

Jyri Koivunen

CHARTING THE LOGISTIC DATA FLOWS IN BOYFOOD OY

Degree Programme in Logistics

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LOGISTISTEN TIETOVIRTOJEN KARTOITTAMINEN BOYFOOD OY:SSÄ

Koivunen Jyri
Satakunnan ammattikorkeakoulu
Logistiikan koulutusohjelma
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Tämän opinnäytetyön aiheena oli kartoittaa Boyfood Oy:n tilaus-toimitusprosessia kuvaavat logistiset tietovirrat ja luoda prosessikaavio tilaus-toimitusprosessista. Työn tavoitteena oli luoda selkeä kaavio, joka kuvaa sisäistä toimitusprosessia ja erittelee toimitusprosessin eri vaiheet tilauksen saapumisesta asiakkaalta tilauksen toimitukseen asiakkaalle.

Tutkimus tehtiin toiminnallisena tutkimuksena, jonka ensivaiheena oli nykytilanteen kuvaus Boyfood Oy:ssä. Seuraavana vaiheena oli eri kartoitusmenetelmien opiskelu ja niiden mukaan eri kaavioiden luominen.

Tutkimuksen tuloksena luotiin prosessikaavio, joka kuvaa Boyfood Oy:n sisäisen logistiikan toimitusprosessiin liittyvät eri vaiheet. Tämän kaavion perusteella tehtiin muutama ehdotus toimitusprosessiin liittyvien tehtäväalueiden vastuun rajaamiseen ja käytännön asioiden helpottamiseen.

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Koivunen Jyri

Satakunnan ammattikorkeakoulu, Satakunta University of Applied Sciences

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The purpose of this thesis was to chart the logistical data flows in the order-delivery process at Boyfood Oy and to create a flow chart of this process. The goal was to create a clear chart, which illustrates the internal delivery process and analyses the different steps from the customer-based order to the delivery to the customer.

This thesis was done by a functional study, which first step was to describe the current situation on Boyfood Oy. Next steps were to study different charting methods and create chart according to studied methods.

Clear flow chart was made as a result of this research, which simply describes the different steps in the internal logistics of Boyfood Oy. A few suggestions were made according to the created flow chart, these suggestions related to setting boundaries between different roles in order-delivery process and to ease up the practicalities.

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TERM LIST

SCM	Supply Chain Management is the management of a network of interconnected businesses involved in the ultimate provision of product and service packages required by end customers (Harland, 1996).
ERP	Enterprise Resource Planning, a system that is used to manage and coordinate all the resources, information, and functions of a business.
BRC	British Retail Consortium, Global quality standard organization.
HACCP	Part of food companies in-house control system.
DFD	Data flow diagram

1 INTRODUCTION

1.1 Boyfood Oy

Boyfood Oy was founded in 1977 and it is a part of the Icelandic Fram Foods Group. Boyfood Oy oversees the entire herring production of the Fram Foods Group and markets its consumer packaged seafood products in Finland. In addition to Finland, Fram Foods has production facilities in Iceland and Sweden. Boyfood Oy is Finland's leading company for producing and marketing high quality herring products for consumers, retailers and institutional kitchens. All of their herring products are manufactured near the site where Finnish herring production got its start, in the renowned herring harbour in Rymättylä. The four production lines at their modern production facility produces everything for a delectable table spread, including pickled herring, vacuum-packed herring, herring for use in catering and traditional whole herring products. In addition to marketing their products under the Boy brand name, they also manufacture herring products under private labels for example Kesko, Inex Partners, Tuko Logistics and Lidl. These retailers are approximately 80 per cent of the total sales of Boyfood Oy on the Finnish markets. Boyfood Oy has an annual turnover of approximately 18.5 million euro and they employ an average of 50 personnel. (Website of Boyfood Oy 2012)

High quality is one of the cornerstones in Boyfood Oy. All of their products are produced ensuring the quality and safety of the BRC (British Retail Consortium) quality system. The certified system is supplemented by in-house controlled HACCP system, which is approved by authorities. Beside the working systems, their important subjects are best raw materials, motivated staff, high field of know-how and its continuous development. The whole staff is involved to fulfil the quality systems requirements and develop it continuously. As a responsible company Boyfood Oy is developing their operations by taking into account the environmental issues. In addition to their own operational environment, they want to know the whole supply chain

from sea to the table, so they can offer to their customers as qualitatively as ecologically best food supplies. (Website of Boyfood Oy 2012)

1.2 Goal of the thesis

This thesis was designed to clarify the data flow in the supply chain, which is needed for conducting the production planning and logistics operations in Boyfood Oy. The goal was to create a data flow diagram. As a result of this thesis, the logistic data flow will be recognized, which makes the production resource planning easier and also the delivery reliability and cost-effectiveness are expected to increase.

1.3 Research method

The main research method was functional study. As the goal was to clarify the data flow in Boyfood Oy, the first step was to describe the current situation and known data flows in the company. The second step was to study charting process and common charting methods. The last step was to chart the data flows by using the studied method and describe the differences between these charts.

