time is longer than stock cycle.

In real life, safety stocks are often needed as buffers. Stock out situations can be very expensive and keeping a safety stock is a reasonable way to prepare for sudden increase in demand, late or short deliveries or transport damages. Figure 5 presents an inventory management situation with safety stock.

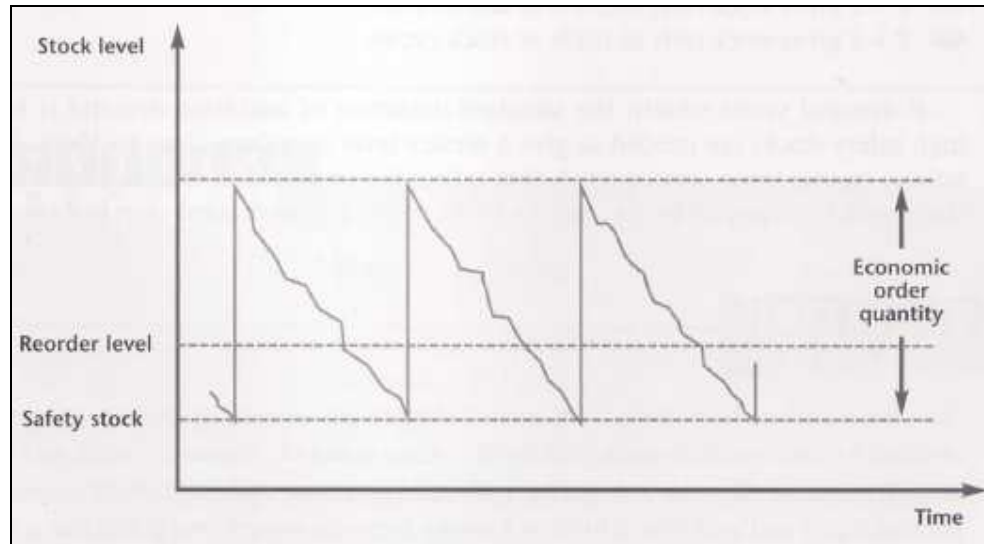


Figure 5. Safety stock raises the average stock level. (Waters 2003, 267)

Traditionally, a customer makes the ordering decisions and determines the ordering quantities. The trend is towards models, where a supplier makes these decisions based on the customer's stock and sales information that the supplier receives on-line.

3.4.1 Vendor managed inventory (VMI)

“Vendor managed inventory (VMI) is a supply chain sourcing practice between a vendor and customer. A common focus of research and supply-chain practice is to seek mechanisms to align the decisions of chain members by means of contracts or agreements. Vendor managed inventory is one such agreement.” (Gümüş &c. 2008, 502-503). In the traditional model customer places the replenishment orders but in VMI vendor is responsible for maintaining the customer's inventory levels and makes the replenishment decisions based on an agreed contract. The customer does not place any orders.

The goal of VMI practice is to optimize supply chain performance. In recent years, companies have strengthened their supply agreements, and the management of inventories has got more attention. Vendor managed inventory represents an interesting approach to stock monitoring and control, and more and more companies have considered benefits of VMI and introduced VMI practice in their business. (Zavanella & Zanoni 2009, 225)

True demand information sharing is necessary for a successful VMI practice. It eliminates the guesswork in inventory/production planning. Manufacturers tend to act based on a worst case scenario if they do not have true demand information and they have to guess. Guessing easily creates too big inventories or possibly stock-outs. A high degree of trust between the parties is important for VMI programs. The trust issue is especially important when the partnership of two individual companies is assessed. Trust is equally important but easier to develop when the two companies belong to the same group and therefore have common senior management and financial interests. (Frazelle 2001, 161)

According to Frazelle (2001, 163) "an electronic, real-time information exchange is a key enabler of supplier integration." Usually this is executed by Electronic Data Interchange (EDI) or the internet. The importance of real-time information exchange for fluent operation of a VMI practice is also noted by Valentini & Zavanella (2003, 216). Information exchange is enabled in the Bayer group by the SAP ERP system. Sales forecasts and stock levels are reported in SAP APO system. Based on this information the production plants plan the production and deliveries.

A VMI relationship does not automatically include a consignment stock but it may be included. (Vendor Managed Inventory, 2009)

3.4.2 Consignment stock

Consignment stock is a special case of vendor managed inventory. In addition to shifted ordering responsibilities, it includes special arrangements in goods' ownership.

The basic idea of consignment stock is shown in Figure 6. Traditionally the vendor owns the goods until they arrive to customer's premises. In consignment stock concept vendor owns the goods until the customer sells them further or uses them in the manufacturing process.

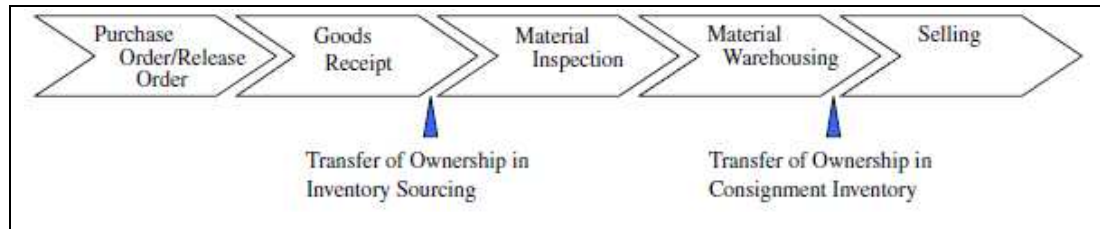


Figure 6. The customer's sourcing activities: transfer of ownership in IS and CI. (Gümüs et al 2008, 503)

The reader has to be precise when reading supply chain management literature. Similar names are used for some concepts that are in fact quite different. The consignment stock (CS) concept is a good example of this. Some writers use a definition, where consignment stock includes the VMI concept. This definition is used for example in the texts of Zavarella & Zanoni (2009) and Valentini & Zavarella (2003). Gümüs & c. (2008, 504) use the definition consignment inventory (CI), which does not include VMI. "In CI, even though the vendor is informed about the consumption of goods at the customer's premises, it is still the customer who finalizes the timing and quantity of orders." BSP Oy has VMI in place with all the Bayer subsidiaries. As VMI is the basic situation for all company trade, a possible consignment stock practice would naturally also include VMI.

The differences between the CI and CS (here C&VMI) concepts are clearly shown in Table 1. Also the differences to the traditional, customer order based sourcing model (inventory sourcing IS) can be seen.

Table 1. Comparison of the basic characteristics of IS, CI and C&VMI. (Gümüs et al 2008, 506)

Comparison of the basic characteristics of IS, CI, and C&VMI			
	IS	CI	C&VMI
Ordering decision made by	C	C	V
Bearer of ordering cost	C	C	V
Ownership of stock at customer	C	V	V
Bearer of opportunity cost	C	V	V

C: the customer, V: the vendor.

Traditionally a customer places an order when the inventory has gone down to the defined re-order point. The customer also owns the goods in his or her warehouse and has to bear ordering and opportunity costs. Opportunity cost means the capital cost caused by holding the stock (Gümüs et al 2008, 505).

The ownership of stock at customer has moved to vendor in the consignment stock (here $C \& VMI = CS$) and CI models. Vendor bears the opportunity cost. In the CS practice the responsibility for making ordering decisions and ordering costs have also moved to vendor. Both CS and CI practices are clearly advantageous for the customer, as in the both cases customer's costs are cut down. However, suppliers are doubtlessly willing to adjust prices when they take more responsibilities. In the Bayer's case, changes in CS related responsibilities would have to be considered when transfer prices are negotiated.

