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Improving the stockroom operations of PUMA Store Helsinki

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Abstract

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The objective of this project is to improve the stockroom operations of PUMA Store Helsinki by creating an effective stockroom operations manual. The first requirement for an effective manual is to find out the operations and procedures that must be included in it. The second requirement is to find out what does an effective manual include.

This is a project-based thesis that consists of introductory, theoretical and empirical parts. The theoretical part consists of topics regarding warehousing and creating manuals. The stockroom operations manual was created by applying the theory to the existing manuals of PUMA and author's own experience from working as the stockroom supervisor of PUMA Store Helsinki. The empirical part describes the planning, implementing and analysis of the project outcome.

The result of the project is a 90-page stockroom operations manual that describes all the aspects of the work in PUMA Store Helsinki's stockrooms. The analysis and the feedback of the project indicate it to have been successful and having met the goal of creating an effective manual.

In conclusion, the project was successful. The new manual delivered the attributes that it was required to deliver. This should result also in shorter order-cycle times, thus improving the customer service level of the store. Further studies should be carried out to find out how to introduce it to the employees of the store and how to use the manual in the induction of new employees. Another study suggestion is to further study the quality of the new manual.

Key words
Stockroom operations, in-store logistics, retail logistics, manual, flowchart

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1 Introduction

This is a project-based thesis that aims to improve the efficiency of PUMA Store Helsinki's stockroom operations. The project outcome is a new stockroom operations manual meant for the employees of the store. The project was carried out between August 2009 and December 2009.

The idea of this project started in Spring 2009. I worked then in PUMA Store Helsinki as a stockroom supervisor and a sales person. The store manager then suggested me to do my thesis on a topic that is related to my work and would thus benefit the store and me as well.

At that time there were problems with the efficiency of the store's stockroom operations. The problem would be solved if every employee would know how to run the stockroom operations. However, at that time there was not an up-to-date manual that the other employees could use to learn the in-store logistics. Thus I decided to create a manual to solve the situation.

This report presents the theoretical framework that the manual (i.e. the result of this project) is based on, the schedule, implementation and the results of the project.

The project was carried out successfully and it brought true value to PUMA Store Helsinki. The store now has an up-to-date manual on the stockroom operations, which every employee can and is supposed to use in their work.

1.1 PUMA Store Helsinki

PUMA Store Helsinki, in Kluuvikatu 4, Helsinki, is a shop owned by the German PUMA AG, which opened in December 2007. The company aims to become the most desirable "Sportlifestyle" company. The PUMA Store in Helsinki is the only one in Finland and strives to achieve the company mission by selling the company's accessories, apparel and footwear, and offering high quality service for its customers.

The size of the one-storey store is ca. 170m^2. The store has two stockrooms, the other is attached to the sales floor and contains footwear, accessories and visual merchandising materials and the other stockroom, which is situated one floor below somewhat far from the store, is for apparel, accessories and visual merchandising materials. On the sales floor all the products

are presented. From apparel there should always be a certain size range and number of each item. The presentation of accessories depends on the size and number of items in storage. All the shoe models are presented on a footwear wall, which presents one right foot shoe of each model that the store currently has. If a customer wishes to try the footwear, the personnel find the right sizes and models from the stockroom.

1.2 The stockroom operations of the store

Currently the in-store logistics are not operating efficiently. The inefficiency is caused from several smaller problems, adding up to one big problem. The main problem is that the inefficient stockroom operations reflect negatively to the level of the customer service that PUMA Store Helsinki can provide to its customers. Currently, the replenishment process is slow due to the problems in the receiving, storing and sending procedures of the store.

PUMA Store Helsinki receives replenishments and new products every week on Tuesdays and Thursdays. When the shipments are received they usually cause the footwear stockroom to get in disorder because of its limited size. If the stockroom supervisor is not on shift it is even more probable that the stockroom gets crowded and stay like that for longer, because the other employees are not familiar enough to the warehouse operations.

The storing is most of the time very slow and inefficient. If the shipments are bigger than one pallet, it is likely that the unloading of shipments to the sales floor and storage takes two or more days. Many times the received boxes contain products or sizes of products that are finished from the store and having them to the sales floor would be important in order to be able to sell them. If a customer asks for something that is finished it is basically impossible to start browsing through the received boxes in the stockroom and in most cases the customer servants have to say that they don't have the enquired product, thus possibly losing a sale.

The replenishment of the sales floor plays obviously an important role in the operation of the store. However, there are problems with this as well. The replenishments should be done every day; this means that what has been sold the previous day should be taken from the stockroom and put on the sales floor. The exact process on how and when to do this process is unclear for many employees and many even consider it as a very frustrating operation.

PUMA's management orders the store in Helsinki to send merchandise to outlets and full price stores in other countries on a regular basis. The deadlines for accomplishing these *send-*

*out*s are usually from one to two weeks. The number of items to be sent can vary from one piece of one item to 300 pairs of different shoes in to several locations. The send-outs and their sizes are nearly impossible to predict in the store. For the moment, the stockroom supervisor is the only person who knows how the send-outs are to be done and how to order the transportation company to pick the shipment. Because the send-outs have to be done in parallel with receiving replenishments, the upper stockroom gets seriously crowded from time to time and reorganising the stockroom into how it should be can take even weeks.

The store has manuals on how the receiving and shipping should be done, but it is in two parts, the older one containing outdated information, the second acting more like an update to the first one. The manuals are not very clear and emphasise more on how to use the inventory data system correctly.

The aim of this project is to create a stockroom operations manual for PUMA Store Helsinki. This manual will be a tool for training the new and current employees of the store so that every employee will know how to correctly run the stockroom. This will increase the efficiency of the stockroom operations and ultimately convert into shorter order-cycle time and better customer service.

1.2.1 Research problem

There is one research question for this project and two sub-questions for it:

How to create an effective manual for the in-store logistics operations of PUMA Store Helsinki?

- What are the operations and procedures that must be included in the PUMA Store Helsinki's stockroom operations manual?
- What does an effective manual include?

1.2.2 Objectives of the project

The objective of this project is to create a better and an up-to-date manual that describes PUMA Store Helsinki's in-store logistics operations and all the necessary procedures and details related to it.

The outcome of the project is expected to increase the efficiency of the stockroom operations and shorten the order cycle time, thus improving the customer service.

1.2.3 Methodology

The quality of the Stockroom operations manual was analysed qualitatively with the help of a feedback form I created. The questions and answers are in Appendix 3. The feedback form consists of open-ended questions divided in four sections, each section addressing a certain part of the manual.

When the manual was ready I asked one of the employees at PUMA Store Helsinki to read the manual and answer the questions in the feedback form. Due to time and personnel limitations in the store during the end of the project, it was not possible to conduct a face-to-face interview or ask two or more employees or members of the management to read and assess the manual.

The employee who read and gave feedback about the manual was chosen randomly. He had as little knowledge about the stockroom operations of the store as any other employee in the store, excluding me.

1.3 Structure of the thesis

The first chapter of the thesis is the introduction. It explains the current situation at the PUMA Store Helsinki and the reason for the project. It also describes the expected result of the project.

The theoretical framework defines first the concepts order cycle and customer service. The aim of the project is to ultimately shorten the order cycle time and improve the customer service. These two concepts can be regarded as key concepts and they must be defined in order to understand what an effective stockroom operation manual must be able to deliver.

The theoretical framework continues with discussing concepts and operations regarding warehousing. This forms the substance of the manual. All the concepts and operations explained here are and must be present in the stockroom operations of PUMA Store Helsinki. Thus, they must be explained and included in the manual as well.

The chapter 2.6 presents and discusses operations blueprints and process maps. These have not been used in PUMA's earlier manuals, but in my opinion they are crucial in explaining complex operations briefly to give an overview to the user. Thus, they are included in the manual, in which they are called simply flowcharts.

After the flowcharts, the second chapter continues with a literature review on writing manuals and the content of good manuals. It covers all the aspects related to writing good manuals and the advices are put into practice in the project.

The third chapter is entirely about the project. It starts with the project plan, then describing the implementation of the project and ending with reporting the results and assessing the project.

The fourth chapter summarises the project and the report and draws a conclusion about the results. The relation between theory and practice in the project is also analysed. This chapter gives also further study recommendations.

The last part of the report consists of bibliography and appendices. The first appendix is the project timeline the second is the feedback form used to assess the manual. The third appendix is the new stockroom operations manual of PUMA Store Helsinki, which is not public.

2 Theoretical framework

The theoretical framework discusses and defines the theoretical concepts regarding warehousing and creating manuals. This chapter is fundamental for successfully carrying out the project. The chapter begins with defining the two key concepts involved in this project, namely the order cycle and customer service.

The project's aim, to improve the efficiency of the stockroom operations and to improve the customer service the store can provide to its customers, will be achieved through shortening the order cycle time. Therefore, customer service and order cycle time must be defined first.

Next this chapter discusses concepts related to warehousing in a retailing environment. All the concepts explained here are vital for efficient stockroom operations and they must therefore be included in a manual that explains the operations of a stockroom.

After the warehousing concepts are known, the principles of effective manuals must still be explained. The section regarding writing manuals discusses the structure, characteristics and contents of effective manuals.

2.1 Order cycle

Order transmittal, order processing, order preparation and order shipment are the four elements that form the order cycle. Many people and many departments of the company usually handle the orders. Each handling of the order prolongs the order cycle time, thus increasing the costs of the company. Therefore, companies try to reduce the order cycle time as much as possible. This can be done, for example by removing as many people and departments as possible from the order cycle process. (Bloomberg, LeMay & Hanna 2002, 67.)

In this case there can be seen to be two different order cycles, of which both time is tried to shorten. One order cycle is between the salesperson of the store and the customer visiting the store and the other order cycle is between the stockroom supervisor and PUMA's management who orders certain merchandise to be sent to another store.

In both order cycle cases, the new manual will only concern the order processing and order preparation, as those are procedures that take place in the stockroom.

Order processing is the set of activities that begins after the customer's order is received and ends when the warehouse is ready to start gathering the ordered products. The processing consists of ensuring product availability and preparing necessary shipping documents. (Bloomberg et al. 2002, 68.)

Order preparation consists of picking the right products and packaging them for shipment. This process starts when the warehouse receives the order and finishes when the shipment is ready for transportation. (Bloomberg et al. 2002, 68.)

2.2 Customer service

Shapiro and Heskett (1985, in Bloomberg et al. 2002, 65) describes customer service in this context with the "seven R's rule". According to the rule customer service is good when it delivers to the customers the seven R's, that is, "the *right* product, in the *right* quantity, in the *right* condition, at the *right* place, at the *right* time, for the *right* customer, and at the *right* cost" (Bloomberg et al. 2002, 65).

Failure in any of the seven R's results in poor customer service, as the flow of product is disrupted. However, it is rare for companies to have the order correct on all the seven points, and those who have it create themselves a competitive advantage and added value for their customer. (Bloomberg et al. 2002, 65.)

The new stockroom operations manual is able to address the issues related to having the products in the right condition, at the right place and at the right time, affecting thus also the cost part of the seven R's rule. The right condition refers to storing the products correctly. The right place for the products are either correctly stored in the stockrooms or on the sales floor. The right time means that the products customers require should be easily and quickly accessible either on the sales floor or in the stockroom's shelves, but not in the packages, in which the merchandise is received. If these can be done as efficiently as possible, it will decrease costs.