2 SUPPLY CHAIN AND LOGISTICS

2.1 Supply chain

Companies cannot control all steps in manufacturing by themselves. Some of the components that they need in manufacturing processes must be purchased from an external supplier. The operation of the company thus consists of several consecutive operations, and this is called supply chain. Supply chain traditionally starts by the customers need. Customer's order generates a number of different functions in a product manufacturing company such operations as purchasing, warehousing and logistics functions. In the supply chain, there can be several other operators, e.g. importers and suppliers before the manufacturing company. At the end of the chain, the customers of the company may have their own customer for whom the services or goods are produced. In this thesis the focus was on describing the effects of supply chain inside the company and particularly in the determination of the supply chains data flow. (Sakki 2009, 13-21)

A key part of the supply chain is the logistic processes that take place in the chain. Such processes are for example, inbound and outbound logistics and transportation. Effective supply chain management requires also effective guidance. This guidance consists of both control of the physical goods and the information flow management. Without information the products are not in the right place at the right time. Most of the supply chain's costs comprises of the wage costs for processing information, goods and invoices. An effective running of the inbound and outbound logistics can make the difference on the result achieved. (Sakki 2009, 13-21)

2.1.1 Data flow in supply chain

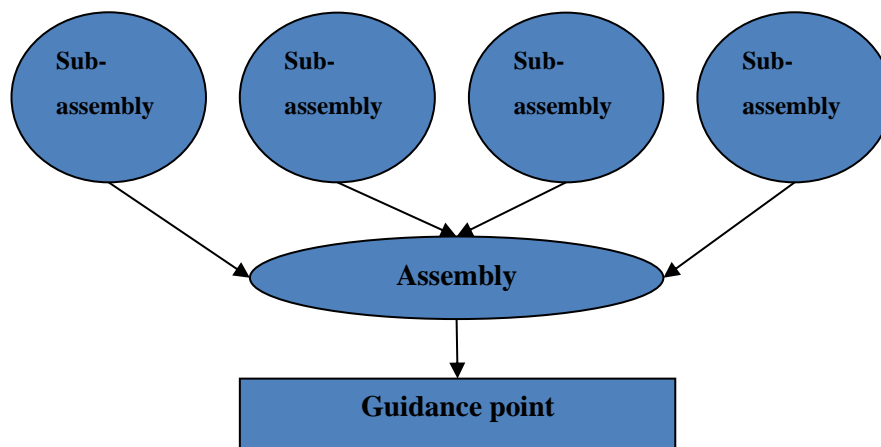
The importance of communication between companies and their internal order-supply chain can't be underestimated. This reasoning, in which the chain of players complements their own independence, is not supported by an efficient supply chain management. In the absence of shared vision, the successive chain players can partly do the same duplication of work. The same information can be stored in the chain at various stages again and again, when it would be enough that the data is stored in one place from where it is available for anyone who needs it. This work is unnecessary, and ties up resources unnecessarily when they could be subjected to other areas. The information on supply chain flows mostly from customer to the supplier. However, the information is supplied within the company to many directions. People, who are involved with supply chain, are working in various tasks within the company such as warehousing, procurement, design, sales and logistics. Prerequisite for effective supply chain management is effective flow of information with all these described organizations. With an effective flow of information, the errors in purchasing and unnecessary stocking can be avoided and also agreed timetables will be complied with more detail. The company's internal information flow and also the information flow between the customer and the company must work efficiently. Customer's desired changes such as delivery schedule changes etc. must be submitted to all the supply chain organizations in order to avoid evaluation errors. (Sakki 2009, 20-22)

2.2 Logistics

The definition logistics usually means control and management of centrally passing flows. These typical flows are information, material and capital flows among other things. To the definition of logistics can also be included the management of procurement, storage, distribution and transportation. The key tasks of logistics are considered to be management of transportation costs and upkeep of standard of service. (Sakki 2009, 22-23; Karrus 2003, 15)

2.2.1 Integrating logistics

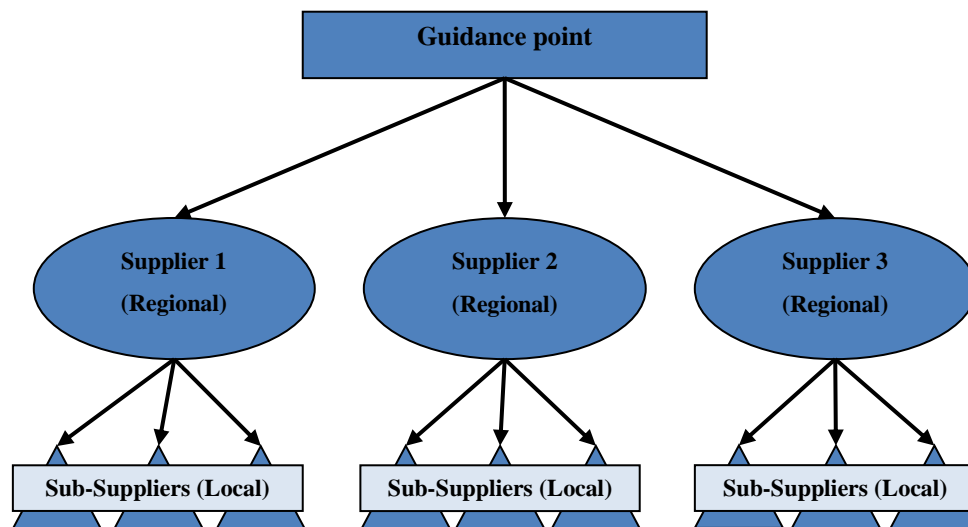
In the integrating logistics the supply-chain process starts from the customer-based order to the company. Company orders the raw materials and the required parts from its suppliers. Different material flows meet each other on the machine in assembly stage for example in the workshop of manufacturing company. The logistics challenges in integrating logistics transmute into effective consolidation of information and material flows. The model of integrating logistics is presented in Picture 1.