The CS and CI practices offer clear benefits for a customer, while vendor's benefits are not that clear. CI can be used as a strategic tool to create new sales channels, when a new product is brought to market. Customers may be more interested in buying a new product if they do not have to bear the risk that the products are not sold. The same strategy can be used when the products are really expensive and difficult for the customer to own. A vendor might also see CI practice beneficial if a customer has a lot of negotiating power. In this kind of a situation, vendor can offer CI practice to secure her position in the market. (Gümüs et al 2008, 503-504) VMI practice gives to a vendor freedom of action as it was discussed earlier in section 3.5. Vendor can offer a CS agreement in place of CI to benefit more from the relationship.

In CS model a vendor can freely decide interval and volume of replenishment orders. The only requirement is that inventory in customer's warehouse stays between a minimum required level s and a maximum level S . Both s and S are agreed in a contract between vendor and customer. (Valentini & Zavanella 2003, 217)

A Vendor can choose a stock replenishment policy based on his or her strategy and cost structure. If a vendor has high transportation costs, big shipments can be made to cut down the transportation costs. Shipping small amounts with a short interval could be another choice. This choice seems reasonable if a vendor has high inventory

holding costs or lack of space in her warehouse. (Gümüs et al 2008, 510) Production planning is easier as a vendor has real time information about the inventory.

Valentini and Zavanella present their ideas about differences in inventory costs per unit between traditional and CS models in two tables (2003, 217-218). Inventory costs in traditional agreements are shown in the Table 2. Inventory cost consists of two components, financial one h_{fin} and a storage one h_{stock} . The financial component is the opportunity cost, cost of tied-up capital. The storage component has to do with costs such as warehouse, goods transportation and insurance. Supplier bears all inventory costs before goods receipt at customer and after goods receipt all costs are born by customer. It is assumed that supplier's and customer's storage costs are more or less identical, i.e. $h_{c,stock} = h_{s,stock}$. However, $h_{c,fin} + h_{c,stock}$ is generally greater than $h_{s,fin} + h_{s,stock}$ because $h_{c,fin} > h_{s,fin}$. This seems natural, as value of goods raises when they go down the supply chain.

Table 2. Inventory costs in traditional agreements (Valentini & Zavanella 2003, 217).

Relevant inventory costs in traditional agreements			
		Position of raw material	
		Supplier	Company
Relevant costs	Supplier	$h_{s,fin} + h_{s,stock}$	0
	Company	0	$h_{c,fin} + h_{c,stock}$

Under CS policy the financial component is shifted onto supplier, as shown on Table 3. When it is assumed that $h_{c,fin} > h_{s,fin}$ is still valid, the total inventory cost of the system decreases in the CS case. This is an interesting viewpoint concerning the Bayer case.

Table 3. Inventory costs under CS policy (Valentini & Zavanella 2003, 218).

Relevant inventory costs under CS policy			
		Position of raw material	
		Supplier	Company
Relevant costs	Supplier	$h_{s,fin} + h_{s,stock}$	$h_{s,fin}$
	Company	0	$h_{c,stock}$

Individual companies obviously try to secure their own benefits when contracts with other are made. In the CS model some of the supplier's and the customer's interests are opposite and compromises need to be made. Setting the minimum and maximum stock levels is an important matter when a CS policy is introduced. The levels strongly determine supplier's freedom of action in the partnership. The following Table 4 explains supplier's and customer's interests in stock level setting.

Table 4. Stock level related motivation for the supplier and the customer. (Valentini & Zavanella, 2003, 221)

Desired (s , S) levels and related motivation for the supplier and the company		
	s level	S level
<i>Supplier</i>	<p>↓ Keep as low as possible It represents a capital "frozen" in the company's warehouse, which determines an opportunity cost</p>	<p>↑ Keep as high as possible It consists in a space offered by the company to stock products, thus freeing space in own warehouses. Consequently, production flexibility may be increased.</p>
<i>Company</i>	<p>↑ Keep as high as possible It is a sort of safety stock which enables a higher service level, whereas its economic burden is borne by the supplier</p>	<p>↓ Keep as close as possible to s level There is a need for limiting the space occupied by the products and for reducing the problems linked to their management and handling</p>

In Table 4 s represents the minimum inventory level allowed in the CS contract. A Supplier's motivation is to negotiate the s level as low as possible. The lower the s level is the less of a supplier's capital is potentially tied in the goods. In proportion, high s level means high safety stock for the customer. High s level is customer's advantage.

S stands for the maximum allowed inventory level. While the supplier prefers a high S level to increase his or her operational flexibility, an S level close to s level is preferable for the customer. A Customer's total storage costs rise when more goods are stored in his or her premises.

CS is preferably used for products characterized by constant consumption. Non-standard products and prototypes are not to be included in CS programs. (Valentini & Zavanella, 2003, 222) This is a clear difference to the CI concept as Gümüs et al (2008, 503-504) recommend CI for creating new sales channels and for making it easier for customer to buy expensive products. Consumption of a new customer is unknown at first and consumption of expensive products is most likely low. CS needs real-time information exchange in order to work properly. This is something that is not available between new partners.

CS agreement between two individual companies is the most common starting point in literature. Zavanella & Zanoni (2008, 225-232) examine a one-vendor multibuyer model, where a vendor delivers the same product to many customers. They create mathematical models to analyze and optimize the total performance of a supply chain. Sensitivity analysis is also performed to find out, which variables are remarkable. Zavanella's and Zanoni's research offers an interesting basis for further study of Bayer's supply chain.

4 DOMESTIC MARKET

4.1 Chosen research methods

As this is final thesis of applied sciences, the discussion of, for example, the type of the research, the research method and the theory of material analysis is limited. Still, some of the basics are briefly discussed.

The final thesis has a qualitative approach. This approach was chosen because the goal was not to generalize but to describe company specific processes. A qualitative approach is useful and justified when attempting to describe a phenomenon or occasion or to understand an action (Karasti, 2004).

In a qualitative research, the sample is always relatively small and it may be difficult to obtain an overall picture. One solution is to use triangulation, which is also a way to increase reliability (Karasti, 2004). In this final thesis, the type of triangulation used was the material triangulation. In practice it means that material was collected from different sources. Same topics were discussed with many people working in different group companies. Information was also collected from company documents, meetings and literature. The goal was to develop a "360-degree-view" of the processes. This can only be reached when the processes are viewed from different angles.

4.1.1 Acquisition of material

Information about Bayer was collected by reading the company documents, by interviewing employees, and by taking part in meetings. These sources were used in the description of the current sales and delivery processes. Background information was needed for assessment and comparison of the current and optional processes.

Source literature was chosen based on its validity, reliability and versatility. Over ten-year-old books and articles were avoided. Books were chosen from libraries of universities and well-recognized article databases were used. Internet was used to get up-to-date information from the commercial world.

Interviews were preferred to written questionnaires. During an interview there was a possibility to discuss upcoming issues and to avoid misunderstandings as the interviewee can be asked for explanation. Less effort was needed from the interviewee compared to filling up a questionnaire. Furthermore, short answers to open questions in questionnaires tend to be a problem. Also the information collected was so varied that compiling a good questionnaire would have been very difficult. The interview technique was closest to a theme interview. Open questions were preferred and the interviewees could speak quite freely but somewhat same topics were discussed with all of them. This type of interview also provided a good opportunity to learn more. The interviewees represented three different companies: Bayer Schering Pharma Oy, Bayer Oy and Bayer Schering Pharma AG.