Pretransaction, transaction and posttransaction are the elements that build up customer service and to which the seven R's are linked. The R's that the new manual can improve are present in the pretransaction and transaction elements (see Bloomberg et al. 2002, 65-67.)

Pretransaction elements are phases that must take place in order to create service that satisfies the customer. In this project's case storing the products correctly and the policy for it are pre-transaction elements (see Bloomberg et al. 2002, 65-67.)

The transaction elements tie together customer service and the order cycle, as the order cycle is one of the transaction elements of customer service. Thus, improving the order cycle leads to improved customer service. (see Bloomberg et al. 2002, 65, 67.)

2.3 Warehousing

Warehouses have three basic components. Those are space, equipment and people. Space allows storing goods when inventories must be carried. Because the warehousing space is not free it also affects the price of the product. (Bloomberg et al. 2002, 174.)

Materials handling devices, storage racks, dock and information processing systems are warehouse equipment. Their purpose is to help product movement, storage and tracking. The type of the product, interaction between the equipment and the other components of the warehouse affect to the type of equipment used in the warehouse. (Bloomberg et al. 2002, 174.)

The third and most critical warehouse component are the people who work in the warehouse. Complete automation of a warehouse is still impossible so there is always a need of competent employees in warehouses. Warehousing can be regarded as one of the most difficult professions as it requires intelligence and especially initiative. The work requires various skills such as product knowledge, knowing the customer needs, handling goods and equipment, and mastering information work. The employees in warehouses have to make independent decisions and stick to agreed procedures. (Bloomberg 2002, 174-175; Karhunen, Pouri & Santala 2004, 374.)

2.4 Basic Warehouse operations

Coyle, Bardi and Langley (2003, 299.) suggest that there are two basic warehouse operations, movement and storage, the latter being the most obvious operation. In addition to movement and storage there are secondary operations that support and are a part of the basic operations. These supporting tasks are maintaining the data system, communicating with constituencies, purchasing materials and supplies, and keep order and control the warehouse (Karhunen et al. 2004, 374).

Interestingly, Bloomberg et al. (2002, 175) consider also information transfer to be a basic function of a warehouse, besides movement and storage. Transferring information occurs simultaneously with product movement and storage. The purpose is to ensure the warehouse's successful functioning by capturing data on inventory levels, inventory location, throughput of the warehouse, space utilisation and other necessary information. This information can then be used to assess the effectiveness of the warehouse. (Bloomberg et al. 2002, 175.)

These aspects are present in the PUMA Store Helsinki's warehouse as well and must be thus taken into consideration in the manual. However, many concepts and details that Bloomberg et al., Coyle et al. and Karhunen et al. discuss under these topics are not relevant in PUMA Store Helsinki's scale and due to that I do not present them here.

2.4.1 Storage

> Storage refers to the physical disposition of products throughout the facility. This can be temporary or semipermanent. A temporary basis means storing a product that is necessary for inventory replenishment. Semipermanent storage is used for inventory in excess of immediate needs. This is called safety or buffer stock. (Bloomberg et al. 2002, 175.)

There are several reasons for companies to have inventories and thus store products. Inventories allow economies of scale, help balance demand and supply and give protection against uncertainties. (Bloomberg et al. 2002, 136.)

Inventories enable economies of scale to be gained in purchasing and transportation. When purchasing larger amounts of materials companies get quantity discounts. Moving larger volumes, thus increasing the equipment utilisation results in economies of scale in transportation. (Bloomberg et al. 2002, 136.)

A main reason for companies to store products is to offset improbabilities in demand. Companies also risk losing sales if customers order more products that the companies have in their finished goods inventories. (Bloomberg et al. 2002, 136.)

2.4.2 Movement

Efficient and quick short-distance movement is a crucial element of warehousing. Receiving, put-away, order picking and shipping are all operations that require short-distance movement in order to be done. (Coyle et al. 2003, 299-300.)

Receiving is the point at which storage begins. At the receiving operation it has to be identified what has been received. This operation plays a critical role in the accuracy of the stock accounting. (Karhunen et al. 2004, 374.)

The goods received can be replenishments, transits or returns. When the received goods are addressed to the warehouse and belong to the warehouse articles, they are replenishments. Transits consist of goods that the warehouse does not store. They can be deliveries to other departments or to certain customers. Returns are products that the customers return because they do not need them or they are faulty. Each kind of shipment requires different kind of actions to be taken. (Karhunen et al. 2004, 374-375.)

Karhunen et al. (2004, 375-376) divides the receiving into two different parts, namely platform operation and the actual receiving operation. Both operations need not to be done by the same person. The platform operation has to be done immediately by the employee who is present when the goods arrive. (Karhunen et al. 2004, 374.)

The platform operation, shown in figure 1, usually shifts the responsibility of the goods from the delivering party to the receiving organisation. The operation consists of verifying the consignee, permitting the discharge of the goods, comparing the shipped quantities to the consignment note, checking the condition of the transport units, noting discrepancies and signing the consignment note and sorting the shipment on the receiving area. Furthermore, the platform operation includes keeping order and maintaining the tidiness of the platform area. (Karhunen et al. 2004, 374-375.)

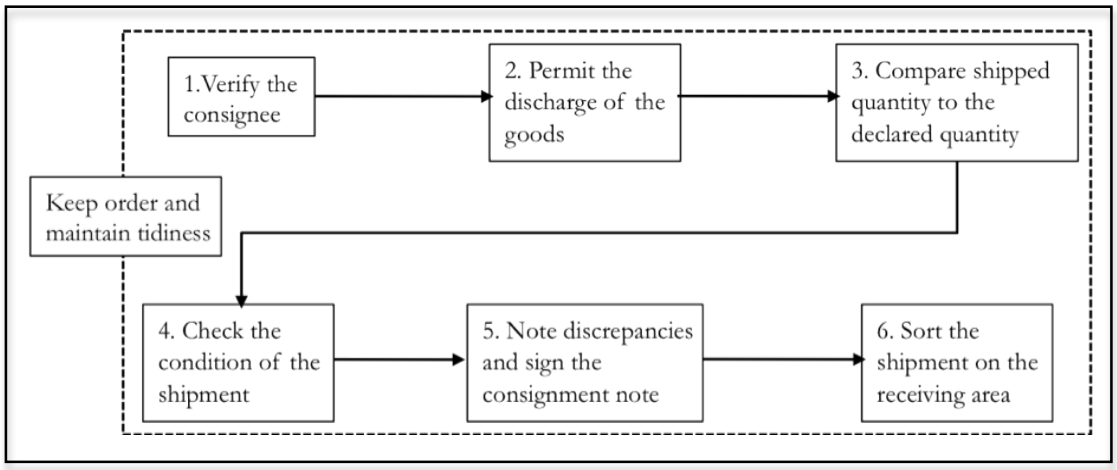

Figure 1. The platform operation (see Karhunen et al. 2004, 374-375)

The receiving operation includes printing out the purchase order for checking the goods, verifying the quality and quantity of received goods, marking discrepancies on the purchase order, putting damaged items aside, cleaning away the packing materials and pallets and confirming the received products and their amounts and book them in the warehouse information system. If the amounts do not match with the purchase order, it has to be informed to the party that did the purchase order. (Karhunen et al. 2004, 375.) Figure 2 illustrates the conventional receiving operation.

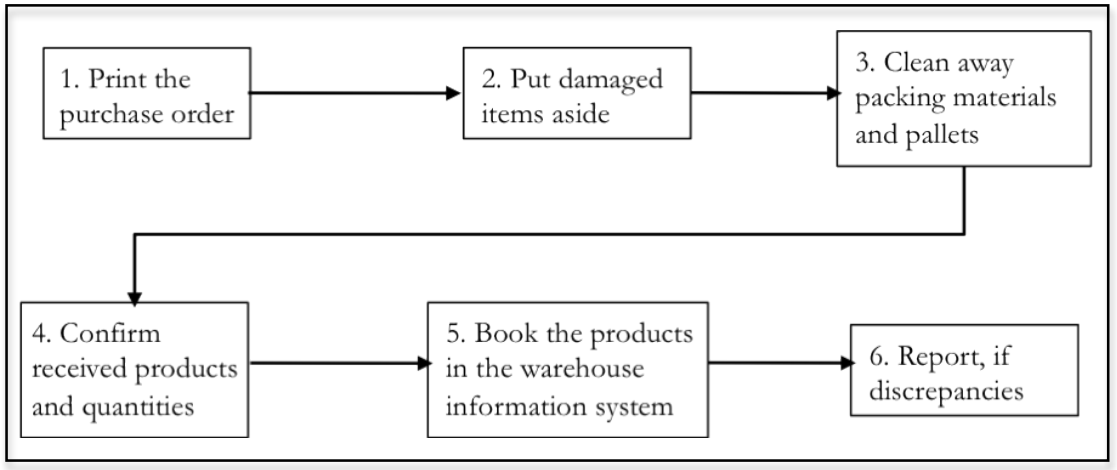

Figure 2. The conventional receiving operation (see Karhunen et al. 2004, 375)

In companies that use Advanced Shipment Notifications (ASN), as is the case with PUMA Store Helsinki, the receiving process is a bit different, although the result is the same. ASNs are used to process receipts automatically. They include Purchase Order (PO) numbers, Stock-Keeping Unit (SKU) numbers, lot numbers and the carton number. Electronic ASNs transfer their information to the inventory system of the company and to make a receiving receipt the employees only have to confirm the ASN. After confirming the ASN it automatically updates

the inventory system by doing the necessary transactions. (Piasecki 2003, 45.) Having ASNs in use does not mean that the quantities of shipped goods should not be checked against the quantities mentioned in the ASN. The difference between the conventional receiving operation can be seen when comparing figure 2 with figure 3.

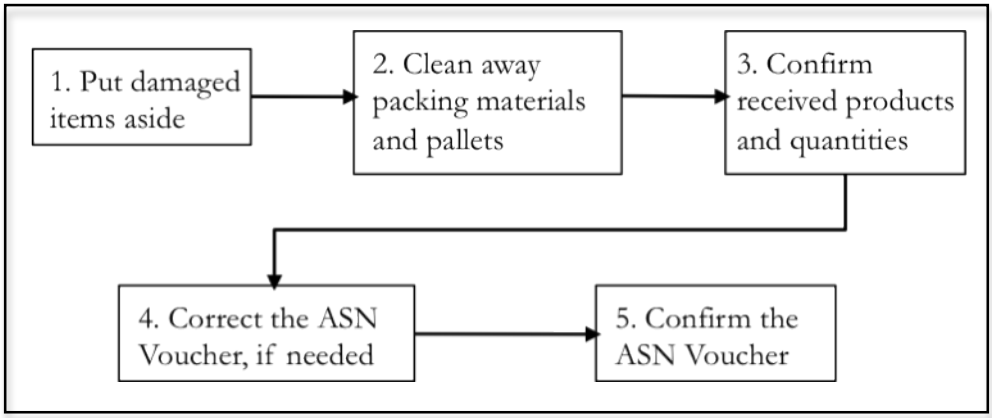

Figure 3. The receiving operation with ASN (see Piasecki 2003, 45).

Piasecki (2003, 253) suggests that there should be a clear and exact procedure, followed by every employee, on how to verify that the received quantities have been checked and counted.