Picture 1 Integrating logistics (Sakki 2009, 17)

2.2.2 Decentralizing logistics

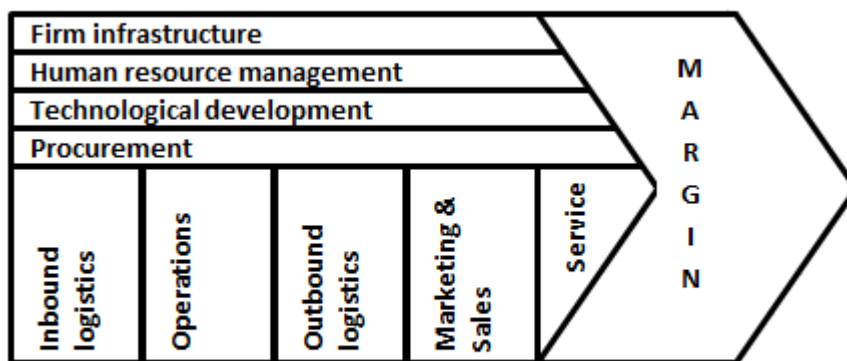
Decentralizing logistics can simply be described as distribution. In this type of logistics the products are commonly standard products whereas in integrating logistics the products are more customized. The aim of decentralizing logistics is to make the products available to customers via a wholesaler or a retailer. Transportation and storage management are notable factors to decentralizing logistics from a logistical point of view. Model of decentralizing logistics is presented in Picture 2.



Picture 2 Decentralizing logistics (Sakki 2009, 17)

2.3 Value chain

The value chain refers to the chain, which is used by a company to add value to its product. In the value chain each operator increases the product value from the customer's point of view. An example of the value chain is the product manufacturing process, where the raw material is converted through many different manufacturing and transportation processes into a finished product. However, every step of the value chain causes costs to the company, which must be recovered from the customer on the product sales price. Different operators in the value chain have their own views on the entire value chain and their roles in it. Effective operations in the value chain will require effective co-operation and communication in the company and between its customers and suppliers. The most common model of the value chain is Michael Porter's model, which is presented in Picture 3. (Karrus 2003, 14-16)



Picture 3 Michael Porter's template of value chain (Porter 1985, 232)

2.4 Cash and information flow

The cash flows are perhaps most important to the suppliers. Cash flows pass through the chain from the customer towards the other end of the chain, to the supplier. The suppliers are required to make major purchases and investments for the production, storage and supply of the raw materials. Therefore, it is essential that these costs are recovered. By the requirement of the efficient operations in logistics, one of the main flows is the flow of information. Information is flowing in logistics chain to both di-

rections between the customer and the supplier. Information for demands and needs is transmitted by the information flow from the customer to the supplier. Also offers pass on from the supplier to the customer in the information flow. In project work, the supplier usually has to inform the customer regularly about the progress of the project. Huge amount of information is passed on in the chain and hence, communication between both parties has a significant role. Mobile phones, various information systems and especially e-mail have facilitated the transmission of information in the chain. A telephone call or sending an e-mail requires a work input from the sender, which might be forgotten in a hurry, especially when the subject of the call or the e-mail message is not significant from the sender's point of view. With the help of information they can respond to the real needs and sales instead of using estimates. (Karrus 2003, 16-18)

2.5 Logistics nature in Boyfood Oy

Logistics plays a key role in company's business. It collects and stores the flowing goods in order-supply chain to the right place into a single entity. In case of Boyfood Oy, we can talk about the assembling logistics. In assembling logistics, the importance of transportation and storing is more eminent than it is in the integrating logistics. In Boyfood's case, the produced products aren't expensive but the stored volumes are quite big. The shelf life of these stored products is long but because of the sales terms the storing time is only 33% of the total shelf life. This means that the products can be stored at logistics hub for 1-4 months depending the before date.