4.1.2 Analysis of material

Analyzing the collected material is the most difficult task in a qualitative study. The first task is to classify the material. After that the researcher should proceed progressively (Karasti, 2004). In this final thesis different sales and delivery processes could be listed and the collected material was classified under each process.

Working with one of the processes at a time was preferred. Sometimes, however, this was not possible. When analyzing the material, a clear factual approach was adopted.

4.2 Processes of domestic business

The wholesaler Tamro Oy is the distributor for all Bayer's medical products in the domestic market. There are two main sales and delivery processes, one for purchased goods and one for goods manufactured by BSP Oy. Goods are purchased from other Bayer supply centers and from external vendors like Santen in Tampere. Most of the products sold in the Finnish market are imported.

BSP Oy and Tamro have a consignment stock practice in place. BSP Oy owns the inventory at Tamro. The warehouse is located in Vantaa. Both purchased and self-manufactured goods are delivered there directly. BSP Oy does not have stocks in its own premises. The clients, hospitals and pharmacies, receive their products always from Tamro.

BSP Oy operates in the so called Pharma business, that is, prescription drug business. Bayer sells also many over-the-counter products in Finland but they belong to the ConsumerCare division and are not part of the Pharma business. The later described processes are strictly for prescription drug business.

Electronic information exchange

Fluent electronic information exchange between companies is one of the key enablers of a successful consignment stock practice. Information exchange between Tamro's ERP system and Bayer's SAP P2R has been developed. As a result, BSP Oy has up-to-date sales information and amount of manual work has been reduced. Update runs are made once a day in the night. In addition to automatic information exchange from Tamro's ERP system to BSP Oy's P2R, Tamro has a TamroSmart customer interface, which can be used with a web browser.

In an optimal situation information exchange would be fully automated. Due to characteristics of the SAP system, some updates have to be made manually. These are, for example, goods returns, corrections to sales, discounts and free samples. Manual updates are made in the accounting department of BSP Oy based on a SAP report printed out in the IT department. A complete list of manual updates is shown in

Appendix 1 (not public). Sales, purchase order receipts and inventory corrections are updated automatically.

Stocktaking

All Bayer's products are counted once a year in Tamro's warehouse. Also BSP Oy's representatives are in attendance. Stocktaking is a good way to control the quality of operations. Minor or no differences between the actual amount of products in the warehouse and the figures in the IT systems are naturally a sign of accurate processes. In proportion, the reasons for possible differences need to be clarified.

Information in BSP Oy's P2R and in Tamro's ERP system must be equal before stocktaking. Stock levels in both systems are added or reduced by the same amount after stocktaking if needed. In case the stock levels do not match before stocktaking, they do not match after stocktaking. Following the inventory by IT systems is not enough. When products are counted manually, possible earlier made mistakes are revealed and the possibility of multiplied faults is eliminated.

Product master data maintenance

At Bayer all business is handled through the SAP system. Without up-to-date master data, entering sales forecasts, planning and completing any kind of transactions is impossible. Product master data needs to be created already at the point of planning of a new product launch. This can be one to two years before the first products are sold.

Correct and equal master data in SAP P2R and in Tamro is essential for a smooth delivery process. Bayer Oy's employees (business unit heads and controller) are the first to know about product launches and improvements regarding the Finnish market. Bayer Oy's supply chain coordinator is responsible for giving correct and equal information for both BSP Oy and Tamro.

Product master data consists of both physical (e.g. weight, dimensions) and immaterial (e.g. price, material number, costs) information, see Appendix 2: Master data maintenance –form (not public). The form is filled in by the employees working in different company functions. The initiative to create or change product master data of

imported products is made by the supply chain coordinator of Bayer Oy, who fills in the basic information. The form goes through the whole chain and all necessary information is filled in. The last one in the chain sends the form to the master data maintenance team of BSP Oy. They maintain the product master data in SAP P2R and make the actual entries to the system.

4.3 Sales and delivery processes of the domestic market

4.3.1 Purchased goods

The basic sales and delivery process for purchased goods is described in Figure 7. Sales forecasts made by the business units of Bayer Oy are the basis for supply planning and production. The supply chain coordinator enters forecasts in SAP APO planning system. Possible remarkable differences between sales forecasts and actual sales are an input to change forecasts. Changes in sales forecasts cause further changes to the dates and volumes of future deliveries and are challenging for the supply centers. Forecast accuracy goals have been set for Bayer Oy as well as for other Bayer subsidiaries.

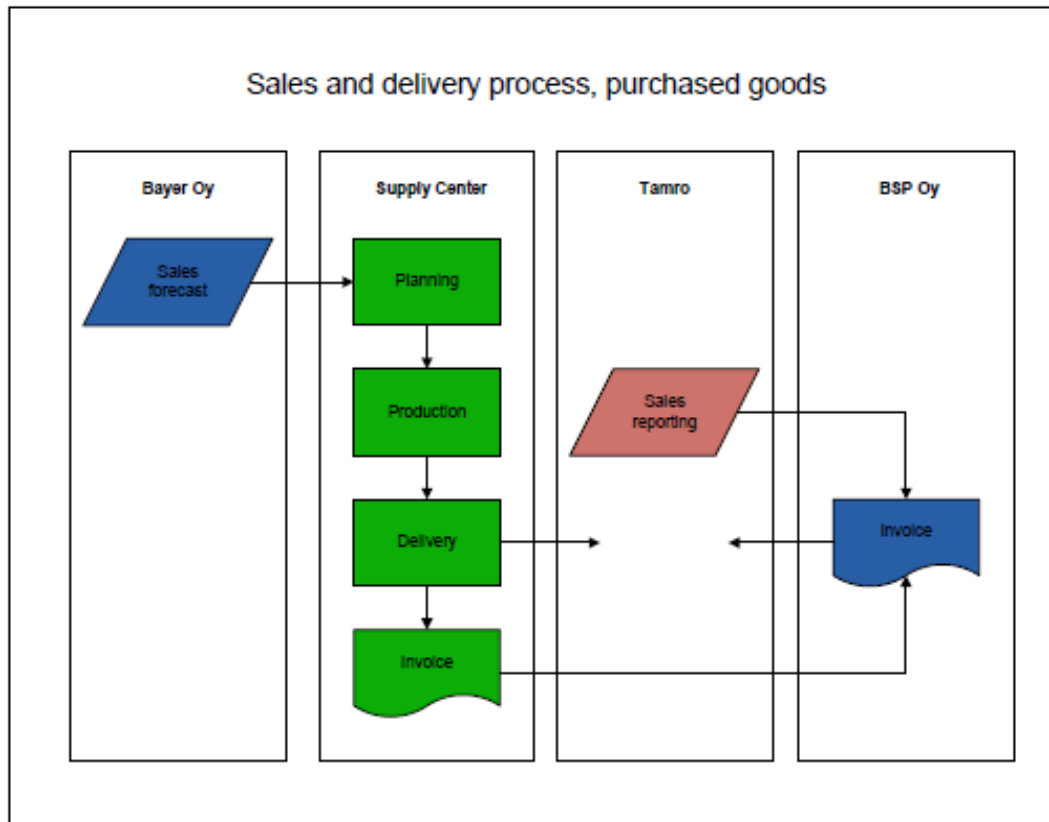


Figure 7. Sales and delivery process of purchased goods.

