Efficient and Effective Returns Handling in 3PL Warehouses

Proposal of a Standardised Process based on a
Multiple Case Study at DB Schenker Logistics

Master's thesis in Supply Chain Management

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Abstract

Returns management constitute a substantial and complex part of activities within logistics and is thereby an area with great potential for overall business improvement. One actor with an interest in improving their returns handling is DB Schenker Logistics, a third-party logistics (3PL) provider. An increase in return flows, in combination with the fact that the design of the current returns handling process varies among the customers, leads to one of Schenker's goals being to develop and implement a standardised returns handling process. Hence, this thesis will deal with the returns handling process, with the aim to identify what components such standardised returns handling process should contain, including operational handling steps, information flows related to these steps, and planning and control of the process, as well as its organisation, formalisation, and design.

During the thesis work, observations of the returns handling process have been conducted for 11 different internal Schenker cases. Together with literature research, secondary data collection, interviews, a workshop, and a benchmarking study, sufficient data was collected to answer the research questions regarding the development of a standardised returns handling process.

In the finalisation of the thesis work, it could be concluded which operational steps to include in a standardised returns handling process, and which information entities to be obtained and exchanged related to these steps. Also, a set of guidelines and metrics could be identified as important ways to facilitate the planning and control of the process. Finally, a proposal of how to standardise the returns handling process could be developed, including organisation, formalisation, and design perspectives. The result can be used for implementation of new, as well as existing customers, however, adaptation to some case specific requirements may be required.

Keywords: 3PL, Returns Management, Returns Process, Returns Handling, Standardisation, Warehouse.

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Johanna Banck & Elin Ferguson, Gothenburg, May 2022

Johanna Banck *Elin Ferguson*

Contents

List of Acronyms

3PL	Third-Party Logistics
CRM	Customer Relationship Management
CT	Control Tower
E-com	E-commerce
EDI	Electronic Data Interchange
ERP	Enterprise Resource Planning
IT	Information Technology
KPI	Key Performance Indicators
OM	Operations and Account Manager
RFID	Radio Frequency Identification
RQ	Research Question
SC	Supply Chain
SCM	Supply Chain Management
TBL	Triple Bottom Line
VAS	Value Added Services
WMS	Warehouse Management System

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1 Introduction

The introductory chapter presents the background, aim, specification of the issue under investigation, as well as delimitations of the thesis.

1.1 Background

Returns constitute a substantial part of activities within logistics. A figure that is emphasising this is the fact that in Sweden, about a third of all clothes are returned (Frisk, 2021). Moreover, returns management is complex due to a high level of uncertainty in terms of quality, quantity, and timing (Duong et al., 2022), which implies that companies need to address the issues deriving from this complexity. Lambert and Cooper (2000) argue that if returns are managed as a distinctive business process, it can affect the overall productivity of Supply Chain (SC) activities. Thereby it can offer an equal opportunity of achieving a sustainable competitive advantage as a properly managed outbound process. Besides affecting productivity, customer relationships can also benefit from an improved returns process (Mollenkopf et al., 2007). All of this together makes the returns management process a topic of interest for further research, and for this thesis.

Return flows affect various processes of the SC, however, the focus of this thesis is on warehousing, primarily third-party logistics (3PL) warehouses. Examples of services provided by 3PL's are warehousing, transportation, and Information Technology (IT) solutions, but also more strategic ones, such as coordination activities. As companies have started to realise the benefits of outsourcing activities not belonging to their core business, such as logistics activities, the demand for 3PL services has increased significantly (Zacharia et al., 2011). With this growing market, 3PL providers face growing competition, making it crucial to take a leading position (Min & Jong, 2006). This is especially true for market segments where there is great potential for increased profitability, such as returns management, as stated by Min and Jong (2006).

Since literature emphasises the positive outcome of improved returns management processes, the 3PL industry would benefit from an improved returns handling process within their warehouses. Returns handling at 3PL warehouses includes activities such as unpacking, goods inspection, refurbishment, repacking, system registration, and put-away. Furthermore, additional case-specific activities may be required depending on the customers' requests, the product characteristics, the condition of the goods, and so on. One 3PL provider with an interest in further investigating their returns handling process is DB Schenker Logistics, hereinafter referred to as Schenker. The background to this is that Schenker sees an increase in return flows, especially for new customers, and that the returns handling processes can be structured in various ways for different customers, due to varying customer prerequisites. Instead, if the process were to be standardised to the highest possible degree, it could entail an increase in customer satisfaction and value creation, hence also strengthening Schenker's competitive advantage. Thus, this thesis will deal with the returns handling process in Schenker's warehouse operations.