3 DATA FLOW DIAGRAM OF BOYFOOD OY

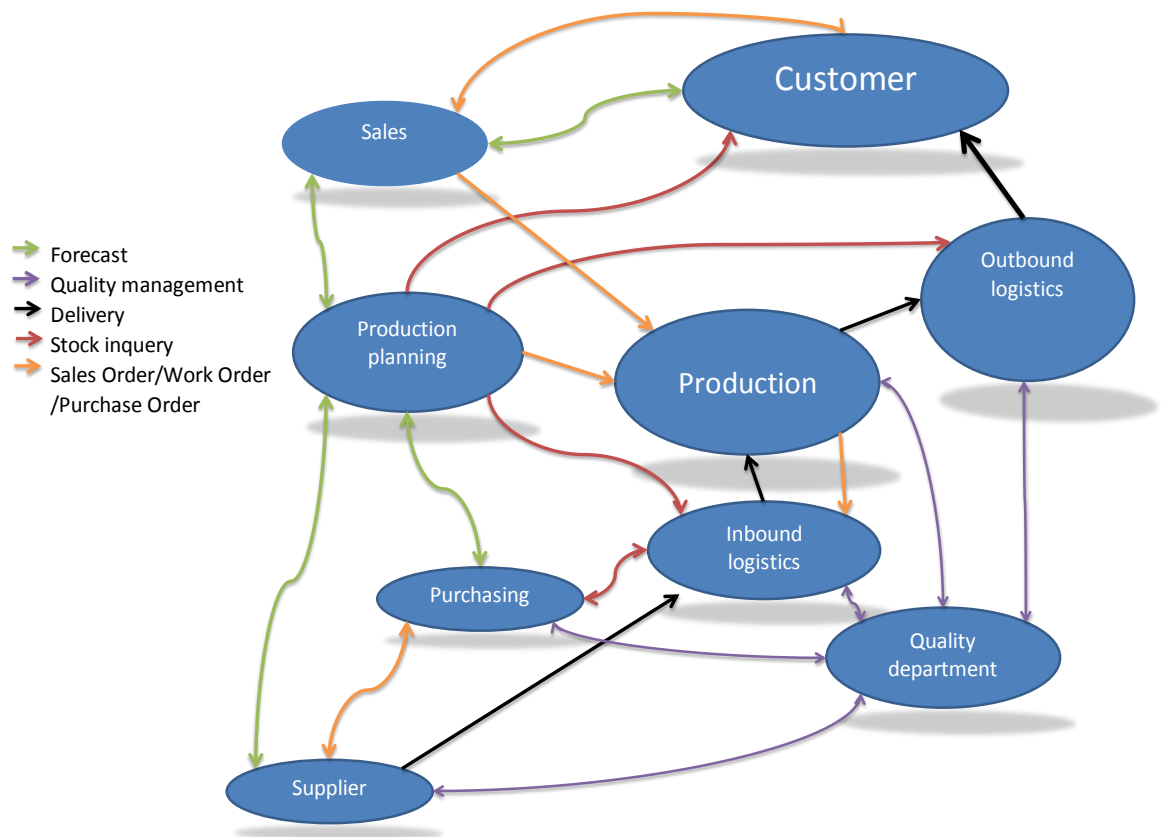
The data flow diagram (DFD) is one of the most commonly used systems-modelling tools, particularly for operational systems in which the functions of the system are of paramount importance and more complex than the data that the system manipulates. DFDs were first used in the software engineering field as a notation for studying systems design issues. Data flow diagrams are categorized as either logical or physical. A logical DFD focuses on the business and how the business operates. It describes the business events that take place and the data required and produced by each event. (Website of Yourdon 2013)

Data flows that can be seen in Boyfood Oy are various internal and external data flows. One of these data flows is the one between Boyfood Oy and its customers. That flow usually contains information about sales orders with requested delivery dates, sales forecasts, forthcoming campaigns and price enquiries. Also the data flow between purchasing department and materials suppliers is important for the manufacturing of product because if the material is out of stock then that certain product can't be produced. This flowing data usually consist purchase orders, order confirmations with delivery dates and also price offers. These two examples are external data flows. The internal data flows are various flows inside the different departments of the company. It contains information about production, logistics, warehousing, work schedules and general instructions for work habits.

3.1 Charting the data flow diagram

There were few problems in charting the data flow in Boyfood Oy. One of the reasons is that there are lots of flows between different departments. One of the most important flows for production planning is the information flow between the customer and Boyfood Oy. This flow has lots of information about the future products, production quantities and campaign info. Also the customer's current stock level and next delivery quantity is at the main focus of the flowing data. The content of the received data varies a lot between different retailers. With the accurate information many problems can be avoided for example the unnecessary warehousing and mate-

rial purchasing errors. Some of the retailers give forecasts for next month total order quantities and other retailers just inform the stock level at their warehouse. This information received from the retailers and the sales history from previous years is used to create Master plan, which is used to calculate the gross cut capacity, plan effective production, longer runs for products and less size changes on the production line. The data flow inside Boyfood Oy is also very important to the company's productivity and existence. The first image that I had about the information flows in Boyfood and their contents are charted in Picture 4.



Picture 4 Data flow chart of Boyfood Oy

3.2 Charting process

I charted the data flow to the chart in Picture 4 as I saw them in January 2012 from logistic and production planning point of a view. These flows were marked with different colours because the flows have different content of information. The importance of these flows can be described by their effects to productivity, delivery reliability and customer satisfaction. After charting this data flow diagram I started to look for a modelling tool for developing my view of data flows in Boyfood.

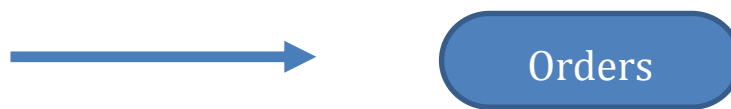
I started to study of the dataflow diagrams by examining the components of a typical dataflow diagram: the process, the flow, the store, and the terminator. The first component of the DFD is known as a process. The process shows a part of the system that transforms inputs into outputs and it shows how one or more inputs are changed into outputs. The process is named or described with a single word, phrase or simple sentence and its name will describe what the process does. In some cases, the process will contain the name of a person or group of people, or a computer, or a mechanical device. Process can be described as it is on Picture 5. (website of Yourdon 2013)



Picture 5 In DFD the process is described with a circle or bubble

Next component of DFD, the flow, is represented graphically by an arrow into or out of a process, which is illustrated in Picture 6. It is used to describe the movement of chunks, or packets of information from one part of the system to another part. The flow also describes the direction: an arrowhead at either end of the flow (or possibly at both ends) indicates whether data or materials are moving into or out of a process possibly doing both. The double-headed flow is a dialogue, a convenient packaging

of two packets of data (an inquiry and response or a question and answer) on the same flow. The store is used to model a collection of data packets at rest. Typically, the name chosen to identify the store is the plural of the name of the packets that are carried by flows into and out of the store. Aside from the physical form that the store takes, there is also the question of its purpose: does the store exist because of a fundamental user requirement, or does it exist because of a convenient aspect of the implementation of the system? Usually the store exists as a necessary time-delayed storage area between two processes that occur at different times. (Website of Yourdon 2013)