If the received shipment is a transit, it has to be forwarded to the correct department. If the shipment is for a customer, it can be moved to the order-picking phase. When returns are received, the first task is to find out the reason for the return. If the received product(s) can still be sold, it will be stored. If it is not resalable, it has to be separated from the saleable goods and booked out of the warehouse information system. Returns under warranty usually have their own procedures to be followed. (Karhunen et al. 2004, 375-376.)

Put-away, shown in figure 4, is the operation that transfers the received goods from the receiving area to the storage area. This operation consists of identifying the goods, defining a location for them and moving them to the correct place for storage. (Coyle et al. 2003, 301.)

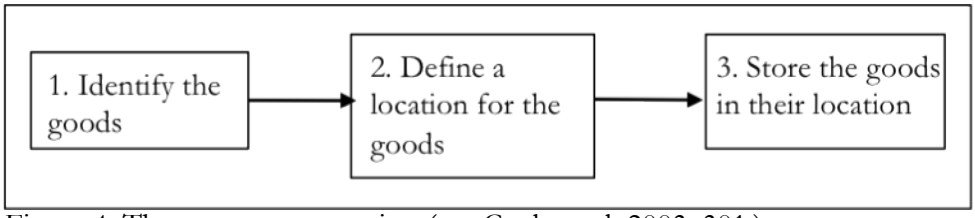

Figure 4. The put-away operation (see Coyle et al. 2003, 301.)

Order-picking means selecting the ordered items from the storage area as described in figure 5. The ordered items are in written format on a pick slip. When the items have been gathered to the shipping preparation area they are packed in a proper package or placed on pallet. If the shipment is on a pallet, the goods must be attached onto the pallet with straps or plastic wrap. When the whole order has been prepared the shipment is temporarily stored on the shipping area for the transport vehicle to pick it up. (Coyle et al. 2003, 301.)

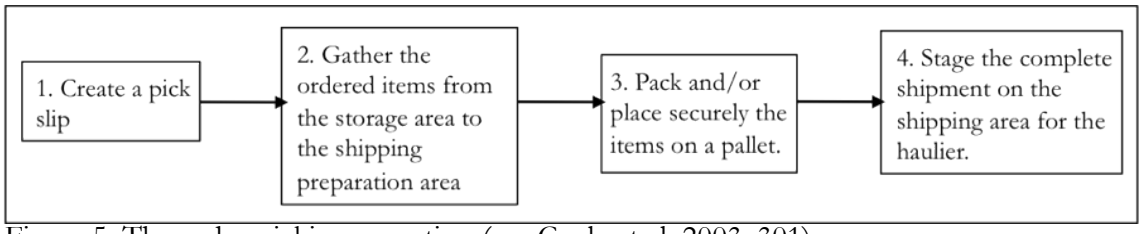

Figure 5. The order-picking operation (see Coyle et al. 2003, 301)

Shipping, depicted in figure 6, is the last movement operation. When the haulier arrives, the shipment is moved from the shipping area to the dock area to be loaded on the vehicle, after which the haulier signs the bill of lading. After this the shipped items will be marked as sent, thus removed from the inventory, in the warehouse information system. (Coyle et al. 2003, 301.)

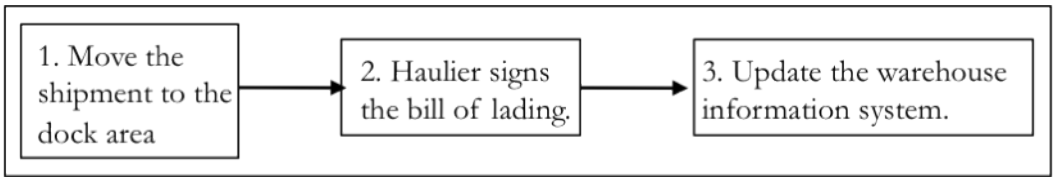

Figure 6. The shipping operation (see Coyle et al. 2003, 301)

2.5 Materials handling

Performing the warehouse operations efficiently requires materials handling. This can be done manually, with mechanical equipment or a combination of both. Materials handling in a nut-shell is "efficient short-distance movement that usually takes place within the confines of a building such as a plant or a warehouse and between a building and a transportation agency". (Coyle et al. 2003, 308.)

Kulwiec (Unknown date, in Bloomberg et al. 2002, 186) defines materials handling not only as movement but "the art and science of moving, packaging, and storing of substances in any form."

According to Coyle et al. (2003, 309) there are four aspects in material handling: movement, time, quantity and space. Materials handling involves movement when goods go in and out of the warehouse, and when they are moved within the storage facilities. Thus, the efficiency of this movement equals efficient materials handling. (Coyle et al. 2003, 309.)

The time aspect is related to the time of having the customer orders filled. This means that parts, raw materials and products must be in the right place in the right time. Longer order cycle times affect negatively to the level of customer service. (Coyle et al. 2003, 309; Bloomberg et al. 2002, 187.)

The quantity dimension concerns the quantities of finished goods delivered to the customers. Properly designed material-handling systems secure that customers get the right quantities of products they ordered. (Coyle et al. 2003, 309.)

Space of a facility is fixed. This has to be taken into consideration when designing materials handling, as the equipment used consumes the space of the facility. The equipment used should use the warehouse space as effectively as possible. The use of the space should be effective because space is expensive. (Coyle et al. 2003, 309; Bloomberg et al. 2002, 187.)

2.5.1 Objectives

Effective and correctly installed material handling systems can reduce costs and labour, increase safety and productivity, reduce waste, increase capacity and improve service (Bloomberg et al. 2002, 186).

Coyle et al. (2003, 309) argues that one of the materials handling objectives is maximizing the usable space of a warehouse. Warehousing is not only about vertical space, but it has to utilise also the horizontal space, in other words cubic space. Because the height of a warehouse is also a cost factor, utilising it effectively means being efficient, thus reducing the warehouse's operating costs. While trying to maximise the storage space in three dimensions, it should be taken care that the aisle space is not minimised so much that it impedes the necessary movement in the warehouse. (Coyle et al. 2003, 309.)

Another objective Coyle et al. (2003, 311.) states, is minimising the number of times the products are handled in a warehouse. The earlier defined movement and handling related to it is

obligatory, without which the warehouse could not operate. However, because of overcrowding, some warehouses need to temporarily store products and move them many times within each area. This cannot always be avoided, but the materials-handling system should minimise this and aim to move the products through the warehouse promptly and efficiently. (Coyle et al. 2003, 311.)

The materials-handling system should also offer effective working conditions. Among many others, one objective in developing effective working conditions is to ensure safety to the employees. Danger should be minimised and productivity maximised. Furthermore, the working environment should be such that it would motivate the employees to do their jobs properly. (Coyle et al. 2003, 311.)

Coyle et al. (2003, 311) suggests that the answer for creating such an environment would be automating warehouses as much as possible. However, this is impossible for example in cases where companies receive orders for a small number of a stock-keeping unit (Coyle et al. 2003,311).

Materials handling is also a part of the customer service. By having an efficiently operating materials-handling system it is possible to improve customer service in a company, though it requires the management to understand this dimension of materials handling. (Coyle et al. 2003, 312.)

Effective materials handling can also help saving costs by increasing productivity, utilising space more efficiently and decreasing misplacing of products. All the materials handling objectives are important and they are related to each other. (Coyle et al. 2003, 312.)

2.5.2 Guidelines and principles

Labour and equipment costs can be minimised by having the distances products are moved in the warehouse as short as possible. One option to realise this would be using the popularity principle, in which high-volume items are stored at the shortest distance from the shipping area. When products are moved, they should stay in motion as long as possible, because stopping and starting increases costs. (Coyle et al. 2003, 312.)

According to the College-Industry Committee on Materials Handling (1990, in Coyle et al. 2003, 313) one important principle is providing an operation sequence and equipment layout

that optimises the materials flow. Such sequences can be represented, for example, with process maps, which are described in the next chapter.

2.6 Operations blueprint and process map

Operations blueprints are lists that describe how the operating functions should be done, what are their features and their timing. The blueprints specify in detail each operating function in an organisation. They also define who are responsible for fulfilling the steps in question, when and how should they be performed. Retailers may have several blueprints separated for different areas, such as inventory management or store maintenance. (Berman & Evans 2004, 314.)

According to Berman and Evans (2004, 314) the advantages of operations blueprints are that they standardise the operations, expose weaknesses and risks in the operations, concretise the operations enabling them to be easily evaluated, show employee requirements and possibilities and needs for improving the operations. I consider the operations blueprints to be also an efficient tool for educating the personnel as they provide a clear overview of the operations including the timing. Furthermore, they can serve as checklist when problems or questions occur.

Bozart and Handfield (2008, 48.) presents a concept, which they call process maps. Process map is a graphic representation that specifies the organisational relationships and/or all the informational, physical and/or monetary steps that together form a business process. Frequently it is a process map that gives a manager the first complete picture of the process in question. (Bozart & Handfield 2008, 48.)

The definitions of operations blueprints and process maps are very similar and to me it seems that they are in fact synonymous. However, Bozart and Handfield (2008, 48-49.) cover the process maps with more detail by presenting a set of graphical symbols that are used to picture different steps of the process, and by presenting rules that should be kept in mind when compiling process maps.

Figure 7 shows commonly used process mapping symbols, which I will use in the process maps I will create for the in-store logistics of PUMA Store Helsinki (see Bozart & Handfield 2008, 48-49). Figure 8 is an example of a process map that is used in the stockroom operations manual.

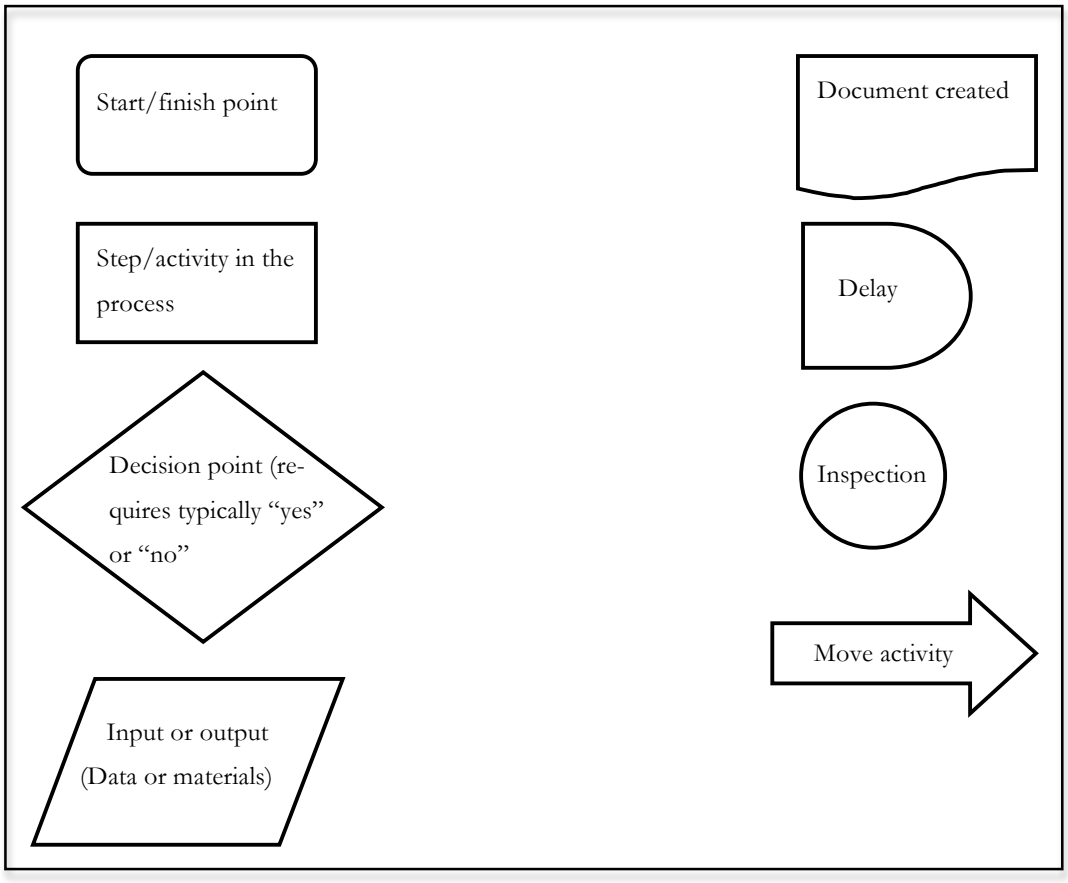

Figure 7. Common Process Mapping Symbols (Bozart & Handfield 2008, 48-49)