As previously mentioned, overall productivity of SC activities and customer relationships are two aspects affected by an improved returns process. In the context of returns handling at a 3PL warehouse, more specifically at Schenker's warehouses, it is important to consider both aspects. Productivity is important since a higher productivity entails less time consumed per returned item and thus less cost, which enables higher competitiveness. The productivity of the standardised process can be divided into the effectiveness, which refers to the appropriate steps being included, and efficiency, which refers to the steps being conducted in the appropriate way.

Customer relationships, on the other hand, are important for the information flow of a standardised returns process. In a 3PL context, customer relationships involve both the companies for which operations are managed, i.e., direct customers, and the recipients of the goods managed in the warehouse, i.e., indirect customers. The returns process requires information input from both direct and indirect customers. In turn, both these customers require information output from the process. Thus, an effective and efficient customer relationship, where the appropriate information is exchanged in the appropriate way, is crucial. Moreover, lead time is another important aspect, as there are certain customer requirements on time frames that must be met.

To avoid sub-optimisation when structuring a standardised returns process, the intersection of productivity and customer demand is thus important. Only focusing on customers' requirements, and structuring the process accordingly, might imply an unproductive process. On the other hand, only focusing on productivity might harm customer relationships. Finding the balance between these two aspects, preferably through a standardised process, is therefore desirable.

1.2 Aim

The aim of the thesis work is to develop a standardised process for the returns handling at DB Schenker Logistics' warehouses.

1.3 Specification of Issue under Investigation

To guide the analysis and thereby enable the accomplishment of the aim of developing a standardised returns handling process, four research questions (RQs) have been formulated. A process includes various perspectives, were the most common ones are functional, informational, behavioural, and organisational perspectives (Bal, 1998). These perspectives are related to what, when, how, and by who something is done. The research questions, which are presented below, are related to these perspectives. RQ1 refers to the functional perspective and thereby the operational steps included in the process, that is what should be done and in what way. RQ2 refers to the informational perspective, i.e., to the information flow in relation to each of the process steps derived from RQ1, that is how should it be done. RQ3 refers to the behavioural and organisational perspectives, which regards how the process should be conducted in terms of when, and by whom, i.e., planning and control on an operational level.

The first three questions are all related to the operational part of the process. However, as the aim of the thesis includes how to standardise the returns handling process, the last question regard how this can be accomplished, including the design, formalisation, and organisation of the process. To sum up, the first three RQs regard the components which constitute a well-functioning returns handling process, while RQ4 concerns the standardisation of such process. The relationship between the components and the perspectives of standardisation is visualised in Figure 1.1.

RQ1: Which operational steps should constitute the returns handling process?

RQ2: Which informational entities should be exchanged in relation to each step of the returns handling process?

RQ3: How should the planning and control of the returns handling process be conducted?

RQ4: How should the returns handling process be standardised?

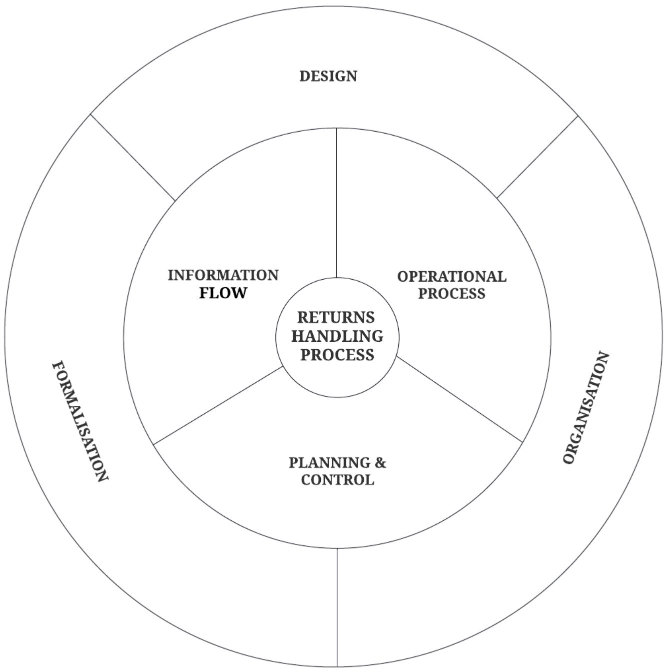


Figure 1.1: Visualisation of the relationship between research questions.