Picture 6 Basic illustration of a flow and store in DFD

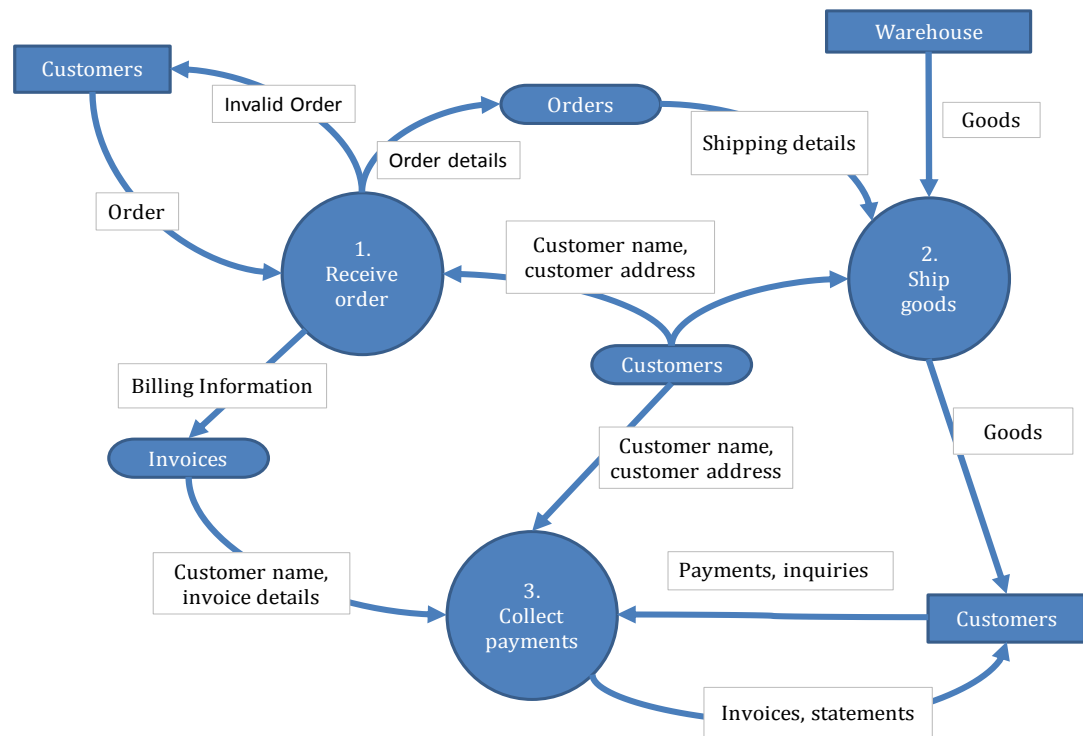
The next component of the DFD is a terminator. Terminators represent external entities with which the system communicates. Typically, a terminator is a person or a group of people, for example, an outside organization or government agency, or a group or department that is within the same company or organization, but outside the control of the system being modelled. In some cases, a terminator may be another system, for example, some other computer system with which company system will communicate. In Picture 7 is described usual terminator. (Website of Yourdon 2013)



Picture 7 External entities are described as terminators

I practiced this method on a typical DFD about order process in Boyfood Oy, which can be seen in Picture 8. Customer sends an order which starts the process. Order will be checked and if it is invalid, it will be returned to the customer. After the order is handled, the order details will be recorded to data store, where from the warehouse will receive the shipping details. Also order will be recorded as an invoice with all

the needed billing information. All related customer data in this process is stored at Customers- data store. Goods will be shipped to the customer and also the invoice is sent at the same time. This data flow was restricted just to include the data that flows during order process.

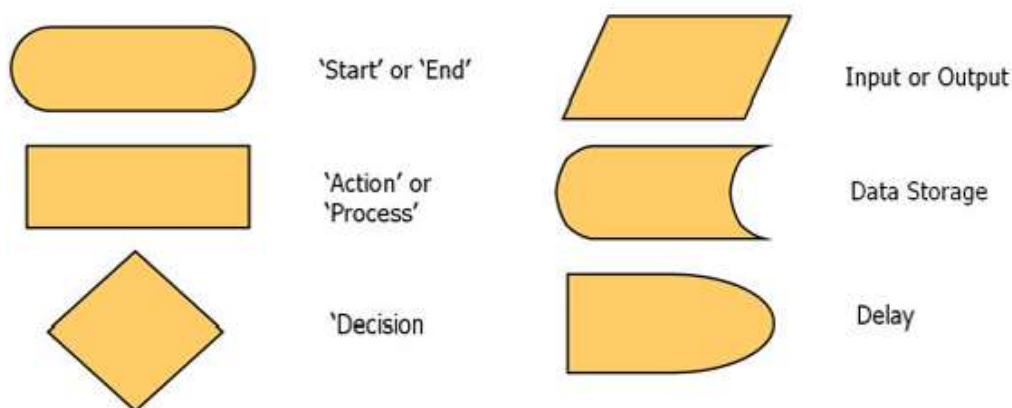


Picture 8 Order process

After I had studied about data flow diagram, reanalysed my previous data flow chart and realized what I needed to do a better and more realistic chart. Also the type of diagram was wrong. This type of diagram was used to analyse systems like software processes etc. I started to search for another type of charting method. One of the main focuses on the search of a new type of diagram was to describe the main processes in the supply chain more simple and understandable way. Also one other notable factor was to recognize the needed data- and material flows.