When a batch of goods has been produced, it is shipped to BSP Oy's consignment stock in Tamro's warehouse, Vantaa. VMI practice is in place in the group trade. Therefore, the manufacturer is responsible for the inventory levels being correct in relation to sales and for a smooth delivery process. BSP Oy's material planner also follows the delivery process. BSP Oy receives an invoice after each delivery.

BSP Oy owns the inventory at Tamro. Consignment stock invoicing is not based on single deliveries but on actual sales reported by the client. Tamro's sales are reported in their ERP system and information is transferred to their customer interface's (TamroSmart) data warehouse. From TamroSmart information is transferred daily to BSP Oy's SAP P2R system. BSP Oy invoices Tamro once a month on the last working day, based on sales information in P2R. Tamro sends a consignment sales report to BSP Oy at the end of a month. This document is compared to BSP Oy's sales report from SAP Business Warehouse. Possible differences are troubleshooted and Tamro is credited or debited in case of incorrect invoicing.

4.3.2 Self-manufactured goods

The sales and delivery process of goods manufactured by BSP Oy is simpler than the process for purchased goods because less parties are involved, see Figure 8. BSP Oy produces and delivers goods to Tamro based on Bayer Oy's sales forecasts. BSP Oy owns the inventory until Tamro takes the goods from the consignment stock. This happens when Tamro makes a delivery to the customer. The delivery from BSP Oy to Tamro is simply a stock transfer because the owner of the goods does not change. Invoicing takes place on the last working day of the month. It is based on information in P2R which is compared to a consignment sales report sent by Tamro.

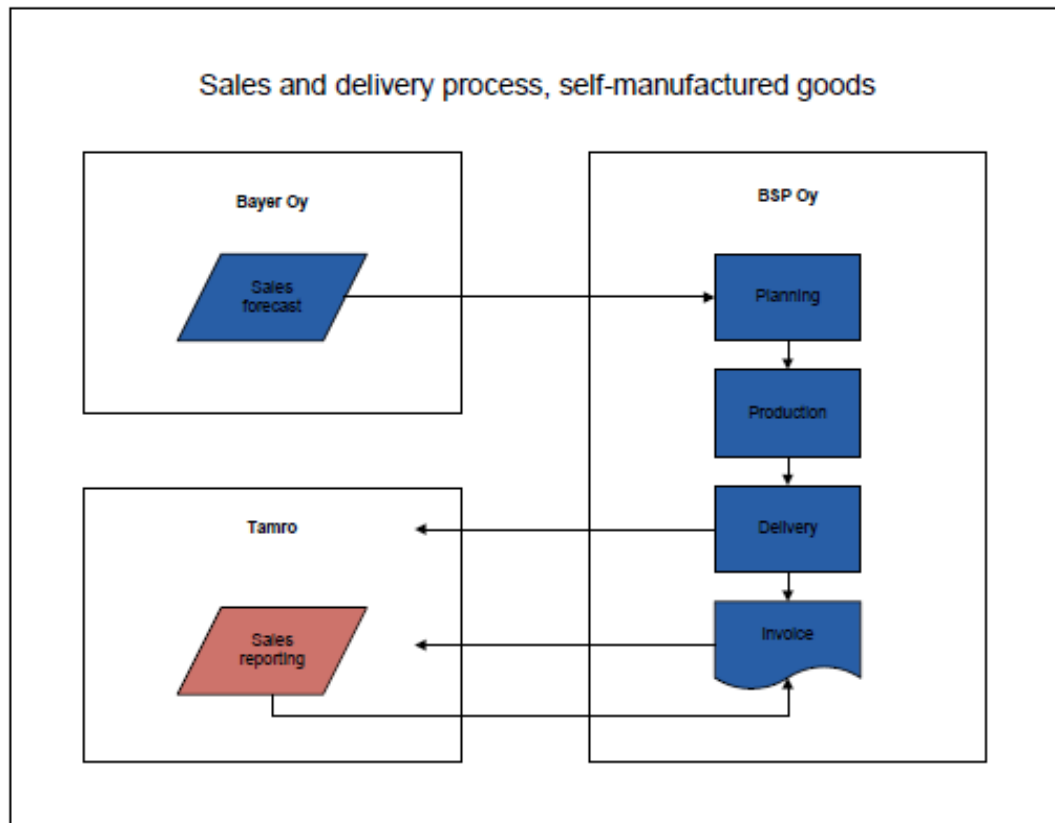


Figure 8. Sales and delivery process of self-manufactured goods.

4.4 Special cases

Product samples

A part of BSP Oy's inventory at Tamro are product samples which are not sold but given as free samples to customers. Sold goods and samples need to be kept separate in accounting. For a major part of products, there are own product codes for sold goods and samples. Nonetheless, regarding to some products, there is only one product code and all goods are put to merchandise stock when they arrive in Tamro. Later, a part of the goods can be moved to sample stock. This movement has to be done following a clear procedure to guarantee correctness of books.

Initiative to move goods from merchandise stock to sample stock can come from different parties. A sales representative, who needs new samples, may request a movement. Also employees of Tamro or Bayer Oy, who have seen the sample stock running low, may initiate a movement.

The supply chain coordinator of Bayer Oy gives permission to move goods to sample stock. Change of goods' status in BSP Oy's P2R needs to be done manually. Bayer Oy's supply chain coordinator informs BSP Oy's controller of product supply, who forwards the information to the warehousing department, where the needed entries to P2R are made. BSP Oy's inventory decreases by the value of the moved goods. The incurred cost is entered as a marketing cost. Entries in warehousing and accounting systems are displayed in Appendix 3 (not public). Product samples should be free of charge for the distributor according to a Bayer policy. Therefore, a credit note is requested from BSP AG. This is done by Bayer Oy's supply chain coordinator. The credit note eliminates the goods movement's effect on result.

A suchlike process has not been created for self-manufactured goods. The simplest choice might be to have separate product codes for samples and sold products. Then there would be no need to change products' status. A status change is not a preferable process. Status changes create a remarkable workload in the supply chain, as many people are involved. Workload can even multiply compared to a process with separate sample codes, if goods have to be moved back to merchandise stock. This can be the

case after delayed deliveries. Also possibility of mistakes rises along with the amount of people.

Shelf life expiration

All products have a determined shelf life. When products' shelf life expires, the products can not be sold anymore. Tamro requests a permission to destroy the goods. Bayer Oy's supply chain coordinator gives his comments and the permission is given by BSP Oy's head of procurement. Tamro invoices BSP Oy for destruction expenses. The invoice is commented by Bayer Oy's supply chain coordinator and approved by BSP Oy's warehouse manager.

Destruction of goods is entered to the system at Tamro and information transfers to BSP Oy's P2R during an overnight update. BSP Oy's current assets are decreased by the value of destroyed goods. Entries in warehousing and accounting systems are displayed in Appendix 4 (not public).

Customer returns (complaints)

If a customer is not satisfied with the quality of goods, they can make a complaint. Bayer Oy's head of domestic business assesses customer complaints. If a complaint is justified, goods are destroyed under controlled circumstances. BSP Oy bears the costs in the first place. If some other party is found responsible for harming the goods, costs can be invoiced from them.