1.4 Delimitations

The work of the thesis focuses on the process from goods receipt until the returned item is registered in the Warehouse Management System (WMS) and ready to be put into storage. This process is referred to as entry to storage and does not include the put-away process, which considers the decision regarding which exact storage location to use, and the physical movement to the chosen location. In other words, previous and subsequent processes, such as transportation and put-away will not be addressed.

Another delimitation concerns the deviations handling, which, in the thesis work will not be covered in detail, as it requires specific and targeted attention, thus also a lot of resources which were not available. Instead, the study focuses on the presentation of how deviations are to be identified and separated from the happy flow will be provided in the proposed standardised returns handling process.

In terms of planning and control of the returns handling process, the main intention is to set the precondition for planning and control. As the focus of the thesis work is on the 3PL perspective, more precisely the perspective of Schenker, certain aspects of planning and control are not included, for instance forecasting of incoming return flows. Although relevant to the planning and control of the process, this is mainly considered a part of the customer's strategic work, thus outside of the scope of the thesis work.

Finally, the thesis only covers the development of a standardised process for returns handling, meaning that it does not include the identification of which process to examine, nor suggestions on the actual implementation of the proposed process. This can be related to some of the steps included in the "approach for design and redesign" presented by Rushton et al. (2017), which will be covered in detail in section 2.4. However, to provide an overview of the scope, it can be said that the thesis covers the steps concerning the mapping of the current situation, on different levels, and the identification of obstacles and opportunities. This means that the first step concerning the identification of which process to design/redesign was excluded, as it was already determined before initiating the thesis work. Moreover, the later steps covering the measurement of opportunities and feasibility, as well as implementation are also excluded. These steps either need to be complemented with quantitative studies, or are part of the implementation phase, which, as stated, is outside the scope.

2 Methodology

In the following chapter, the methodology for the thesis work is presented, in terms of the research approach, followed by the planned research method, data collection, data analysis, and research process. A discussion regarding the quality of the chosen methodology is also included.

2.1 Research Approach

Business research strategy involves decisions regarding three strategic areas (Bryman & Bell, 2011). These areas are the connection between theory and research, considerations regarding epistemology and ontology, and whether to use a qualitative or quantitative approach.

Business research can adopt to one of three options when it comes to the connection between theory and research, a deductive, an inductive, or an abductive research approach (E. Bell et al., 2019). The deductive option is an approach where theory guides research. Already existing theory act as a basis for one or several hypotheses, which then either gets confirmed or rejected by the research. In contrary to the deductive method, a study with an inductive approach contributes to new theory, based on generalisations of the result of the study. In that way theory is the outcome of the research, which typically is based on interviews and observations (Bryman & Bell, 2011). Lastly, a study carried out in accordance with the abductive approach assumes a puzzle or a cluster of problems which is not yet addressed in literature and seeks to find a solution (E. Bell et al., 2019). Since the results of this thesis work can be generalised, theory is an outcome of the research and thus, the relationship between theory and research in the thesis is in line with the inductive approach.

The issue on what should be regarded as an acceptable foundation of knowledge for the thesis is usually called the epistemological issue (Bryman & Bell, 2011). The word epistemology refers to the theory of knowledge (Britannica Academic, n.d.). When discussing epistemology issues, the central issue is whether the social world should be studied according to the same principles as the natural sciences (Bryman & Bell, 2011). A positivist approach suggests that methods of natural science should be considered for social sciences, whereas an interpretivist, or sometimes subjectivist (Muijs, 2011) approach criticises the use of scientific methods when studying social dilemmas. Instead, the interpretivist approach suggests a hermeneutic method, which focuses on the interpretation of the human action.

Furthermore, ontological considerations regards whether social entities are objective or social constructions (Bryman & Bell, 2011). The two contrary approaches are called objectivism and constructionism. Objectivism suggests that social phenomena are external facts independent from human influence, whereas constructionism suggests that facts are constantly influenced by social actors.

As the results of the thesis, to a considerable extent, are based on data collected through interviews and observations it is of importance to consider the interpretivist approach. That is to use the hermeneutic attitude when analysing the data and thereby bear in mind that the results will be impacted by the human factor. In a similar matter, as social influences exist, the thesis' ontological considerations can be connected to the constructivist approach.

Another part of research classification is the distinction between qualitative and quantitative research, where the distinction can be described briefly by the presence or absence of quantification (Bryman & Bell, 2011). Together with the two previously discussed strategic areas, these form two strategic clusters for research strategy. The research strategy relevant for the thesis is in accordance with the qualitative cluster presented by Bryman and Bell (2011). The qualitative nature is evident throughout the thesis, as the focus is primarily on analysing correlations and patterns rather than basing conclusions on time studies and numerical data.