4 FLOW CHART

Second type of charting method that I studied was a flow chart. Flow chart is a diagram that shows the breakdown of a task or system into all necessary steps. Each step is represented by a symbol and connecting lines show step-by-step progression through the task. Usually these flow charts are simple to understand but they can also be very complex and detailed. As flowcharts are created, certain things are described with same shapes. Standard symbols are described at Picture 9. (Website of Teach-ICT 2013)



Picture 9 Basic symbols of a flow chart (Website of Teach-ICT 2013)

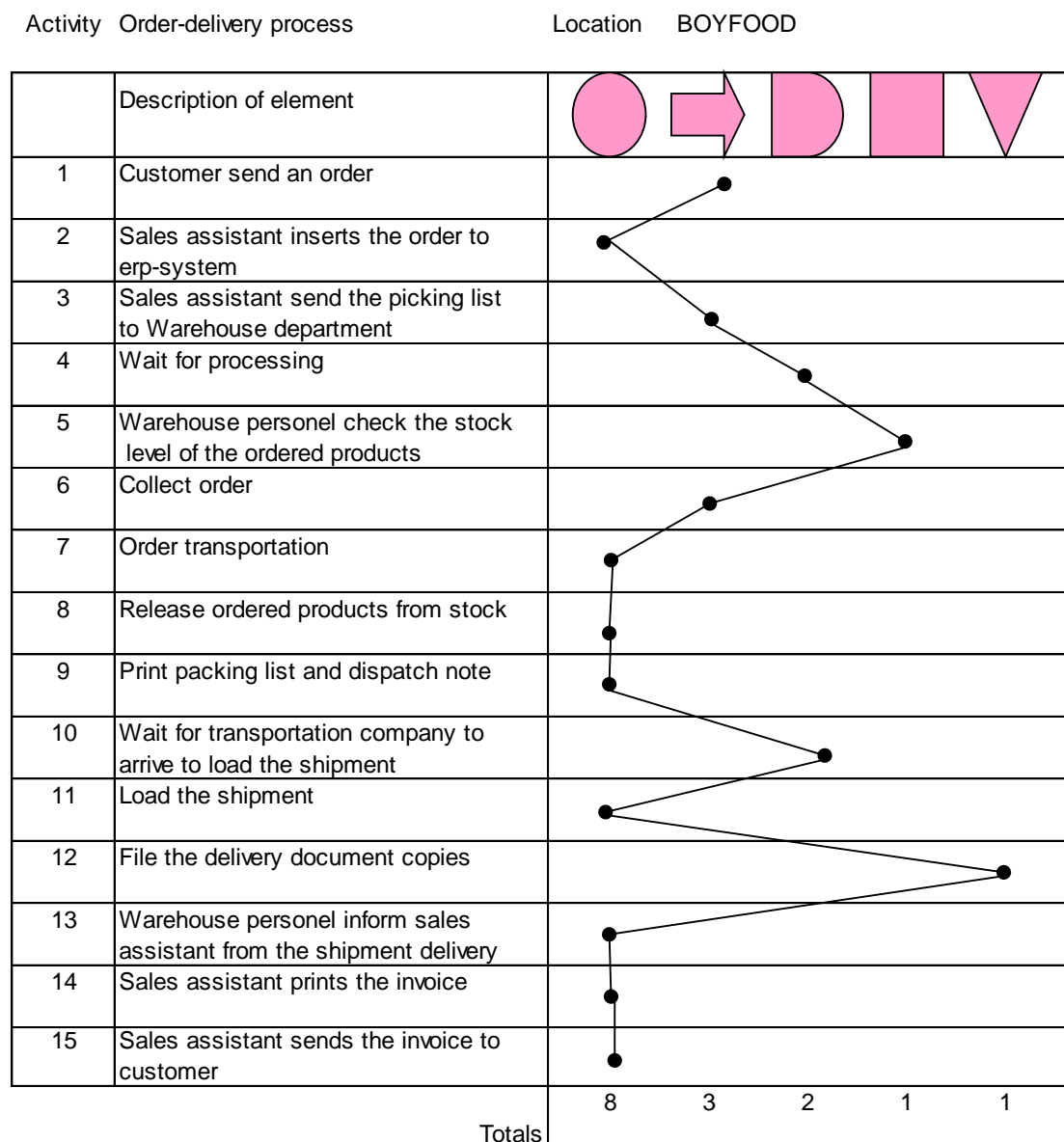
Start/End-symbol marks the starting or ending point of the process. Action/Process-symbol can represent a single step, or an entire sub-process within a larger process. Decision-symbol describes a decision or branching point. Lines are representing different decisions that emerge from the different points of the diamond. Input/Output-symbol represents the material or the information entering or leaving the process, such as customer order (input) or a product (output). Data storage indicates a step where the data gets stored. Delay-symbol indicates a delay in the process. All these different symbols make the flow chart more understandable and easier to read. (Website of Teach-ICT 2013)

4.1 Charting process

Charting process started from setting boundaries to the flow chart. If the boundaries are not well set, the effort to chart the process might take time and the result might





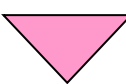
not be good. A top-level macro view will be all that is necessary at that moment. Second step is to determine the steps of the process. Main target is to identify the basic framework of inputs, outputs, activities, and decisions. Next step was to establish the sequence of process steps. This was made with a thought that how process is occurring, not how it is expected to occur. After these steps were done, the drawing process began. I made a flow process chart from the order-delivery process, which helped me to draw the actual flow chart. This flow process chart you can see in Picture 10 and description of elements are in Picture 11 (Slack, N., Chambers, S. & Johnston, R. 2001).