Recall cases

Medical companies have to be able to react fast in case of a quality problem. If a quality problem appears and the goods have already been delivered from the manufacturing plant, the relevant product batches need to be recalled from the market. Products are either sent back to the manufacturing plant or destroyed, depending on the manufacturer's decision. Local destruction of goods is always the first choice as it is a simpler process than sending goods back to manufacturing plant for destruction.

BSP Oy's head of procurement accepts a destruction of goods after an acceptance has been given from the group level. Tamro destroys the goods and sends destruction documentation and invoice for destruction to Bayer Oy's supply chain coordinator, who then forwards the documents to BSP AG. BSP Oy receives a credit note in return.

In case BSP Oy would have to recall self-manufactured goods from the market, most likely they would have to bear the costs themselves.

5 MANUFACTURING AND EXPORT

5.1 Current sales and delivery processes

Currently Bayer Schering Pharma Oy has four different models for group trade. These models are customer related. In practice it means that BSP Oy always uses the same model in trade with a specific customer. For example, trade with Bayer B.V., The Netherlands, is always bilateral trade. However, with other supply centers Bayer B.V. may have different models in use. The group customers of BSP Oy are located all over the world and each country has its own specialties regarding import legislation and regulation. This fact has had an effect on the choice of the business model with some countries such as the United States. Legislation issues always affect everyday work.

The delivery process time varies a lot depending on the amount of paperwork. Trade is especially simple between countries in the European Union. Modernized non EU countries form the second group. More paperwork is needed but usually all the documents can be delivered electronically. The third group is formed by countries where IT has been implemented to a more restricted extent. The financial situation is also unstable in many developing countries. Trade is more complex if special arrangements as letters of credit need to be used.

During the years the bilateral sales and delivery process has been implemented with more and more countries. The other option, which is also commonly used, is to run the business through the parent company. The reason to channel goods and money

through the parent company has often been an unstable economical situation in the destination country. BSP AG is also normally involved in the sales and delivery processes if a Bayer company is not in charge of the goods distribution in the destination country, or if the delivered quantities are really small. Shipping costs would be too high for small amounts. Many small deliveries are collected to the central warehouse in Germany and then shipped at once to the customer.

A vendor managed inventory (VMI) practice is in place between BSP Oy and its group customers. A manufacturer is responsible for producing and delivering goods for clients according to clients' sales forecasts. Ordering decisions are made by a manufacturer. They also bear ordering costs. BSP Oy is responsible for its customer subsidiaries' inventory levels and can choose the date and volume of deliveries. BSP Oy's group customers' inventories are seen as inventories of BSP Oy, when inventories are followed on a group level. However, in accounting goods belong to customer's assets after they have received the goods. A customer bears opportunity and storage costs. This is taken into account when transfer prices are set.

Reorder levels are determined in SAP master data. When the stock has run down to the reorder level, the system gives an alert. After a supply planner has approved the alert, the system creates automatically a production plan to satisfy the need.

Transfer pricing

The importance of transfer pricing has also been noted at Bayer. A special unit coordinates transfer price negotiations to make sure that the laws are followed and to guarantee interest of the whole group.

Companies have different roles in transactions and determining those roles is important when transfer prices are set, as it was stated earlier. BSP Oy acts as a fully-fledged manufacturer when it sales products to other Bayer subsidiaries around the world. BSP Oy has research and development functions, it buys raw materials and components, designs production lines and plans production, manufactures and packs products and has a quality assurance function. All these are characteristics of a fully-fledged manufacturer. BSP Oy bears a lot of risk as its operations and responsibilities are wide. Client subsidiaries that buy products and sell them further in their country are buy-sell

distributors. They have marketing, sales and warehousing functions and they also set prices when products are sold to the market. (Karjalainen & Raunio 2006, 99, 109)

Bayer uses RPM to determine transfer prices. Client subsidiaries' responsibilities and risks are more limited and their cost structure is simpler than what a manufacturer has. Therefore, it has been reasonable to determine transfer prices from a buyer's point of view.

The following method is used to check the correct level of transfer pricing. Client subsidiary's sales income from last year is known. Cost of goods sold (COGS) is taken away from this amount. Total marketing and sales costs, administration costs and other costs are also reduced. A margin of 3-5% should be left for the subsidiary. If this is not the case, the transfer price needs to be either raised or lowered. An example calculation is presented in Appendix 5 (not public). Only distributors' margins are determined and basically the manufacturers can receive a really high margin if they are able to cost effectively develop and manufacture a successful product. However, the risks are high compared to distributors.

5.1.1 Bilateral process

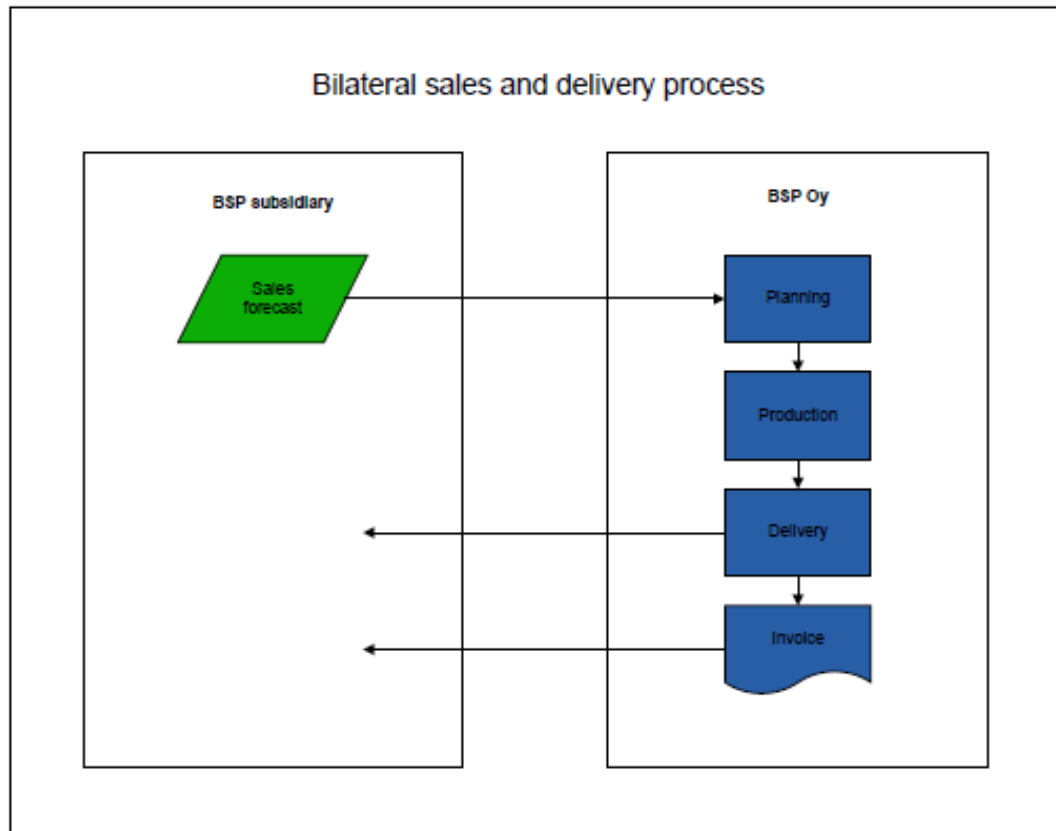


Figure 9. Bilateral sales and delivery process.