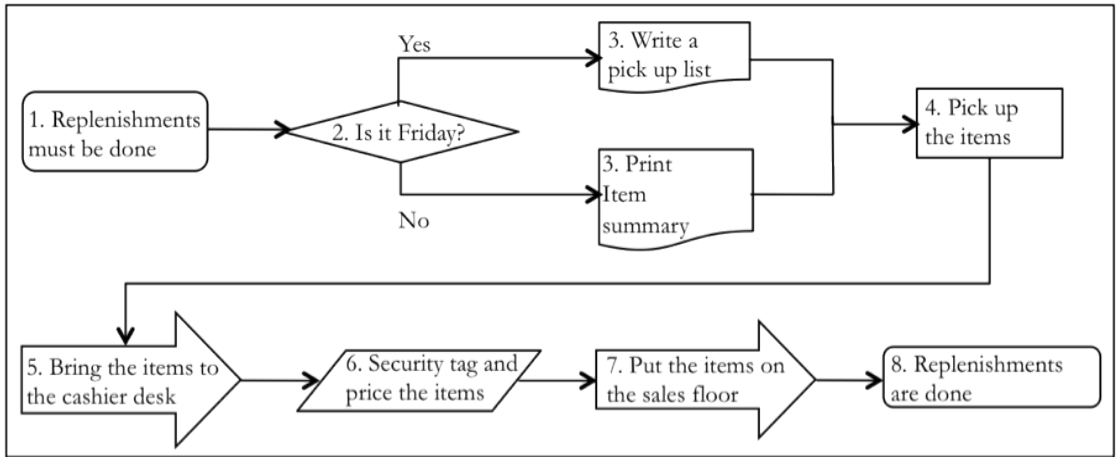

Figure 8. A process map used in the stockroom manual of PUMA Store Helsinki

Because business processes are complex and depicting them in flowcharts require very detailed information the flowcharts can become very complicated or get off the track if certain rules are not followed (Bozart & Handfield 2008, 49). These rules are as follows:

1. "Identify the entity that will serve as the focal point". The focal point can be a customer, an order, a raw material or a similar entity. The process map should only focus on the activities and flows that are related to the movement of the entity. (Bozart & Handfield 2008, 49.)

2. "Identify clear boundaries and starting and ending points". In order to be able to create a process map, clear starting and ending points have to be decided. The starting point can be, for example, when a customer places and order, or when a manufacturer receives the order from a customer. Identifying the boundaries means that the process map can focus only on physical, information or monetary flows, a mixture of them or all of them. (Bozart & Handfield 2008, 49.)

3. "Keep it simple". Especially when doing process maps for the first time it is easy to describe the process with too much detail. Common mistakes are to subdivide major activities in many smaller branches without giving any additional understanding of the process or to depict every possible occurrence in the process, including those that happen rarely. This mistake is difficult to avoid and the only way not to make it is to ask whether the detail in question is crucial for understanding the overall process and whether it is worth the added complexity. (Bozart & Handfield 2008, 49.)

2.7 Manual

Manuals are needed, for example, when new working methods are developed. Manuals can be instructions for transportation, warehousing or installing. They can also be guides related to the use of a product, or service, repair and safety instructions. There are also manuals for using software, which are called user documentation. Manuals must cover all the actions that the user will probably take. (Finnish Standards Association SFS 2001, 21; Grimm 1987, 1; Kauppinen, Nummi & Savola, 2006, 102-103.)

Manuals provide the users with information on right and safe ways of using with text, pictures, symbols and charts (Kauppinen et al. 2006, 103). Piasecki (2003, 46) refers to the content of manuals with the term *procedure*. They are a mixture of rules and instructions that delineate

how to perform the process in question. The procedures do not need to include every possible detail, but they do need to be detailed enough to enable performing the process correctly. Procedures can include information on how to physically perform the task, which equipment should be used, how to fill out and process paperwork correctly, when and in which order the tasks should be performed, and possibly required approval or authorisation. (Piasecki 2003, 46-47.)

Software manuals should have comprehensible instructions, build confidence and obliterate possible fears towards the software. The manual should teach the users to prepare and enter the data in question, and to use the output of the software. (Grimm 1987, 1.)

Kauppinen et al. (2006, 102) claims that manual users are the most difficult to satisfy readers there are. The manual should keep up the interest of the impatient readers and simultaneously explain the things lucidly and guide the reader quickly and effortlessly to find the correct information from the manual. Frequently, it is necessary to explicitly tell the reader why it is important to read the manual. People tend to trust their skills and knowledge and start acting without reading the manual first. Thus, getting people to actually read the manual is one of the main goals of manuals. To achieve this, the manual must not either under- or overestimate the reader. (Kauppinen et al. 2006, 102.)

2.8 Types of manuals

Grimm (1987, 41) defines three different types of manuals, namely training manuals, reference manuals and combination manuals.

2.8.1 Training manuals

As the name suggests training manuals are supposed to teach. It aims on building the readers' knowledge by presenting first simple ideas and go on with more complex ones. The manual should first introduce the system or process in question together with guidelines for the typical flow of work. (Grimm 1987, 41-42.)

The system should be described simply and logically assuming that the reader does not know anything about the system or process. The objective of the manual is that after the reader has finished reading it she should understand the system. The writer can help herself by looking back how she learned the system and which were the steps. (Grimm 1987, 42.)

A training manual should be tutorial and enable measuring its success with, for example tests that should be taken before the users can start following the process in question. A good training manual should tell the readers what they can do after reading it, how well should the task in question be done and under which conditions. Special emphasis should be put on examples: each step should be explained also with a motivating example. It is important to combine the use of a manual with other types of training. (Grimm 1987, 42.)

2.8.2 Reference manual

Instead of teaching about the system, a reference manual is supposed to let the user find specific information as quickly and effortlessly as possible. Reference manuals are not read from cover to cover, except for new employees. To reach its goal, the information of the manual needs to be organised differently than in a training manual. (Grimm 1987, 42.)

The topics should be organised so that they are easy to find. The standard tasks must be described precisely and thoroughly including explanations of deviations. Because of the assumption that no one reads the manual at once, some facts must be explained several times. As the reader may only read one section it requires each section to stand alone. (Grimm 1987, 42-43.)

2.8.3 Combination manual

Due to cost-savings and practicality, most manuals combine features from both training manuals and reference manuals. Combination manuals first train the user and afterwards act as a reference manual. (Grimm 1987, 43.)

It is required that this type of manual assumes that the reader does not know anything of the system or process. On the other hand, repetition of information or instructions must be included in each step that requires it. Because of the elements of a training manual, the organisation cannot be used for reference as efficiently as possible. This fact makes it very important to include an index in the manual. A combination manual lets the reader to familiarise with it during the initial training facilitating the later use of the manual as a reference. (Grimm 1987, 43.)

2.9 Organisation of the manual

The manual must be organised so that the manual is accessible it communicates the contents clearly (Grimm 1987, 45). Figure 9 illustrates a framework that Kauppinen et al. (2006, 105) presents for long and complex manuals.

1. **Introduction**
   - Subject and goal
   - Motivating and skills required from the reader
   - Uses and possibilities of the manual
   - Contents, outline and scope
   - Safety
2. **Description of the equipment**
   - The system and its parts
   - Purpose and operation of the parts
3. **List of materials and tools**
4. **Step-by-step instructions**
   - One step at a time
   - Grouping of the steps
   - Illustration
   - Exceptions
   - Prevention of errors
5. **Troubleshooting**
   - Table of common errors and their solutions

Figure 9. Manual framework (Kauppinen et al. 2006, 105)

2.9.1 Introduction

The first part of the manual is the introduction being the cornerstone of the whole document. Its mission is to get the user to actually read the manual, and if the introduction fails in this, the manual becomes worthless. A too long or complicated introduction might exhaust the reader from the very beginning. On the other hand, failure to give enough information might leave the manual incomprehensible. (Grimm 1987, 46; Kauppinen et al. 2006, 105.)

It is critical for the introduction to provide an overview of the entire system in question, as it might be the only place the user can have it due to the fact that the manual is divided into small sections. The interrelationships and the interaction of different sections should be explained, especially when the system is large. Diagrams help the readers to get the big picture. (Grimm 1987, 102.)

The introduction guides the reader to use the manual correctly. It has to include the topic, subject and the purpose of the manual. The reader has to be informed clearly what kind of skills and knowledge she is assumed to have. Furthermore, the introduction must state the extent and outline of the manual, guide to the efficient use of it and attract and motivate the reader to actually use the documentation. Although there is the introduction in the beginning of the manual, each section should still always begin with a summary, thus making clear the subject and explaining the following text. (Grimm 1987, 46; Kauppinen et al. 2006, 105.)

Safety issues are a fundamental part of manuals. It is the manual writer's responsibility to prevent in every way the reader from doing anything that could damage the equipment or cause danger to the user. When necessary, the reader must be warned with simple and clear warnings. The warnings must be explained so that the reader distinguishes them when reading. If the warning concerns the whole manual, it must be in the introduction, if it concerns a specific operation of phase, the warning must be communicated with the specific instructions. (Finnish Standards Association 2001, 27; Kauppinen et al. 2006, 106.)

The warnings must be visualised by using commonly distinguished symbols of danger, typographic effects or creating a separate warning box. The warnings must be situated in the correct places, in other words, before the reader makes the mistake or acts incorrectly. The reader must be informed the type of danger, the consequences of neglecting the instructions, and to avoid danger and use proper safety equipment. (Kauppinen et al. 2006, 106.)

2.9.2 Description of the equipment

The reader cannot use or repair the equipment without knowing what are the parts, materials and peripheral devices of the system. At times it is necessary to explain the meaning and principles of components or parts of a whole. The description of the equipment section is for these explanations. Pictures and drawings are normally necessary to give the reader a proper conception of the equipment used. (Kauppinen et al. 2006, 106.)

2.9.3 Materials and tools

Some tasks require the use of materials, parts and equipment that the reader does not have immediately available. Therefore it is preferable to create a separate list with these details. The list of materials and tools must be presented before the actual operational instructions. (Kauppinen et al. 2006, 106.)