2.2 Research Method & Design

In the selection of the overall research design, there are various alternatives to choose from. For this thesis work, a case study was the chosen alternative, as this is the most suitable option when the focus is on research questions including questions such as *how* or *why*, and on contemporary situations instead of historical ones (Yin, 2014).

Furthermore, a multiple case study approach was applied. Multiple case studies are, in general, preferred over single case studies according to Yin (2014) since it counteracts the risk of the findings being highly contingent on the context of a specific case. Apart from this, a multiple case study was also appropriate for the thesis work as it allowed for comparison between cases of different customers and sites. Furthermore, four benchmark cases were added to the study to prevent influence solely dependent on contextual factors further. Based on such comparisons, best practices and critical characteristics of the returns handling process were identified. Regarding how many cases to include in such a study, the suggested number is somewhere between 6 and 10 in general (Yin, 2014). This influenced the number of cases included in this research, which ended up at 11 internal cases.

The research has been conducted in three phases, where the first one was aimed at creating a general understanding, the second at giving a more detailed perspective, and the third concerned data analysis and validation of findings.

2.2.1 Literature Review

Literature reviews have been used throughout the project to obtain an understanding of the theoretical data available, as well as for guidance of the work. The data was collected from books and articles from various data bases such as Chalmers Library, Google Scholar, and Scopus, where most of the literature has been peer-reviewed before publication, strengthening the reliability of it. To find relevant literature, keywords such as *3PL*, *Returns Management*, *Returns Process*, *Standardisation* and *Warehouse* have been used. The keywords emerged through a snowball effect, some originated from initial searches, while some were based on discoveries within the initial searches, which is also common according to Bryman and Bell (2011). In addition to electronic sources, printed books were also a part of the literature. The selection was partly guided by the available assortment of the libraries, both Chalmers Library and public libraries, and partly by bibliographies of previous studies within the area.

2.3 Data Collection

In this section, the methods for collecting data throughout the three phases are presented. More specifically, these are questionnaires, interviews, observations, and secondary data.

2.3.1 Questionnaires

Questionnaires have been used in the first phase to gather numerical data on return levels, for instance how many hours that were spent on returns for each case during one month, and how many returns that were handled. These questionnaires were of the self-completion character, more precisely in the format of mail questionnaires. According to Bryman and Bell (2011), such questionnaires are typically short and with few open-ended questions, making them easier to administer but also limiting the ability to follow up the answers. However, as the purpose of these questionnaires was to collect specific information from Operations & Account Managers (OM), as well as Control Tower (CT) administrators, of the different sites of Schenker, the limitations of such questionnaires were not considered a problem. The questions included in the questionnaire to OM are listed in Table B.1, and to CT in Table B.2 in Appendix B. The results from the self-completion questionnaires were compiled and then used to guide the selection of which cases that were to be included in the study.

2.3.2 Interviews

During the first two phases of the thesis work, interviews were carried out. The first phase consisted of one brief interview with a supervisor that manages a few of Schenker's customers. This supervisor had general knowledge regarding operations in the warehouse, planning decisions, insights into issues, and who to turn to for further questions. Also, as the customers managed by this supervisor, as well as the return flows of these customers, were of great interest for the study due to the size of the return flows, selecting this supervisor was straightforward. Moreover, the supervisor was positioned at the site where most of the thesis work has been performed, thus facilitating communication. The topics in this interview were partly predetermined, allowing a relatively free conversation, in accordance with the semi-structured character discussed by Bryman and Bell (2011). The purpose of this first interview was to gather a rather broad, yet detailed, picture of the returns process of two cases, and thereof enable deciding the how the rest of the interviews should be carried out. More specific decisions that had to be addressed regarded which representatives to interview, what questions to include, and the format of upcoming interviews.

In the second phase of the research process, interviews were held with a variety of roles, to broaden and deepen the perspective. The roles of these were superuser, IT support, Operations Excellence Engineer, and CT administrator. Descriptions of these roles are presented in Table C.1 in Appendix C. The aim of these interviews was to establish a more detailed perspective of the current situation in the returns handling processes of various cases, as well as issues perceived by employees from various levels of the organisation. The character of these interviews were also of the semi-structured character, as follow-up questions and relatively free discussions were welcome and appreciated. However, the knowledge established previously allowed for more specific questions as well.

Apart from interviewing employees from DB Schenker Logistics, additional interviews have been conducted with representatives from companies operating within logistics and warehousing, during study visits. The aim of these study visits was to widen the perspective, enabling the possibility to perform cross-studies and benchmarks to companies within the same industry.