Flow process chart



Picture 10 Flow process chart of order-delivery process in Boyfood Oy

Flow process chart symbols

An operation task or work activity	
A movement of materials or information or people from one place to another	
A delay or pause in the process	
An inspection , check or examination of materials or information or people	
A storage of materials or file of information or queue of people	

Picture 11 Description of elements in Flow process chart

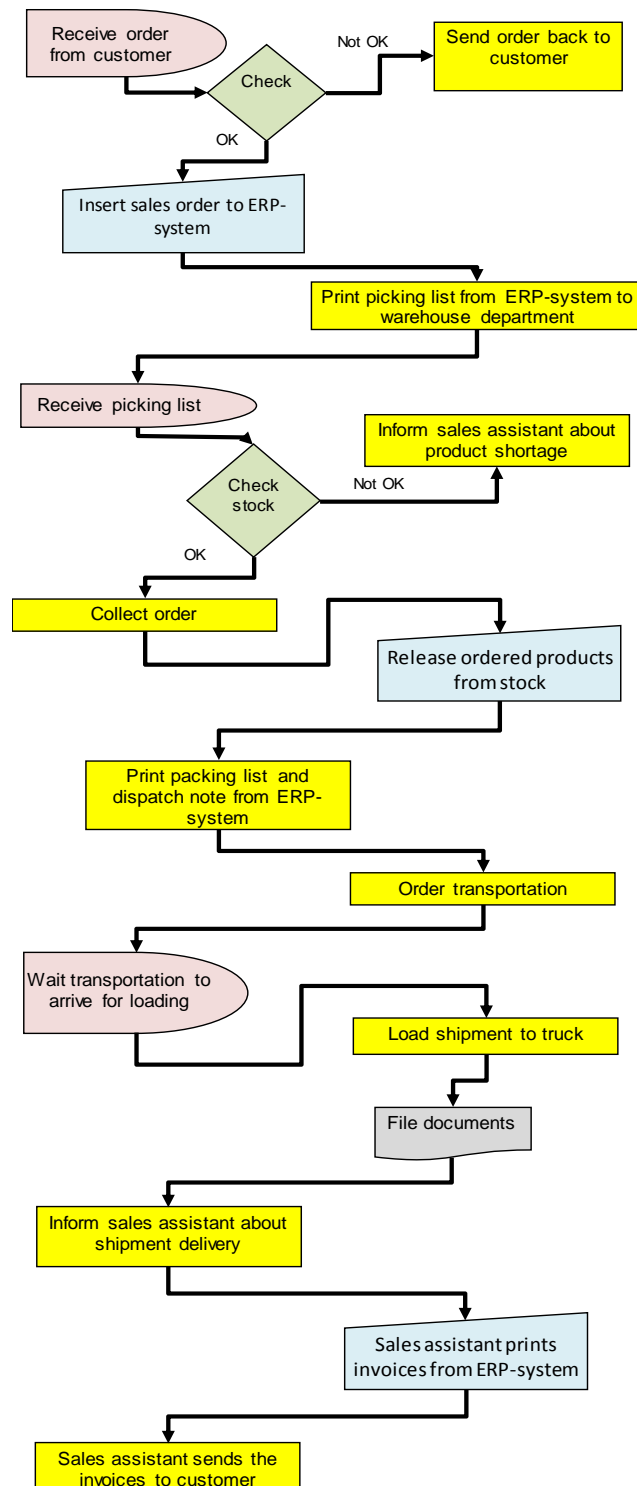
5 RESULTS

After studying different charting methods, I decided to chart the data flow with a flow chart. This chart type was easy to interpret and understand. The standard flow chart symbols were simple and informative. As the charting process progressed, I understood the meaning of information flow in the order-delivery chain. It needs a lot of work to check the information and correct them. Every delivery must be shipped at right time to right place in right condition. Also the costs for every delivery are important for the company's competitiveness and result. Each person in the delivery chain is in a big role to make this all happen. As the charting process was finished, there were made suggestions to ease the information flow between sales assistant and warehouse department. These suggestions were morning meeting between sales assistant and warehouse department. Second suggestion was to check and update all shelf life date to all products to the ERP-system. Those suggestions are analysed more in Conclusions of this thesis. The result of the charting process can be seen on Picture 11.

The actual flow starts from the customer based order, which will be received by phone, email or fax. The responsibility to insert the order to the ERP-system is on the sales assistant. If the order is not correct the sales assistant returns the order to customer. After this step the picking list will be printed to warehouse department's printer.

Warehouse department will check the printer from time to time. After receiving the picking list the warehouse department will check the stock levels and best before dates of each and every product that the customer has ordered. If there is something wrong with the ordered products, the warehouse will inform sales assistant about the abnormal situation. Otherwise the shipment will be collected. The next step is to release the ordered products from the current stock. After all the needed documents (packing list and dispatch note) have been printed, the warehouse department will book the transportation. When the transportation arrives, the truck will be loaded and all the document copies are filed to archives. Warehouse department will inform the sales assistant about the delivered shipment. Sales assistant will print out the invoices from delivered products and sends them to the customer. This process isn't compli-

cated but the responsibilities between different parts of the delivery chain must be well defined. If some part won't act as it should the whole process won't work and the customer won't receive the needed products.



Picture 11 Flow chart of order-delivery process in Boyfood Oy

6 CONCLUSIONS

After I had set the clear boundaries to the flow chart that I was charting, the whole process took a step forward. First chart was a typical diagram with lots of lines and colours. The study for different charting methods cleared my thought about the result of this thesis and the first diagram looked very complicated and messy. I had to make a clear chart with necessary information about the logistics information in the order-delivery process in Boyfood Oy. I think that I have learnt the whole process from every point of the delivery chain. As the sales assistant who inserts the order to the system and also as the person in the warehouse, who makes all the needed delivery procedures.