2.9.4 Step-by-step instructions

This part is the core of the manual. It explains in detail what the reader is supposed to do and how. An important issue that must be stressed in this part is that the instructions are not "wish lists", but they must be followed exactly as they are documented. Thus, the expectations of the execution and the results must also be realistic rather than idealistic. (Kauppinen 2006, 106; Piasecki 2003, 48.)

Each stage and the instructions related to them must be written so that it can be understood after reading it the first time and implemented immediately. Enough information should be provided for the reader to be able to proceed to the next step. However, too much information will confuse the reader easily. The steps should be in a list format, thus helping the reader to understand what has to be done in order to proceed to the next step. Keywords should be highlighted with bold, italic or uppercase letters. (Kauppinen 2006, 106-107.)

One step should include instructions for accomplishing one step of the process. The steps should be distinguished from each other by numbering them and separating them with an extra empty line. Numbered instructions are faster to read, they indicate accurately what is expected to do and they also help the readers to find precisely what they need. (Grimm 1987, 57; Kauppinen 2006, 107.)

The actions and additional information should be separated from each other by differentiating the actions typographically from other material and presenting them before describing the effects and consequences of them. Steps that are related to each other should be grouped together under topics that describe the action. If actions branch off in to two or more paths or there are alternative operations, these should be separated into their own topics. (Kauppinen 2006, 107.)

Kauppinen (2006, 107) encourages utilising plenty of drawings, pictures and flowcharts to communicate to the reader where are the important parts, how to act and what should happen.

2.9.5 Troubleshooting

This section deals the errors and problems that the reader may face. The process might not proceed as wished, the equipment is not working properly or the results are not adequate. It is usual to present common errors in a table format, which allows easy readability and gives the opportunity to provide short repair instructions. (Kauppinen 2006, 107.)

It is also recommendable to include a glossary at the end of the manual. The reader may not remember all the terms although they would have been explained in the text, especially if the manual is used mostly for reference. The glossary should be in alphabetic order and each word should have only one definition that applies to what the manual means with the word. (Grimm 1987, 130.)

2.10 Organisation possibilities

Although the framework is known, there are still several options to organise the actual information and instructions under the several topics of the manual. The chosen organisational patterns must be selected to best fulfil the readers' needs. Furthermore, the text must be organised logically, and the logic has to be obvious to the reader. The reader perceives detailed and earlier presented ideas more important than those with less details and presented later. A simple way to clarify the organisation is to use a flowchart as a table of contents, especially if the organisation is in chronological order. (Grimm 1987, 48-49, 51.)

One possibility to organise the text is to put the instructions in the order of importance. This means that the most important ideas or items are presented first. This organisation model can be used in a reference manual or the introduction of a training manual. (Grimm 1987, 45.)

Another possibility is to organise the manual chronologically. The steps or events that occur first are explained first. This order is used when explaining procedures. (Grimm 1987, 46.)

Grimm (1987, 46.) presents also a practical organisation for overviews and introductions, namely, analytical organisation that means dividing a complex subject into smaller parts and explaining them.

Furthermore, manuals can be organised by the topics it covers without any particular organisation. This simple method might be suitable for instructions on entering data in software or explaining the output of software. (Grimm 1987, 46.)

It is not required to use only one organisation pattern in a manual. All of them can and should be used if it best fulfils the readers' needs. Different organisation can be used for different sections of the same manual. (Grimm 1987, 46.)

2.11 Methods of presentation

When organisation of the data is chosen, the method of presenting must be decided. This again, has to be chosen according the needs of the readers and the material itself. The available methods of presentation are prose, cookbook style, numbered instructions and four-step method. No matter what method will be used, the message should always be illustrated with figures. If the manual uses typographical effects or different typefaces to mark operations that the reader must do or warnings that the reader does not effortlessly understand, they should be explained in the text. (Finnish Standards Association 2001, 49; Grimm 1987, 54.)

In document writing prose means using paragraphs, in other words, writing straight text in the usual form. The downside of this method is that it is easy to miss some information when it is tightly in the paragraphs. (Grimm 1987, 54-55.)

When the instructions are written like a recipe, the cookbook style is used. With this style, a verb starts the sentences, allowing fewer word to be used compared to the prose method. Possible conditions related to the instructions must be stated first followed by the verb. This style reduces the time used for reading and quickens understanding. (Grimm 1987, 55-56.)

Four-step method is applied when the instructions concern, for example, computer software. Because of the latitude and flexibility of such systems, the user can choose what to do, without following strictly certain predefined steps. The user decides what and when to do it. In this case, the manual's function is to guide when and why to do the tasks. (Grimm 1987, 59.)

The four steps that provide this guidance are motivation or reasons, effect, general steps and example. The first step tells the user what they want to do and why. The second step states the effects of the user's actions. The general steps consist of the steps that the user has to follow in order to achieve the desired effect. The final part of the four-step method is to provide an example of the concept that is being explained. (Grimm 1987, 59.)

The method to be used depends on the manual, but different methods can also be combined in one manual. Prose can be used in the introduction or overview and cookbook style for step-to-step instructions concerning one user and strict procedures. (Grimm 1987, 60.)

Piasecki (2003, 49) stresses the importance of including graphics into the manuals, thus helping the reader to better understand the material. One possibility is photos. Pictures can be taken with digital cameras and an image processing software can be used to include additional information and effects to help the reader. Photos can be taken of the equipment, specific tasks, workflows or work areas. It is possible to include graphic representations of the equipment by scanning such images from manuals that came with the equipment.
(Piasecki 2003,49-50.)

In addition, Piasecki (2003, 50) suggests using CAD drawings of the facilities enhanced with arrows, text and other necessary details for concretising safety issues, storage and staging areas and also workflows.

Software training can greatly be enhanced and made more effective with the help of screenshots of the program in question. Every PC is capable of taking pictures of the screen. The writer has to bring the preferred data on the screen and take the screenshot. Necessary details and editing can be done with an image processing software. (Piasecki 2003, 50.)

Piasecki (2003, 50) claims that people rarely read flowcharts still admitting that in certain situations they are the best method to explain a process. According to Finnish Standards Association (2001, 54), such situations occur when a specific sequence of the operations is necessary for safe and correct execution of the procedure. The flow charts should be presented along with the text explaining them (Finnish Standards Association 2001, 54).

Teaching how to correctly fill out documents and forms is easiest when the manual includes scanned images of such documents processed correctly. The effect of such images is again

possible to increase by adding graphic aids and text to explain necessary details. (Piasecki 2003, 50.)

When the course of the procedure depends on other variables, such as type of material or quantity of items, tables are a viable means of presenting the data (Piasecki 2003, 50).

2.12 Format and layout

The purpose of the format and layout is to help the reader interpret, understand and remember the content of the manual. It is important that the physical appearance of the manual's page is simple and easy to read. This can be done with aiming in visual simplicity, and carefully choosing the colour of the paper and ink, which also affect the readability. The manual writer's task is to create a format and layout that is to be used for the whole manual. (Grimm 1987, 62, 66.)

2.12.1 Format

Format means the set of information that is uniformly arranged on each page. Such information can be the date, title, section, page number and update information. The position of each of these pieces of information should be fixed on each page, allowing the reader to easily find information that she is looking for. This information can be located, for example, in the header of each page. (Grimm 1987, 62.)

Page numbers are one of the most important factors related to the format. Their task is to facilitate the reader to find specific information according to their needs. The page numbers must have their own format that should be simple and clear. Formats that include more information (e.g. a section number) are not to be used. It is recommended that the page number would also indicate the total number of pages. (Finnish Standards Association 2001, 47; Grimm 1987, 63.)

2.12.2 Layout

The information that will not be on each page is not covered by format. The arrangement of that information is called the layout. It includes the paper size and margin width. The standard width of the left margin is 20mm, allowing the document to be bound or perforated, and the standard top margin is 10mm. The typeface used should be as clear and big as possible. The

type size of the body type should be at least 9 point, whereas in the headings of the manual and in short messages that the user often reads, the type size should be at least 12 point (Finnish Standards Association 2000, 2; Finnish Standards Association 2001, 51; Grimm 1987, 64.)

The layout defines also the line spacing and the number of empty lines between paragraphs and sub-headings. The use of additional empty lines between headings should be defined in the layout, as superfluous white space facilitates finding topics and it is visually pleasant. Headings should be used each time the topic changes still keeping in mind that too many headings make the manual to look like an outline. (Grimm 1987, 64.)

Headings not only help the reader to discover the topics and let them stop the reading, but also the writer to write without fretting about topic sentences and transactions. Nevertheless, topic sentences are not utterly useless as some readers ignore the headings at times. (Grimm 1987, 64.)

The layout should also define the different levels of headings. The levels should be distinguished from each other with typographical effects, typeface size and the positioning of the headings. (Grimm 1987, 64.)

2.13 Writing style

The aim of making the reader understand the manual effortlessly poses requirements for the style of the text. The style in this context means the way of putting word together to form phrases and sentences including word choices, usage and punctuation. Manuals should use short words and sentences, as they are easy to understand. People tend to ignore what they do not comprehend. (Grimm 1987, 75.)

2.13.1 Language

Choosing the words correctly is crucial for the reader to understand the text. The writer should use explicit words that mean the same thing to all the readers. Long and rarely used words are to be changed to shorter and simpler everyday words. Furthermore, the use of nouns should be replaced with the use or verbs where possible, in order to shorten the text. Another way to shorten the text is to avoid expressions that require the use of several words when they can be replaced with one word. (Grimm 1987, 77-78.)

The ultimate goal is to use as little and as short words as possible, consequently helping the reader to read faster. This goal can be reached with the use of conversational style, consistent words, correct and consistent capitalisation and careful use of abbreviations. (Grimm 1987, 78.)

Using conversational style equals writing the way people talk. When talking people normally use short sentences with simple and short words. However, the readers do not have the possibility to ask questions if they do not understand some parts of the text, as it is possible while discussing with another person. This means that regardless of the conversational style, the writer should nevertheless keep in mind the grammar and correct punctuation. More precisely, the writer should use contractions, ask questions, talk to the reader, use short sentences, not use "which" and "that", avoid slang and use clichés and idioms. (Grimm 1987, 79.)

One way to make the sentences flow better and apply the conversational style is to use contractions. However, they should not be used when the writer stresses a point, as the word "not" and the verb used together with it highlights the importance of adhering the instruction. (Grimm 1987, 79-80.)

In the same way that questions are a part of discussions, the manual should also include them. The writer should anticipate the reader's probable questions and give answers to them. However, overusing this technique will lose its effect. (Finnish Standards Association 2001, 49; Grimm 1987, 80.)

Talking to the reader means using "you" instead of "the user". Addressing the reader is more personal, it abolishes the problem related to the sexist personal pronouns that emerges when using "the user", and in addition it shortens the sentences. (Grimm 1987, 80.)

Using short sentences makes the manual easier to write, punctuate and read. The writer does not miss any important ideas when one sentence includes only one idea. Sentences should be as short as possible without losing the point. The punctuation of shorter sentences is easier, since they generally include only a period. (Grimm 1987, 80.)

The words "which" and "that" indicate long sentences, because frequently a new idea is presented after those words. Consequently, those two words are against the goal of writing short sentences and they should not be used. Instead, the new ideas must be in their own sentences. (Grimm 1987, 80-81.)

Although slang is widely used in conversation, it should not be used in manuals. Sometimes clichés and idioms are the best method to deliver the message to the reader in the clearest way. (Grimm 1987, 81.)