2.3.3 Observations

Observations of the returns handling process at Schenker took place during the two first phases of thesis work. In the first phase, this was mainly done to establish a comprehensive perspective of the current situation and to identify issues in return flows. However, observations also occurred in the second phase together with in-depth interviews. The findings from the observations are presented in the format of word tables and flow charts, which visually indicate the steps conducted in the returns process. Furthermore, observations were also conducted during study visits to the benchmarked companies. The aspects that were covered and observed are presented in Table E.1 in Appendix E.

According to Kuada (2012), observation is a technique commonly used in qualitative data collection. The observations can be used to describe phenomenon and to let the observer make inferences. Nevertheless, with observations as a part of the research design, it is important to consider the personal bias aspect when analysing empirical findings, as observations never occur unprejudiced, according to Johansson (2018). Also, the observed persons might be affected by the fact that they are being studied, thus affecting the reliability of the results (Bryman & Bell, 2011). To increase accuracy of the inferences based on observations, Kauda (2012) suggest to involve the observed part in the discussions regarding the inferences. Hence, the findings of the observations were discussed either directly with the concerned person, or with highly knowledgeable persons within the observed area.

2.3.4 Secondary Data

Secondary data has been collected in the first two phases of the work. The secondary data consisted of information and data from sources such as Schenker's own WMS and process routines. The aim was to allow for a better understanding of the current situation. The process routines, in cases where such existed, were studied before the observations were conducted, to facilitate understanding beforehand, as well as allowing for follow-up questions on the routine descriptions. An important consideration that had to be kept in mind during the work with this secondary data was that the data had not been gathered for this specific study. Thus, it required some time to familiarise with the available data, both in terms of its meaning and its usage. This is also expressed by Bryman & Bell (2011).

2.4 Data Analysis

The approach for the data analysis was in line with the grounded theory approach, described by Bryman and Bell (2011), amongst others. This is an approach where the collected data is processed through coding, leading to a set of categories that can be used to conceptualise and identify relationships between findings.

As the study included several cases in need of comparison, a cross-case analysis was the main method. In the context of this thesis, a case refers to a return flow of either a customer of Schenker, or of an external company. External companies were included in the cross-case analysis as Schenker has been benchmarked against other companies that are also handling return flows, as previously mentioned. Applying this method of analysing the collected data, including both internal and external cases, aided the identification of patterns and best practices, also outside of the Schenker context. These insights provided the foundation for the decision on which components should be present in a well-functioning returns handling process. The well-functioning returns handling process then worked as a basis for the development of a standardised returns handling process, including how to organise, design, and formalise the process. To validate the standardised returns handling process, a workshop was held with various roles of Schenker.

According to Yin (2014), the findings from a cross-case analysis can be compiled in qualitative tables, such as word tables with different categories, allowing to structure the data and identify patterns. However, it is important to consider the fact that such word tables heavily rely on argumentative interpretations, which must be supported by the data and findings (Yin, 2014). Apart from tables, the findings from interviews, observations, and secondary data have been compiled and presented in flow charts, visualising various return flows and its components, which has facilitated the data analysis.

To fulfil the aim of the thesis work, the "approach for process design and redesign" by Rushton et al. (2017) has also been truly relevant, which was mentioned in the delimitations of the thesis as well. As stated by the authors, the act of redesigning current processes is usually the main concern for logistics operations, rather than designing entirely new ones. Thus, this approach has been an inspiration for the thesis work, because current return flows have been considered throughout the quest for a standardised returns process, similar to a redesign.

The first step (out of seven) in this approach concerns identification of key processes to be designed/redesigned (Rushton et al., 2017). In this step, people from all main functions should be included to get a clear picture, as well as consideration of customer requirements. The next step is about mapping the main elements of the chosen process to get an understanding of the process and its outcomes. The third step regards detailed flow-mapping to identify issues, opportunities, and even parts that are excessive. The step following this is about identification of improvement opportunities based on the flow-map. It is beneficial to use a specific team for this step, as well as the subsequent steps, with mandate and knowledge of the parts affected by a potential redesign. Stage five is all about measurement of opportunities and options, while step six concerns the identification of which available option is the most feasible. Here, it is important to get full support from the management team. Lastly, once a solution is determined and accepted, the implementation phase can start. In connection to this, performance indicators should be set up to enable follow-up of the process.