The created flow chart gave a few suggestions to improve the order-delivery process. One suggestion was a morning meeting between sales assistant and warehouse department. This would be a quick meeting where the main focus is in the delivery reliability and also they check the deliveries that were shipped previous day. If there would be problems with a shipment, they would contact production planner and they will try to solve it together. Information about the delivery problem would be informed to the customer by sales assistant. This suggestion would keep the customer-satisfaction at good level.

One other suggestion was that the shelf life data would be updated with boundary values. That would help the warehouse department with the control of outdated goods. All this work to check the outdated goods were made manually. As a result this update would give accurate reports from the Erp-system. And the products that would be outdated in next few weeks could be sold out with more focus by the sales department. The products that will be sold with more focus will still have around 50% of shelf life left so the product is in good condition. This method will create less the outdated goods disposal and it also has an effect on the cost-effectiveness.

The first suggestion, the morning meeting between sales assistant and warehouse department, was put into action after the suggestion was introduced to the factory's management team. Second suggestion was delayed because the erp-system was going to change as Boyfood Oy was emerging to Felix Abba Oy Ab.

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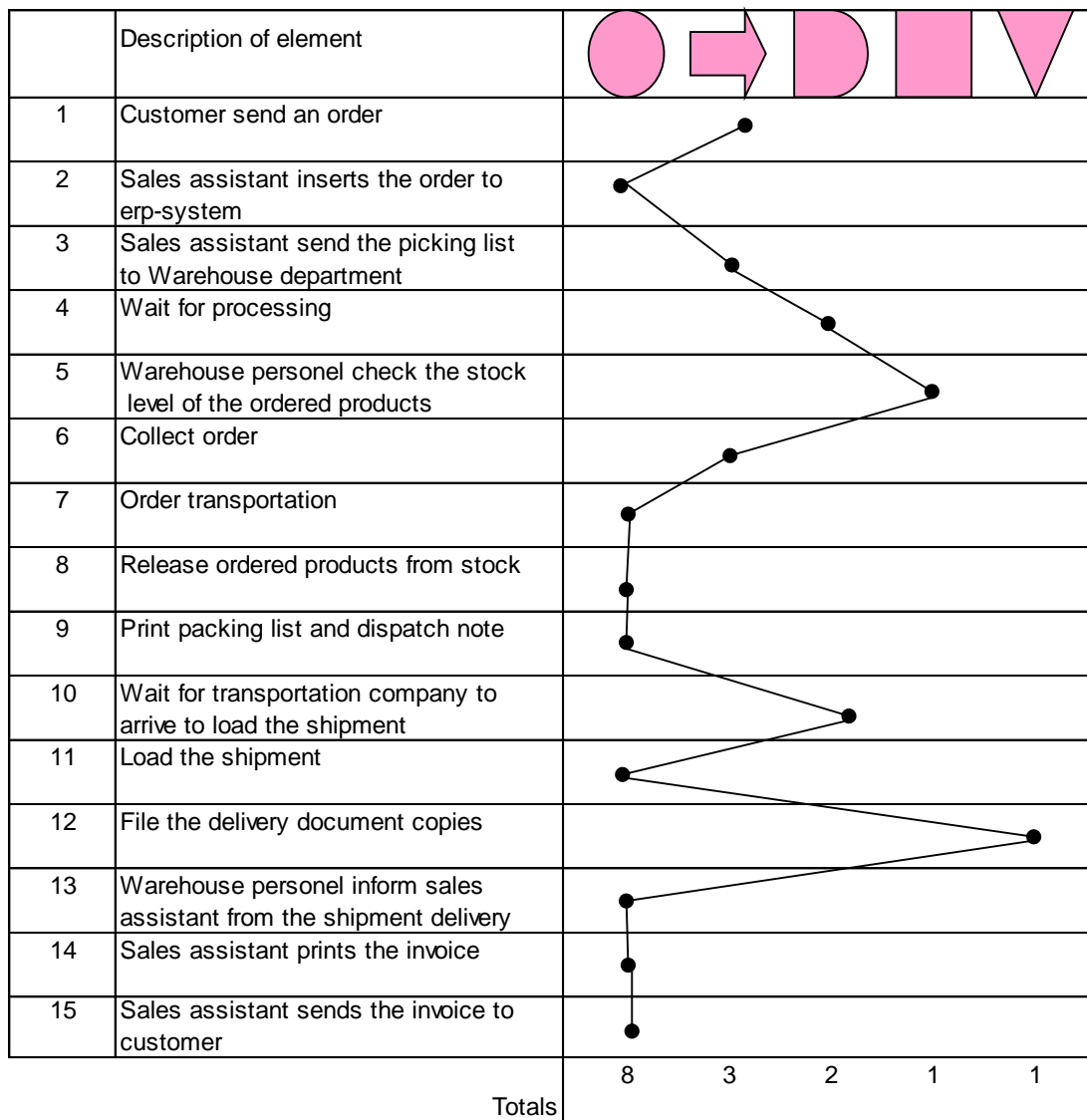
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8 APPENDIX 1

Flow process chart

Activity Order-delivery process

Location BOYFOOD


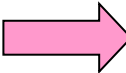


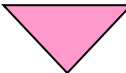


Source: Slack, N., Chambers, S. & Johnston, R. 2001.

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9 APPENDIX 2

Flow process chart symbols

An operation task or work activity	
A movement of materials or information or people from one place to another	
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An inspection , check or examination of materials or information or people	
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