Using consistent language is important for the reader to understand the text. When one word is used for something, synonyms should not be used in the future. This facilitates the learning of the reader. Words that should not change if the meaning does not change can be verbs related to user actions, words that can be spelled correctly in more than one way, or titles (e.g. the manual itself). The capitalisation of words should also remain consistent throughout the manual. Same words should be capitalised in the same manner in the entire manual. (Grimm 1987, 81-82.)

It is recommended not to use abbreviations in manuals, since they can be difficult for the reader to understand. However, it is relevant to use them when the reader needs to use the abbreviations in question in their work. When introducing the first time an abbreviation that the reader might not understand, its meaning should be explained in the text. (Grimm 1987, 82.)

2.13.2 Active voice verbs

Grimm (1987, 86) advises to use active voice verbs in the manual. The first reason for using them is that they are simpler to use than passive voice verbs, because active voice uses the basic sentence structure of English making the sentences easier to understand. Moreover, the use of passive voice requires additional words and letters to be used, thus extending the sentences (Grimm 1987, 87.) Example 1 illustrates in practice the differences between active and passive voice.

One aim of the manual is to define who is responsible for completing the different tasks. If the writer uses passive voice, the reader must read the whole sentence before finding out who is responsible for carrying out the task in question. Passive voice sentences do not even have to include the information of who completes the task. Active voice sentences define the responsible persons and that is why they should be used. (Grimm 1987, 87.)

Active voice sentences are also more pleasant to read. They raise the reader's interest and are direct and concise. This supports the objective of getting people to read and digest the manual. (Grimm 1987, 87.)

Count the items in the box. (active) The items in the box must be counted. (passive)

Example 1. Active vs. passive voice verbs

2.13.3 Grammar and punctuation

Rules and standards of grammar on punctuation have been developed to help people communicate and understand each other. That is why manuals should also follow grammar and punctuation rules. The aim of keeping sentences short helps the writer in this. (Grimm 1987, 91.)

Transitional words and phrases, called connectives, should be used to show the reader the connections between ideas. Connectives can communicate the reader about opposing statements, comparisons or illustrations. They should be used precisely in order to express the correct message. Using them incorrectly makes the connectives useless. (Grimm 1987, 93.)

Commas should be used sparingly, although they are essential to understanding. They have many uses, but in manuals they should be used to separate parenthetical phrases and series. Instead, they should not be used to separate ideas, but a new sentence should be written for a new idea. If the manual writer follows the guideline of writing short sentences, the use of commas will automatically be minimal facilitating the writer's job. When series or words of phrases are concerned, the writer should take care that they originate from the same word and their grammatical structure remains the same. (Grimm 1987, 93-94.)

Semicolons should be used extraordinarily little. Most of the people do not know how to use them, as even grammar handbooks cannot provide clear situations for their appropriate use. A semicolon might be used in a case when two sentences are related to each other closely enough for a period to separate them too much. (Grimm 1987, 94-95.)

The use of quotation marks and underlining is similar to the use of semicolons. They should not be used too much, because they catch the reader's eyes. Manuals do not need direct quota-

tions or other typical uses of quotation marks, although the writer might be tempted to use them, for example, for headings in input instructions. There are other situations as well, when using quotation marks would be natural, but they should not be used, as they clutter the page. (Grimm 1987, 95.)

Underlining clutters the text as well. That is why the manual writer should use bold, italics or capital letters for emphasising or to indicate user-entered data in software. Any of the mentioned effects should not be used too often because they can lose their effect as the readers easily ignore them. (Grimm 1987, 95-96.)

2.14 Proofreading, editing and reviewing

Once the first version of the manual is written, it should be proofread, in other words, checked for typographical errors, incorrect spelling and other mistakes. It is recommendable that someone else than the writer does the proofreading, in order to more easily find errors, deficiencies and illogical breaks in thought. (Grimm 1987, 167.)

Reading the draft manual critically and searching for sections that require improving is called editing. One main goal is to improve the clarity of the manual. It is wise to let another person, who is not familiar with the subject, read the draft and point out parts that are unclear.

Words and terms should be used consistently in the manual and checking that is also a part of editing. In addition, the style and format, including indentation, should be consistent and similar styles and phrasing should be used in similar sections. (Grimm 1987, 169-170.) Figure 10 provides a detailed checklist for editing manuals.

1. Is the subject obvious from the beginning?
2. Is the manual complete?
3. Does it contain anything extra?
4. Is it well organised?
5. Is it grammatically correct?
6. Are words spelled correctly?
7. Do most sentences have active voice verbs?
8. Are most sentences short but not choppy?
9. Is it technically correct?
10. Are computer terms explained?
11. Are abbreviations explained?
12. Does it fulfil its purpose?
13. Does it use consistent language and capitalisation?
14. Is it visually pleasing?
15. Do the examples match the written instructions?
16. Are examples correctly placed?
17. Does the table of contents match the titles and headings in the text?

Figure 10. Checklist for editing manuals (Grimm 1987, 170)

2.15 Testing the documentation

In order to create a decent manual it should be tested before starting to use it. A user of the manual should carry out the testing. (Grimm 1987, 176.)

The testing should be done so that the manual is given to the user and she has to follow the instructions of the manual. This enables the whole documentation to be tested. If a user is not available to test the manual, the writer should ask someone unfamiliar with system to use it with the help of the manual. The test user should be encouraged to give feedback about positive and negative factors in the manual. If problems arise during the testing, it can be a signal that the instructions related to the problematic part are unclear. (Grimm 1987, 176-177.)

The purpose of the testing should be explained to the test user. Moreover, the tester should keep a log for their comments and suggestions regarding the manual. The writer should provide the log or a form with detailed questions. (Grimm 1987, 176.)

3 Empirical Part

The empirical part describes the purpose and details of the project, how it was carried out, what were its results and their significance.

3.1 Project plan

The outcome of this project is a manual for PUMA Store Helsinki on its stockroom operations. The manual is intended to be a training manual for new and old employees, as well as a reference manual especially for the stockroom supervisor of the store.

The project consists of two major milestones, namely, the writing of the manual and testing it by an employee of PUMA Store Helsinki.

Once the manual is ready and taken into use, it is expected to increase employee efficiency and accuracy, thus positively affecting profitability. The manual gives to the employees an understanding on their actions and clear and detailed instructions on how to handle PUMA Store Helsinki's stockroom operations correctly. The manual can be used in other PUMA Stores as well, if some changes are done to suit each individual store's situation.

3.1.1 Objectives

The structure of the manual will be the following:

1. Introduction
2. Description of the equipment and software
   2.1. Barcode scanner
   2.2. Logistics provider's web service related instructions (*confidential*)
   2.3. Inventory system's instructions (*confidential*)
   2.4. Logistics provider's web service related instructions (*confidential*)
3. List of materials and tools
4. Step-by-step instructions
   4.1. Replenishments
   4.2. Receiving merchandise
   4.3. Storing merchandise
   4.4. Sending merchandise

5. Troubleshooting

The introduction explains the purpose of the manual and examines the contents to the reader. It provides the reader with the information on why she should read the manual and what the reader should be able to do with the help of the manual. This part includes also motivation of the reader, and safety issues with the explanation of warnings used further in the manual.

The second part of the manual describes the equipment and software that is needed in the daily in-store logistics operations of PUMA Store Helsinki. Each of the four parts will describe minutely the use and principles of the system in question. After having read this part the user should understand the four systems and their principles of using.

The list of materials and tools are presented in the third part of the manual. The aim of this part is to make the reader aware of the requirements of different tasks she has to accomplish in daily stockroom operations. The list of materials and tools required for performing specific tasks are also given to the reader together with the detailed instructions of the task.

The fourth chapter of the manual is the most important part. It explains step-by-step the four main operations that the stockroom operations consist of. These instructions include general information, software instructions, information on how physically perform certain tasks, how to do the paperwork correctly, the correct order of performing the tasks and possible approval or authorisation requirements. After having read this chapter once anyone should be able to run the stockroom operations in an accurate and correct manner.

The fifth chapter treats the problems and exceptions that arise almost daily. The chapter is in a table format that is easy to read and enables quick actions. The fifth chapter will also include a glossary with all the relevant terms related to the manual.

3.1.2 General approach

From the organisation point of view this project develops its operations remarkably. Firstly it updates the information of several manuals that are currently in use and unites them under one cover. Furthermore, it introduces CAD drawings, flowcharts and hands-on tips and instructions to guide the stockroom operations thus bringing yet more added value.

I will compile the manual using the information that the older and newer manuals provide. Some of the information in the existing manuals must be updated or even removed as unnecessary. The main method for analysing the relevance of the manuals is to compare the given instructions with my own experience of how things should be and are best done.

The theoretical framework is another key source for the compilation of the manual. It states factors that are to be taken into consideration regardless of the system or procedures in use in order to ensure inventory accuracy and the correct execution of the stockroom operations.

Moreover, the theoretical framework provides information that neither has previously been in the manuals nor I have considered in my work. Such issues are, for example, the use of CAD drawings and flow charts in illustrating the correct working methods for my colleagues and new employees when training them.

3.1.3 Contractual aspects

I have agreed with PUMA Store Helsinki to create a manual as my thesis by the end of the year 2009. The store manager will also receive the final report in addition to the manual. No incentives or penalties are included in the contract.

3.1.4 Schedules

The manual consists of five different chapters and the testing and its evaluation can be considered as one single entity. This makes it natural to divide the schedule into six different parts. The total scheduled time for writing the manual is six weeks starting from week 43 and ending during the week 48. The exact schedule for the writing of the manual and testing is in the the form of a Gantt chart in Appendix 1.

The first part to be written is the third chapter as it is the simplest and shortest part of the manual, but also fundamental for the operations that the manual describes.

The second part that is written is the second chapter. The reason for this is that examining the equipment and software in detail is necessary for writing effective step-by-step instructions, which is the fourth chapter and the third part of the manual to be written.

Having written the chapters from two to four the core of the manual is ready. After this the fifth chapter, troubleshooting, will be written and finally the introduction.

The last part of the project is testing and analysing the feedback of the test person. One week is reserved for the employee to read and give feedback about the manual.

3.1.5 Personnel

I will carry out the project alone as it simultaneously serves as my bachelor thesis. However, the testing phase requires another person to test the manual and give feedback of it. The test person will be one of the employees of PUMA Store Helsinki.

3.1.6 Evaluation methods

The project will be evaluated qualitatively by asking feedback from an employee of PUMA Store Helsinki, who will test the manual and give feedback about it.

Once the manual is ready, I will create a feedback form. It will ask feedback from the format and layout of the manual, and questions on each part of the manual. The questions are to be answered in written format with the test person's own words.

The test person will be an employee of the store who is little or not at all aware of the stock-room operations. The test person's task will be to read the manual and after that perform the tasks that the manual's fourth chapter describes.

The feedback results will be analysed and discussed in the project report. The implementation of the suggested improvements will not be part of the project. The improvements will be done to the second version of the manual, which will not be a part of the thesis project.

3.1.7 Potential problems

The major potential problem is failure in adhering the schedule. The aim is to have the manual ready at the end of November, which can result impossible to reach, as the manual will be very wide and its compiling may turn out to be slower than estimated. Another risk is that I will fall ill and not be able to proceed with the project as efficiently as planned.

If the expected, or any other unexpected problems occur, it will probably mean that the completion of the project will be delayed. However, the project is very likely to be ready before the end of the year 2009, regardless of potential problems.