In Figure 9 the bilateral sales and delivery process is described. Customer subsidiaries enter their sales forecasts to the SAP APO system. Sales forecasts of customers are viewed by BSP Oy's supply planners who then approve them for further actions or negotiate with the customer. Once the forecasts have been approved, APO creates a production plan. Order sizes are optimized automatically based on warehousing costs and costs of product change in the production line. This automatically created version is then modified by production planners. The manually approved production plan is "frozen" and given to the production department. The system maintains a long-term production plan draft. A plan of 66 days is maintained manually.

Produced batches have to be released by the quality assurance function before goods can be delivered to a customer. Delivery documents are created by logistics coordinators in the logistics execution department. Dispatch store workers control the

physical dispatch and make the goods check-out in the system. BSP Oy does not have own transport equipment and transportation service is bought from a forwarder.

A customer is invoiced according to every delivery. Invoices are based on agreed contracts. Price, incoterms and delivery address are agreed and determined with every customer, e.g. in Distributor's agreements.

Goods and money move directly between BSP Oy and a customer subsidiary. Nonetheless, the parent company is involved in the negotiations about the terms of trade, e.g. prices and incoterms. This is needed in order to guarantee the profit for the group, not just for a single company.

5.1.2 Triangulation

Triangulation model is described in Figure 10. All the steps from making a sales forecast to execution of a delivery are the same as in the bilateral process. The difference is in invoicing. While goods are delivered directly to a customer subsidiary's warehouse, they are sold to BSP AG, who then invoices the customer. BSP AG invoices a customer subsidiary either after every delivery or at the end of an agreed invoicing period. Invoicing period is related to a consignment stock practice, that BSP AG has in place with some customers. In triangulation, BSP Oy is like BSP AG's subcontractor.

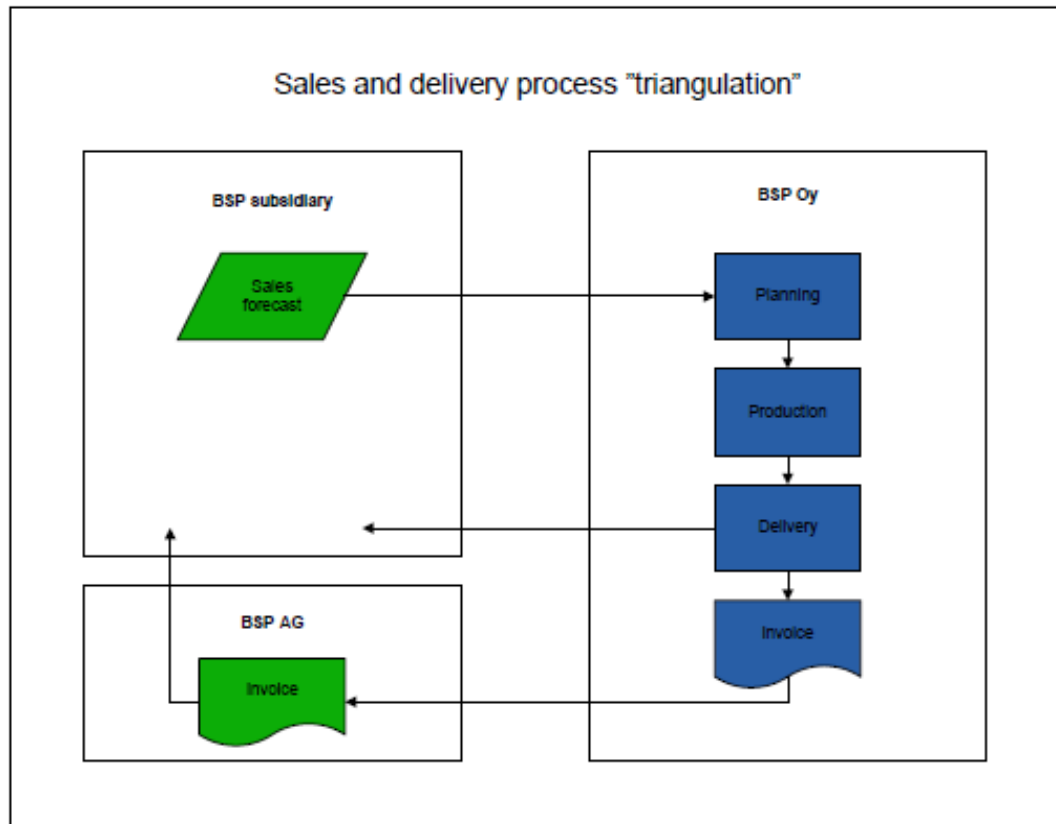


Figure 10. Sales and delivery process *triangulation*.

5.1.3 Via Velten and to Velten

Via Velten and *to Velten* are processes, where Bayer AG is the buyer of goods and the shipment destination. These processes are described in Figures 11 and 12. BSP AG is involved every time, when data, goods, or money is transferred between BSP Oy and a customer subsidiary.

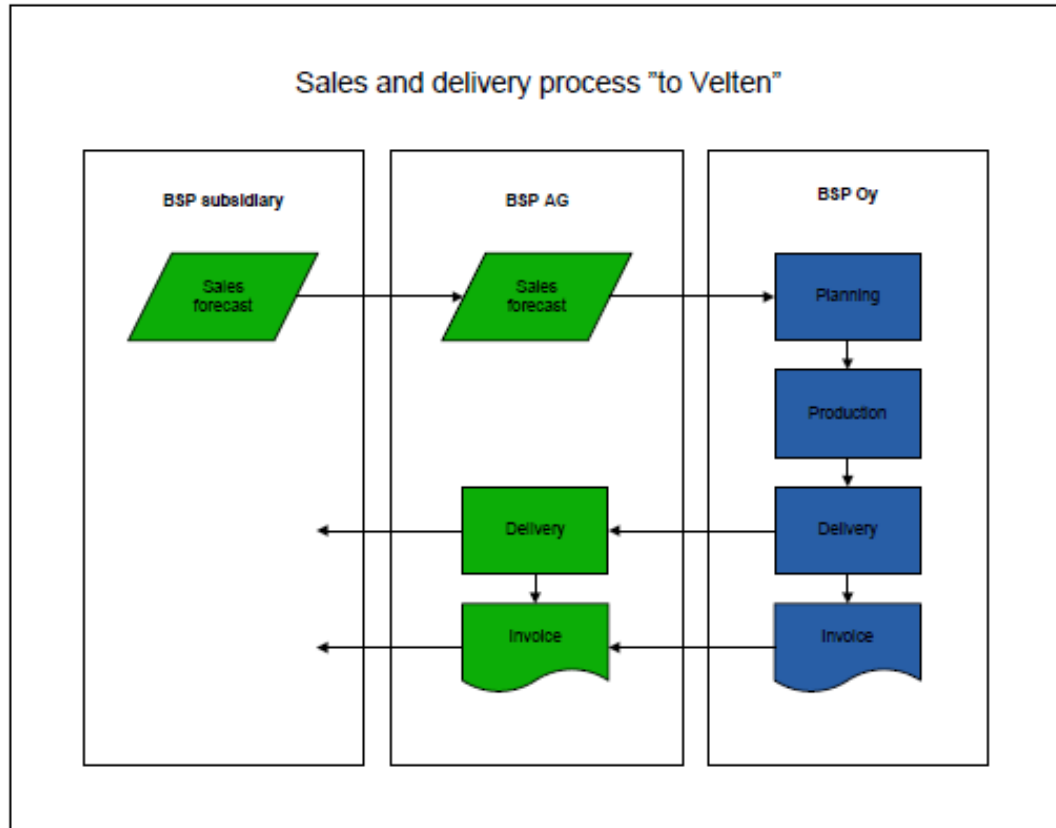


Figure 11. Sales and delivery process *to Velten*.