However, it can be said that the steps included are mainly the second and third, to some extent also the fourth, while the previous and subsequent steps are outside the scope of the thesis work, as the identification of which process to design/redesign was predetermined before initiating the thesis, while implementation is outside the scope, as explained earlier.

2.5 Research Process

The chosen method for the thesis work consisted of various steps, carried out in three different phases of the work, as previously mentioned. Additionally, a continuous literature review has been carried out throughout the project to support the preparation and implementation of the project, as well as the analysis and the conclusions. A visualisation of the research process is presented in Figure 2.1 and specified below.

Before initiating the data collection of the first phase there were some preparations, for example regarding what topics to include in the interview, which had to be made. Thereafter the first phase was initiated, and the steps included were self-completion questionnaires, a brief interview, a first collection of secondary data, and observations of the returns handling processes at one of Schenker's warehouses. The aim of this phase was to gather sufficient information to be able to plan the way forward, in terms of specified research method, as well as determination of the scope of the project. The questionnaires were emailed to Operations & Account Managers of all Schenker's customers as well as CT administrators. This facilitated the selection of which cases that were to be included in later stages, as the selection was based on a combination of the size and type of the return flow. Nevertheless, the interview and observations in phase one only covered two cases, as the purpose of these were to create a general, yet sufficiently detailed, perception of the returns processes. This would not have been possible if too many cases were included, and thus two cases with a considerably high number of returns, and varying product characteristics were selected.

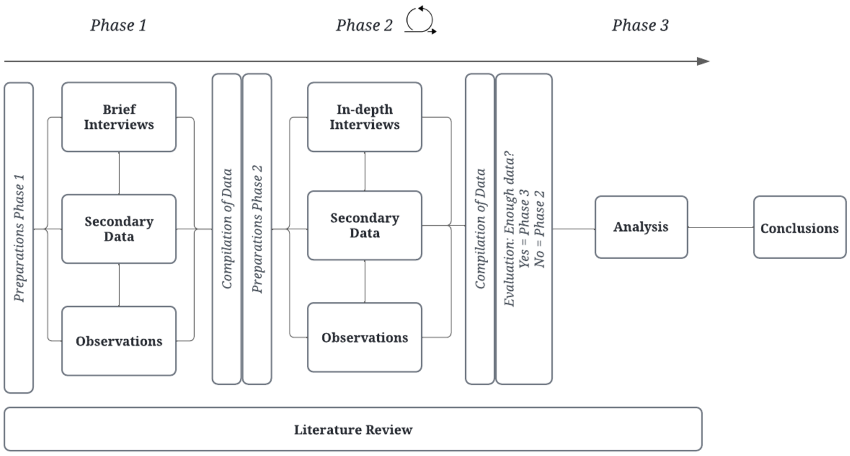


Figure 2.1: Schematic overview over the research process for the thesis.

After compiling the data collected in the first phase and an overall understanding had been established, the preparations for the second phase of the project begun. Firstly, a decision on which cases to include in the next phase had to be made. This was, as stated earlier, based on both size and type of return flow handled. Then, topics and specific questions to cover were developed. The second phase itself consisted of a thorough empirical study including more in-depth interviews with different roles, for instance superuser and IT, a secondary data collection, as well as further observations of the returns processes of the selected cases. The process was iterated until sufficient data had been collected. In practice, this meant that after the data compilation, an evaluation of the collected data lead to the decision whether to move on to the ultimate phase. Hence, there was no set number of iterations.

The third, and final phase, was devoted to the analysis of the empirical results which were compared and studied in relation to literature. By following this process, the analysed results have enabled the development of a standardised returns process, which was validated during a workshop. Finally, conclusions were drawn, and the answers to the formulated research questions can be found in chapter 8.

2.6 Research Quality

There are several factors that can have an impact on the quality of the research. According to Yin (2014) the quality of a qualitative research can be assessed through two criteria, namely, reliability and validity. Reliability regards how well the study can be replicated, in other words, if another researcher can follow the same logic and procedures and end up with the same findings, hence requiring a well-documented process. Validity, on the other hand, concerns the aspect of whether the study measures, observes or identifies what it is supposed to (Bryman & Bell, 2011). There are two perspectives on this, the external and the internal validity. External validity is the extent to which the results can be generalised, whereas internal validity deals with the extent to which there is consensus between the observations and the theoretical ideas. To deal with these issues, it is important to consider possible causalities and opposing explanations (Yin, 2014).