3.2 Project implementation

The project was implemented basically in two different parts. First I wrote the manual according to the schedule and following the theoretical framework described earlier in this report. The second part of the project implementation is the assessment of the manual and taking it into use. The following two chapter describe and analyse the two parts of the project implementation.

3.2.1 Writing the manual

Format and layout

I started the manual writing process by creating a format and layout for it. Appendix 2 is a sample page of the manual, showing how the manual's format and layout are. Both layout and format follow the instructions discussed in the theoretical part. The header of the manual includes a PUMA logo, the name and year of the document, the current page number and the total number of pages. The footer states the name and number of the chapter in question, thus helping the reader to locate the desired chapter. The headings are in three levels allowing enough relevant headings to be used.

The typeface used in the headings is used in all PUMA's written communications. The colour of the main headings is red, and the other headings are black. The sizes of the typeface change according to the level of the heading.

I did not use the same typeface in the body text. Instead I chose to use a serif typeface, as it is more pleasant to read as body text. Furthermore, the body text typeface is developed to be pleasant to read also from PC's screens. This was an important advantage, because reading the manual especially for reference purposes is easier to do from the stockroom's PC.

Writing process

As planned, the first part to actually write was the third chapter that describes the materials and tools used in the stockroom operations. The reason for this is that it is the simplest and

most elementary part of the manual making it also the quickest chapter to write. This is also the only chapter that does not refer to any other chapter, thus it was a logical starting point.

The method of presentation I used was prose. The use of each tool and material is used. Furthermore I explained where to store the items and how to procure new ones. In some cases I also used pictures or figures to make the explanations more clear. The writing process of this chapter took three days. The process was slower than I had estimated in advance. Furthermore taking the pictures and creating the figures was time-consuming.

The second chapter I wrote was the second chapter "Equipment and software" that explains in detail how to use the technical equipment and software needed in the stockroom operations. The reason why I wrote this next was because the fourth and most important part of the manual refers to this chapter and the reader must master the equipment and software before being able to follow the instructions given in the fourth chapter of the manual.

I wrote the instructions for using the technical equipment in cookbook style. That way the instructions are quick and easy to read. The equipment is also simple and straightforward to use so there is no need for detailed explanations of the actions that the user must take.

I used the four-step method for the instructions of the software and web applications. The reason for this is that the use of them requires more understanding of what the desired results are instead of memorising clear steps that lead to a predefined result. In this case the user must know for example when does she want a shipment to be picked up or how many packages are going to be shipped. This chapter includes several screenshots that act as an example along the written instructions. The writing process of this chapter was delayed because I fell ill and could not write as much as planned. Taking and editing the screenshots was also slower than expected.

After the second chapter I wrote the manual's most important chapter, that is, the fourth that describes the basic operations of the stockroom. It is the most important because it describes in detail how to perform the basic operations and each detail of them.

Each description of the operation begins with a flowchart that summarises the operation in question and with a list of tools that are required to perform the operation. The symbols used in the flowcharts are explained in a figure in the introduction of the fourth chapter. After the flowchart and list of tools each step of the flowchart is explained in detail step by step.

The method of presentation used in this chapter was mainly prose and in few cases the cookbook style. Prose was the best option in most of the cases because explaining the steps of the flowcharts required in some cases very detailed instructions, and on the other hand actions performed in some steps required explanations for the reader to better understand and learn how she is supposed to perform the operations. Some simple and short steps were best described by using the cookbook style. Besides the flowcharts there are a few figures that help the reader to better understand the text.

Writing this chapter took most time of the manual writing process. Especially the flowcharts were slow to build. Furthermore describing the steps required careful thinking so that all the necessary details would be mentioned and explained.

At this point the manual had the most important instructions it had to include. After this I wrote the troubleshooting chapter. In some parts of the operations it is possible to do mistakes that however should be avoided. When I recognised parts of the operations prone to mistakes, I warned the reader about it and instructed her to refer to the fifth chapter in case she would do the mistake in question.

When it was time to write the fifth chapter I went through the text I had written earlier and picked up those error-prone parts and wrote instructions how to correct the mistakes or avoid them. Furthermore, at the end of the fifth chapter there is a glossary that explains all the abbreviations used in the manual.

Next I created the three appendixes of the manual. The first appendix is the layout of the upstairs' stockroom and the cashier desk area. The second appendix is the layout of the downstairs' stockroom. Both layouts use different colours to communicate where to store the different product types and other equipment needed in the store. The third appendix is a picture of the stockroom's table added with text and arrows to instruct how the table and its shelf should be organised.

The last thing to be written was the introduction. The introduction tells the reader what is the purpose of the manual, how and when to use it, what is the structure of the manual and what safety matters should be taken into consideration regarding the stockroom operations.

3.2.2 Assessing the manual and taking it into use

I assessed the manual qualitatively by creating a feedback form with mainly open questions. One employee of the store then read the manual and afterwards I gave him the feedback form. The employee who read the manual was not familiar with most of the stockroom operations. The feedback process took a few more days than I first estimated. The feedback form and the results can be seen in Appendix 3.

The questions of the feedback questionnaires aim to find out whether or not I reached my objective of creating a kind of a manual that I intended to create. The feedback form is divided into four topics. The questions are such that the answers should tell whether I managed to do a manual that follows the theories discussed in this thesis, thus being an effective and well-built manual.

However, the feedback of the PUMA Store Helsinki's employee does not reveal whether the content of the manual is correct in terms of the logistics theories discussed here and whether it follows the PUMA Store network's own current procedures. I will assess the theory and manual by comparing them to each other and analysing whether the theory supports the manual.

When I wrote the manual I simultaneously had to assess whether the instructions are valid and comply with the procedures set by PUMA's management. Because I am responsible of the stockroom operations in the store and deal with them daily, I know the correct procedures best in Helsinki's store. Thus, there is no need assess this aspect anymore than I did while writing the manual.

Once ready the manual was not introduced in any other way than giving it first to the employee who gave feedback about it. The manual was copied on both PC's of the store and every employee was advised to read the manual through carefully. Because of the limited resources and the busy Christmas season I did not plan an organised introduction of the manual or testing of employees. Getting management's feedback within the project's timeline is also impossible due to the time of the year.

I did not make a paper version of the manual yet, but decided first to get the feedback. I wanted to make sure that there are no major errors in the manual that should be corrected

immediately. If there would have been errors that required immediate corrections the printed manual would have become obsolete and it would have incurred unnecessary costs.

3.3 Results

The result of this project is the Stockroom operations manual for PUMA Store Helsinki (Appendix 3, not public). It is a 90 pages manual that explains in a detailed manner the PUMA Store Helsinki's stockroom operations. The manual consists of text, pictures, figures and flowcharts.

Another result of the project is the feedback questionnaire and the answers from the employee who answered the questions. The questions are divided in four sections regarding different aspects of the manual. The answers were to be answered in full sentences, thus the feedback was analysed qualitatively.

3.4 Assessment

The feedback of the manual is positive and it seems that I have reached my objective very well. The results can be seen in Appendix 3. The feedback suggests that I have managed to write a manual that is good according to the manual writing theories discussed in this thesis.

The first part of the feedback form is about the content of the manual. The feedback suggests that the content is wide enough and presented in an understandable and good manner. The respondent also thought that the manual is well-suited for training purposes and that the pictures and figures help to understand the text. On the other hand the respondent wrote that the manual acts well as a reference manual too, agreeing also that the manual acts well as a combination manual.

The second part of the feedback formed has questions on the organisation of the manual. The respondent wrote the organisation is clear and easy to understand and the table of content is helpful in finding information. According to the respondent all the chapters are useful and they did not miss anything or have unnecessary information. The respondent appreciated the screenshots in the second chapter. The feedback for the third chapter suggests it to be helpful and promoting safety. The flowcharts, pictures, figures and tables were all easy to understand.

The third part of the feedback form is about the format and layout of the manual. According to the respondent the format and layout of the manual are clear and informational, and they include all the necessary information. The typeface is easy to read and the heading levels are easily distinguishable.

The feedback form's fourth part concerns the writing style of the manual. The respondent stated that the language used in the manual is in general good and easy to be read and understood.

According to the theories discussed in the theoretical part the operations in any stockroom must deal certain tasks. These tasks are discussed and explained in the manual I created meaning that I have created a well-functioning and accurate manual.

The fourth chapter of the manual "Basic operations" includes the theoretical concepts related to the basic warehouse operations (i.e. storage and movement) discussed in the theoretical framework. Material handling is also a part of the manual's fourth chapter, whereas information transfer is mainly explained in the second chapter of the manual.

A totally new element in PUMA Store Helsinki's instructional materials are operation blueprints or process maps, which in the manual I referred as flowcharts. I included the flowcharts in the fourth chapter in the beginning of each of the four sub-chapters that explain one basic operation.

The other parts of the manual do not include theory as such, but they support the most important parts of the manual, which are the second and the fourth chapter. Thus the supporting parts enable the manual to be a functioning entirety.

It can be concluded that the project was successful. The assessment of the employee of the store was positive and I managed to include the relevant theoretical content into the manual.

4 Summary and Conclusion

The objective of this project was to improve the efficiency of PUMA Store Helsinki's stockroom operations. The creation of the new stockroom operations manual was seen to be the solution for the inefficiency of the stockroom operations, the research problem being "How to create an effective manual for the in-store logistics of PUMA Store Helsinki?"

I carried out the project by creating a manual that is based on theoretical background on logistics and creating manuals, PUMA's existing manuals and my work experience at PUMA Store Helsinki.

4.1 Key results

The most important result of this project is the PUMA Store Helsinki's Stockroom operations manual, which is a comprehensive document describing thoroughly the current stockroom operations, its procedures and details.

In the future the manual will help in the induction of new employees and training of the existing employees of the store. Especially the latter increases the efficiency of the stockroom operations, as every employee will have access to the information of how to correctly run the stockrooms.

The most important parts of the manual are the second and the fourth chapter. The second chapters explains in detail, with the help of screenshots and pictures, how to use the equipment and software needed in the everyday tasks stockroom operations of the PUMA Store Helsinki.

The fourth chapter explains the basic operations, thus including the information that the reader has already learned after reading the second chapter of the manual. The basic operations are explained with the help of flowcharts and figures.

4.2 Conclusions

The positive feedback received from the employee who read and assessed the manual and based on my analysis of the manual it can be concluded that the project was successful. There

are three cornerstones, of which combination lead to creating a new effective stockroom operations manual.

One of the cornerstones the manual is based on is the theoretical framework. The research on contemporary theories about logistics and writing manuals brought added value to the new stockroom operations manual in form of increased professionalism, intelligibility and thoroughness of the content.

PUMA's old manuals formed another cornerstone of the new manual. By reviewing them and assessing their relevance I was able to select the important and up-to-date information and compile a single comprehensive manual.

The third cornerstone that enabled the project to be carried out is my work experience as the stockroom supervisor of PUMA Store Helsinki. Because not all of the existing manuals of PUMA were up-to-date and as user-friendly as they could, I was suggested to create a new manual. My experience of handling the in-store logistics operations enabled me to select the relevant information out of the obsolete information.

As a conclusion it can be stated that the project solved the problem and the efficiency of PUMA Store Helsinki's stockroom operations increased. This should result also in shorter order-cycle times, thus improving the customer service level of the store.