In the earlier discussed cases, bilateral process and triangulation, sales forecasts of customer subsidiaries are transferred directly to BSP Oy (in SAP plant J601). In the processes "via Velten" and "to Velten", forecasts are first collected to BSP AG's plant 0021 and from there they are transferred to the plant J601. This should be an automatic process. However, malfunctions may occur and manual checks need to be made. After production goods are delivered to BSP AG's central warehouse in Velten, Germany. The invoice is also addressed to BSP AG.

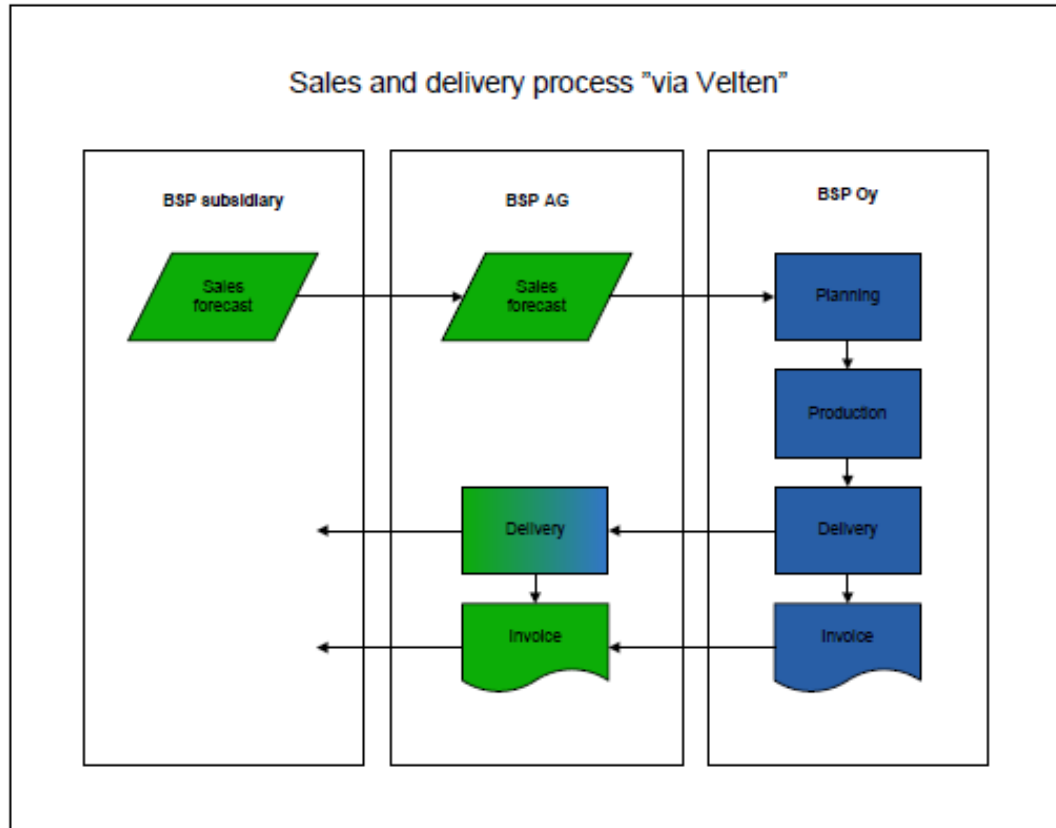


Figure 12. Sales and delivery process *via Velten*.

In the "to Velten" process, BSP Oy's responsibility unambiguously ends when BSP AG has received the goods and the invoice. In the "via Velten" process, BSP Oy's supply planner needs to follow that a delivery reaches the warehouse of the customer subsidiary.

5.2 GV03 process

BSP Oy is currently implementing a new delivery process. A new virtual plant GV03 is added to SAP system. All the deliveries concerning BSP AG will be channeled through this plant. The goal is to harmonize the sales and delivery processes of BSP Oy and to automate tasks of BSP AG. On one hand, this will cause more work as one more order and delivery need to be created and the SAP master data gets more complicated. On the other hand, the delivery processes are harmonized as three processes (triangulation, via Velten and to Velten) will be replaced by one process. Still,

triangulation will stay as a sub process of GV03. This is due to a SAP problem related to one product not manufactured in Turku. The different variations of the process are shown in Figure 13.

Sales forecasts are either transferred directly from a customer to BSP Oy or through BSP AG depending on a customer subsidiary. Goods are delivered directly to some of the customers while goods of other customers are delivered to BSP AG's central warehouse. BSP AG has a consignment stock practice in place with part of the subsidiaries.

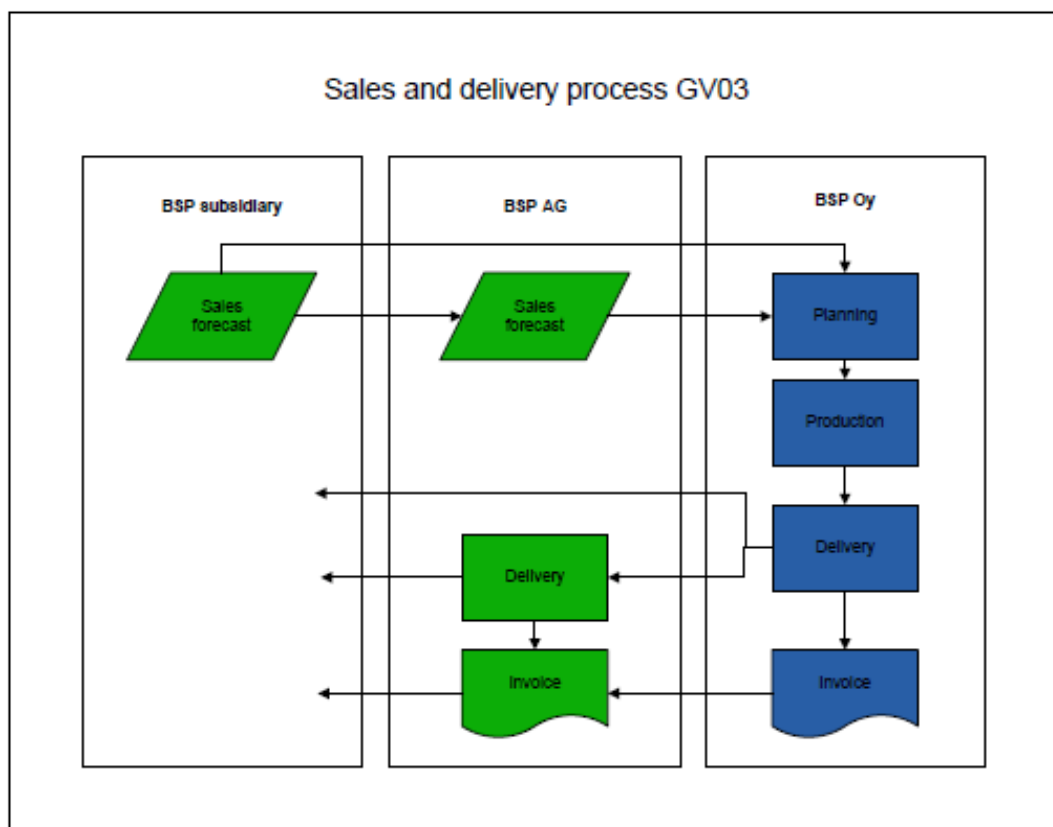


Figure 13. Sales and delivery process GV03.