As these factors can have profound effect on the quality of the research, they have been considered throughout the thesis work, for example by carefully documenting the research process, using multiple sources, and addressing opposing explanations, ensuring reliability. Furthermore, in the late stages of the third phase of the thesis work, a workshop was held to ensure the internal validation of the findings of the analysis, and get input on the proposed standardised returns handling process. The workshop was held in presence, at the site where most of the thesis work was conducted and also where the head office is located, allowing a wide range of participants to be invited.

The participants present at the workshop were two supervisors, a Solution Design Manager, an Operations Excellence Engineer, and a Change & Demand Manager. A description of these roles can be found in the list of roles in Table C.1 in Appendix C. This variety of people allowed for validation of various aspects, and various levels of detail, as they possess knowledge regarding additional sites and cases. Hence, external validation was considered as well.

The structure of the workshop was that the topics for discussion were decided beforehand and sent out to the participants. Firstly, the current situation was presented, and then various discussion points were covered, as presented in Table D.1 in Appendix D. The aim of the workshop was to validate the standardised returns handling process developed during the thesis work, both internal and external validation. Hence, the discussion topics were formulated to cover all the aspects of the findings, i.e., the components and the organisation, formalisation, and design of the standardised process. However, the participants were allowed to discuss freely to enable new perspectives and opinions regarding the thesis findings. In total, the duration of the workshop was 90 minutes.

3 Theoretical Framework

The theoretical framework presents theory regarding third-party logistics and warehousing, returns management and its processes, as well as supporting resources and supporting processes, including Customer Relationship Management, and Planning and Control. At the end, two summarising figures are presented. The theory is thought to provide a solid foundation and understanding of concepts relevant for the study. Furthermore, it also acts as a basis for the analysis of the thesis work.

3.1 Third-Party Logistics

Logistics activities are increasingly being outsourced to 3PL providers (Rushton et al., 2017). The most common ones to outsource are, for instance, warehousing and storage, transportation, packaging, and reverse logistics. Since competition amongst 3PL providers is steadily increasing, while potential customers are careful in their selection of logistics provider, having the correct focus is essential (Rushton et al., 2017). Examples of key features are the ability to continuously improve, communicate, and to provide the right type of service. Such service often includes less traditional logistics services, for instance production and assembly, repacking or refurbishment. These services are often called Value Added Services (VAS) since they, as the name suggest, add value to the primary product. Moreover, various Key Performance Indicators (KPIs) and metrics are often established to measure the performance of the outsourced activities, e.g., in terms of productivity, labour, cost, and throughput (Rushton et al., 2017).

In addition to sharing resources and thus benefit from economies of scale, 3PL providers may bring value to the customer due to their ability of learning, both on an individual and on an organisational level. Individual learning, often referred to as the learning curve, relates to changes in behaviour due to practice (Speelman & Kirsner, 2005). The concept is that a person's skill increases as a function of practice. Early on, the gains are dramatically increasing whereas later, the increase reaches more of a steady state. In a 3PL returns context, this can be connected to the production personnel handling many returns for various customers. Hence, due to the learning curve, the skills of this personnel increase faster than the one of a person handling a fewer number of returns.

Organisational learning is defined by Panayides (2007) as "the organization-wide activity of creating and using knowledge to enhance competitive advantage" (p. 136). One main advantage of organisational learning is its effects on customer relationships (Panayides, 2007). This effect is achieved through the key organisational learning activity of collecting and sharing customer information internally. Panayides (2007) states the fact that organisational learning within 3PL providing companies contribute to added value in the services as well as an overall higher firm performance.

Furthermore, Panayides (2007) stresses the importance of information sharing on previous experiences and mistakes to enhance learning and improvement. One way of accomplishing information sharing with the aim to learn and improve from previous experiences may be through standardisation. Rogers and Tibben-Lembke (1998) spotted standardisation of reverse logistics processes as an area with improvement potential. Standardised returns processes result in decreased time-consumption related to returns. Also, errors are easier to detected and avoided in a standardised process (Rogers & Tibben-Lembke, 1998). Moreover, in a study by Badenhorst (2013) standardisation of reverse logistics processes was found to be "extremely important and not too cost-intensive to implement" (p. 7).

3.1.1 Warehousing

The use of warehouses in supply chain networks are, in most cases, inevitable to ensure profitability (Bartholdi & Hackman, 2019). Two main reasons are the possibility to better match supply and demand, and to enable consolidation of shipments. The activities performed at warehouses can be divided into the inbound and the outbound process (Bartholdi & Hackman, 2019). The inbound process includes receiving and put-away into storage, and the outbound process handles order-picking and checking, packing, and shipping activities. In addition, many warehouses also handle returns and perform value added processing. Thus, warehouses can play different roles, such as inventory holding point, cross-dock-, assembly-, or returned goods centre (Rushton et al., 2017).