Further studies should be carried out to find out what would be the most efficient way introduce the manual to the employees and how could it be best used in the induction of new employees. Another suggestion is to examine deeper the quality of the manual with, for example, testing or interviewing the user.

4.3 Significance and reliability

The significance of the manual is crucial for PUMA Store Helsinki. The feedback and my analysis of the manual suggest that applying the theories for the manual proved that the theories are valid in practice and must be taken into consideration in similar projects.

The manual is significant also in practice, as all the employees of PUMA Store Helsinki have now access to the information of how to run the stockroom operations. Previously this was difficult, if not impossible. The efficiency of the store's stockroom operations can be in-

creased by, for example, planning the work shifts more flexibly because every employee is supposed to be able to handle the basic stockroom operations. It is likely that the stockroom will be less crowded in the future increasing the customer service capability, which is the ultimate goal of the project.

The manual has significance also on the international level. The PUMA Store network is worldwide and the organisation language is English. With few localisations the manual can be used in any PUMA Store of the world to replace the old manuals.

The content of the manual is reliable. It is based on my work experience as the stockroom supervisor, the existing PUMA's procedures and manuals, backed up by the theoretical framework.

However, the quality of the Stockroom operations manual as an instructional tool could be further studied. Due to time and personnel limitations it was impossible to conduct a deeper study on the quality of the manual from the user's point of view.

Another reliability issue rose at the end part of the project. The management of PUMA announced that the logistics service provider might change in the near future. This would make obsolete the parts of the manual that explain the procedures with the existing logistics service provider. If the change will occur, the manual should be updated immediately after it.

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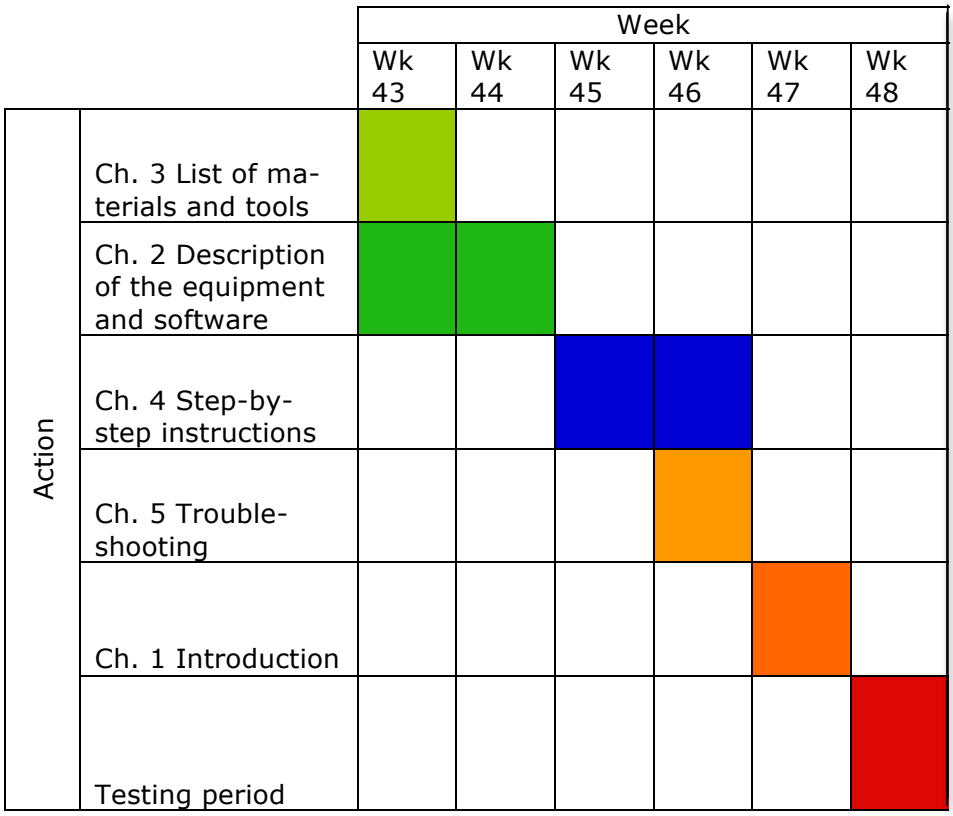
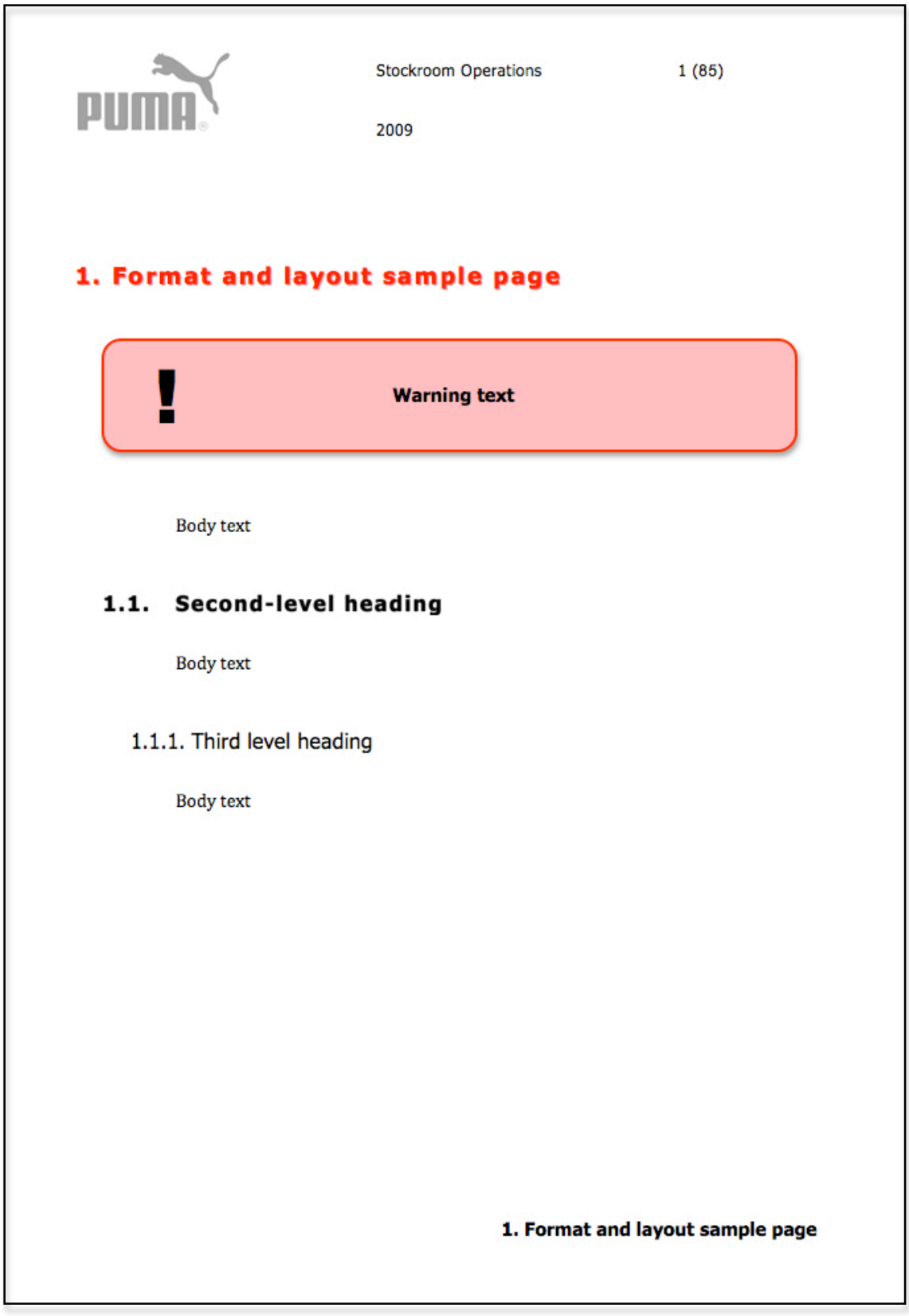
Project Schedule Gantt chart



Sample page of the Stockroom Operations manual



Stockroom Operations 1 (85)

2009

1. Format and layout sample page

Warning text

Body text

1.1. Second-level heading

Body text

1.1.1. Third level heading

Body text

1. Format and layout sample page

Feedback form of Stockroom Operations

The purpose of this form is to gather feedback of the Stockroom Operations manual of PUMA Store Helsinki. You are very welcome to give as much feedback as possible regarding anything that comes in to your mind. Both positive and negative feedback is welcome, as both will be taken into account when updating the manual and doing improvements for the next version of the manual. The more feedback you give, the easier that improving process of the manual will be!
This feedback part is divided into four sections. The questions in the first part are related to the content of the manual. The second manual has questions on the organisation of the manual and the third part is about the format and layout of the manual. The last part is about the writing style of the manual. If you feel that something is not asked or you have some additional comments, there are extra empty lines at the end of the form where you can write freely.

The content of the manual

1. Is the content of the manual wide enough? Is there something that is missing or should be explained more clearly?

The content of the manual is wide enough and the text of the manual is clear and easy to read.

2. Is the content presented so that the manual is good for training purposes? If not, why?

The content in the manual is presented very well. All the basic and required information is in it, so it is a good manual for training purposes. In addition the pictures and figures are helping a lot!

3. Is the content presented so that the manual is good to be used as a reference (e.g. to check things you don't remember)? If not, why?

The manual is also a great as an a reference!

4. Would it be better to have a training manual and a reference manual separately?

I think that the Stockroom Operation manual can be used as a both training manual and as a reference manual.

The organisation of the manual

5. Is the organisation of the manual clear and easy to understand?

The organisation of the manual is clear and easy to understand. If there is an information that you need to find fast, you can find the page in the table on contents in no time.

6. Did you understand the purpose and use of the manual after reading the introduction?

The introductions were clear enough.

7. Was the second chapter useful? Was there anything unnecessary or should something be explained more precisely?

The second chapter was very useful. It's very important to have a manual with the information like that, so that if you dont remember how to use ex-ampel some parts of Retail Pro you can use the manual as a reminder. Screenshots were very helpful.

8. Was the third chapter useful? Was there anything unnecessary or should something be explained more precisely?

The third chapter was also very useful. It is very good to know where stuffs are ment to be and also how to use them, so that you wouldn't hurt yourself or co-workers.

9. Was the fourth chapter useful? Was there anything unnecessary or should something be explained more precisely?

The fourth chapter had a good flowcharts, which made the information easier to understand.

10. Was the fifth chapter useful? Was there anything unnecessary or should something be explained more precisely?

Troubleshooting part is very useful, because it prevents you making any mistakes and also helps you in situations when you dont know what to do.

11. Did you understand easily all the pictures, figures and tables?

Yes, I did.

12. Did you understand easily the flowcharts? Were they too detailed or too general?

Flowcharts were good.

The format and layout

13. Was the format of the pages clear and informing enough? Was something missing or unnecessary?

The format of the pages were clear and informational. Nothing was missing and there were nothing unnecessary.

14. Are the fonts easy to read and big enough? Should they be changed?

The font was easy to read.

15. Are the heading levels easy to distinguish from each other?

Yes they are.

16. Should there be less or more headings?

Noup, all good!

The writing style of the manual

17. Is the language used in the manual easy to understand? Are there too complicated or difficult words?

Language used in the Stockroom Operation manual was good.

18. Are the sentences too long or complicated? Are there sentences that were hard to understand?

Sentences were clear and easy to understand.