Only a couple of products will be delivered through the GV03 plant at first. These are products, whose manufacturing has recently started in BSP Oy and which are mainly delivered to the German market. During Q1/2010 the GV03 process should be implemented for all the products sold through BSP AG.

The GV03 process will have two variations, contract manufacturing and toll manufacturing, of which contract manufacturing is the usual one. Contract manufacturing means that BSP Oy buys the ingredients and sells the product for BSP AG at an agreed price. Toll manufacturing means that BSP Oy gets the active pharmaceutical ingredient (API) for free from BSP AG. Basically, BSP Oy will invoice for a manufacturing service rather than a product.

A couple of accounting related issues has come up during the first months. As the location of the virtual plant is decided to be in Finland and export is channeled through it, foreign sales are reported as domestic sales. Reports have to be corrected manually to avoid misleading management accounting reports. Another issue has come up in financial accounting. Value added tax is included in invoices because the system interprets that sales transactions are between domestic parties even though in reality the buyer is a foreign company.

The taxation issue has now been taken into account and the following decisions have been made. Toll manufacturing cases via GV03 plant are invoiced without tax. Contract manufacturing via GV03 is invoiced with tax. Contract manufacturing deliveries, which are not channeled through GV03, are invoiced without tax.

5.3 Bilateral consignment stock

In a bilateral consignment stock based sales and delivery process, manufactured goods would be delivered to BSP Oy's consignment stock in a customer subsidiary's warehouse. The owner of the inventory would be BSP Oy until the customer has sold the goods further. There would be an agreed invoicing period, such as one month, and invoices would be sent based on sales reporting in the end of the period.

Replenishment orders and transportation

VMI practice is already in place in group trade. Therefore, a new delivery process with a consignment stock should not bring any change to the current order placement practice. BSP Oy plans deliveries and places sales orders based on the need reported in the SAP APO system.

In practice, there might be some change. If BSP Oy owns the inventory at customer, a customer subsidiary would have less interest in the inventory level. In the current situation there are cases, when a customer does not accept to receive a delivery, if their sales have suddenly dropped compared to the forecast.

Terms of delivery define the bearer of risk and costs after goods have been produced but not yet delivered to a customer. Terms of delivery used in Bayer' group trade, leave a part of costs for a customer. In the consignment stock process, ownership of goods does not change, when goods are delivered to a customer. Obviously terms of delivery are not applicable in a situation, when goods are not sold yet. BSP Oy would have to pay all transportation costs.

Average delivery volume would decrease, if bilateral trade would be the practice with all group customers. For the moment, BSP Oy does not send many small deliveries but can deliver bigger amounts to the central warehouse in Velten. Other supply centers work likewise and deliveries to small customers are combined.

Holding the stock

Costs for holding the stock would be shared between BSP Oy and a customer subsidiary. BSP Oy would bear the opportunity cost, as their money would be tied to the goods. A customer subsidiary would bear physical warehousing costs. Responsibility for taking insurance for the inventory would have to be agreed on.

The value of goods rises when they move down a supply chain. If the supplier BSP Oy would own the goods at a customer subsidiary, the amount of money tied to goods in the warehouse would decrease. (Valentini & Zavanella 2003, 217-218) This is an interesting viewpoint but the total financial effect has to be calculated before more conclusions can be made.

Invoicing and cash flow

Consignment invoicing is based on customer's sales reports and invoices are sent in the end of an agreed invoicing period. BSP Oy has this practice currently in place in the domestic business with Tamro. Based on this experience it can be assumed that

consignment invoicing with foreign customers would cause more work in BSP Oy compared to the current situation. Stocktaking and other tasks related to reliability of sales reporting would be added to the current workload.

BSP Oy's cash flow would be more constant due to consignment invoicing, if the invoicing period would be shorter than the interval between two deliveries is at the moment. Currently deliveries are made less than once a month regarding to most products and customers. However, a high percentage of BSP Oy's turnover comes from a few big customers. For these customers, products are delivered quite often, once or twice a month. Consignment invoicing would therefore have the biggest effect on the invoicing of the smaller customers, which is a relatively small part of the total turnover. In addition, BSP Oy's invoicing costs regarding small customers would rise as smaller invoices were sent more often. Rising invoicing costs would create a need to automate the invoicing process.

IT systems

The implementation of a new sales and delivery process in SAP causes a big workload for IT, logistics and planning departments. It is time consuming, challenging and expensive. After a process is created, it has to be tested before it is implemented into practice.

The bilateral consignment stock process does not include involvement of BSP AG. Basically, BSP Oy would have to take responsibility for many SAP related issues that are at the moment handled by BSP AG. This would create a need to recruit more personnel. Recruiting qualified personnel might be a problem. Even if skilled employees are found, it takes time to train them.

Bayer Healthcare AG provides the SAP system for BSP Oy. This means for example, that the system is located on a server in Germany. Implementation of a new sales and delivery process should not lead to remarkable IT investments in BSP Oy.

6 CONCLUSIONS AND FURTHER RESEARCH

Development of domestic sales and delivery processes

Tasks of domestic market's sales and delivery processes are spread to many departments in two companies, BSP Oy and Bayer Oy. Partly, it is due to demands of SAP ERP system and partly, due to distribution of work, which is based on customary practices to a certain extent. Fluent communication is important to guarantee a fluent process. BSP Oy and Bayer Oy are going to be merged to one company. Most likely this involves changes in the organization structure. When the project starts, peoples' roles in the domestic processes should be reviewed.

Roles and tasks of people have changed one year ago. Employees' knowledge of the whole process, effects of their actions to the process and interdependence between real-life actions and accounting is limited. The process will become more effective, when employees understand better these matters. This final thesis can hopefully help in building the big picture. Small-scale job rotation could help to understand effects to other people's work.

Consignment stock practice

Designing, testing and implementing a new sales and delivery process needs a lot of work. In other words, it is a big investment. Clear, profitable benefits have to be seen if such a project is started. Implementing the consignment stock practice in BSP Oy's group trade would not provide such benefits. Consignment stock would cut down customer's costs, but in group trade it would be similar to moving money from the left pocket to the right. Furthermore, changes in cost structure would be considered when transfer prices are negotiated. Transfer prices have to be justifiable and can not be manipulated for tax planning purposes.

Consignment stock practice might be more beneficial in trade with external customers. Customers might be interested in cutting down their costs and consignment stock practice would also strengthen Bayer's position as their supplier.

Implementation of the new GV03 plant will harmonize BSP Oy's sales and delivery processes in export business. There would have to be good reasons to establish a new process that would again increase the amount of different processes. Implementing the bilateral consignment stock process with all BSP Oy's group customers would not be efficient and would take a lot of time. Establishing a consignment stock in some country would be easier for BSP AG than for BSP Oy as BSP AG already has the consignment stock process in place with many countries.

Further research

An interesting aspect in consignment stock is the fact that it decreases the amount of money tied to inventory in a supply chain. Value of goods rises when they move down a supply chain. If the supplier would own the inventory at a customer subsidiary, value of inventory would be lower than when the customer owns the inventory. More costs would be incurred to a supplier, but decreasing inventory in a supply chain would be beneficial on the group level. The total financial benefit of decreasing inventory would have to be calculated and compared with costs of CS process implementation.

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