When looking more specifically at 3PL warehouses, Bartholdi and Hackman (2019) suggest that they can be defined as warehouses "to which a company might outsource its warehousing operations" (p. 9). Positive outcomes for companies using 3PL actors for warehousing operations occur due to economies of scale. The rationale is that the 3PL provider can serve various customers in one facility and even out seasonality, which the single company would not be able to on its own, while also sharing equipment and personnel amongst these customers.

Regarding the layout and design of warehouses there are a lot of different options, as well as factors influencing which option is best suited. Modern warehouses are, in general, complex and necessitate a wide set of skills, according to Rushton et al. (2017). Furthermore, decisions must be made regarding what type of flow to select (e.g., linear or U-flow), what height the facility should be, whether to include a mezzanine floor, how to move goods (e.g., with conveyors or forklifts), and the storage type (e.g., pallets, long-span shelves, flow racks, or Automated Storage and Retrieval Systems).

A rather recent trend that is influencing the warehouse design is the growth of E-commerce (E-com), which, according to Hübner et al. (2016) entails extensive investments in "infrastructure, processes and capabilities for warehousing and distribution" (p. 562). The fact that it is not a matter of only serving stores anymore, but also online customers directly, puts new requirements on logistics and operations (Hübner et al., 2015). On top of this, customers are increasingly requiring a seamless experience across different channels (D. R. Bell et al., 2014). Thus, an omnichannel approach is important to be able to serve customers through all available channels, in different constellations. Apart from creating a complex set of channels, E-com also puts pressure on logistics as it usually results in heavy peak seasons that are difficult to manage, and an increase in return rates (Rushton et al., 2017). Because of this, the importance of warehouses' ability of managing returns is growing.

Operations of the returns management should be separated from the operations of the forward flow (Rogers & Tibben-Lembke, 2001). With low return rates and/or low return volumes, returns management is favourably conducted in a combined facility, i.e., a warehouse or distribution centre with both forward-, and reverse flows (Stock & Mulki, 2009). However, with high product returns volumes, or in cases where the returns need significant processing, returns management is best conducted in a separate warehouse facility. The impact of either alternative must be balanced against each other in each specific case. There is no fixed figure for when it is beneficial to use the same nor a separate warehouse for returns. Another important aspect to consider is that when having a combined facility, there is often a higher willingness amongst the personnel to give attention to forward flows, rather than reverse flows, when demand for forward logistics is high, as this is usually considered priority (Tibben-Lembke & Rogers, 2002).

3.1.2 Returns Handled in Warehousing

Rogers et al. (2002) present five categories of returns: consumer returns, marketing returns, asset returns, product recalls, and environmental returns. Returns within each of these categories entail unique challenges in the returns management process.

The consumer returns are the most common ones (Rogers et al., 2002). These occur when a consumer regrets their purchase or when the purchased item has any deficiency. Marketing returns arise because of a lack of demand for a certain product in a forward point of the SC. A "slow seller" might be an example of a marketing return (Rogers et al., 2002). Asset returns consist of load carriers such as reusable containers or other assets that are transported backwards in the supply chain with the aim to reuse or in another way, recapture value. Recalls are simply products sent in return, on request from the producer, due to quality deficiencies. Lastly, environmental returns include disposal of hazardous materials (Rogers et al., 2002).

Types of returns related to 3PL warehousing is primarily the consumer returns. The reason is due to E-commerce companies' returns strategy which commonly implies returns being sent back directly to the distribution centre, which in the 3PL context is the 3PL warehouse. In addition to consumer returns, 3PL warehouses deal with marketing returns, as retailer's may send back products which does not sell in their stores. Recalls is also handled, both in consumer to warehouse, and retailer to warehouse flows. In flows containing hazardous goods which are covered by special disposal regulation, environmental returns do also occur in a 3PL context. One example is pharmaceuticals where the 3PL may be an actor certified for disposal. Lastly, asset returns may be handled in a 3PL warehouse, for example in industrial flows, where the recipient is a production facility. To summarise, any type of return might be handled in a 3PL context as the 3PL warehouse tier might be an inevitable step in the reverse supply chain.

3.2 Returns Management

Cooper et al. (1997) presents Returns Management as one of the eight vital processes within Supply Chain Management. Returns Management refers to all activities related to returns, reverse logistics, gatekeeping, and avoidance (Rogers et al., 2002) as summarised in Figure 3.1. The definition of the term "returns" focus on the physical movement of products backwards.

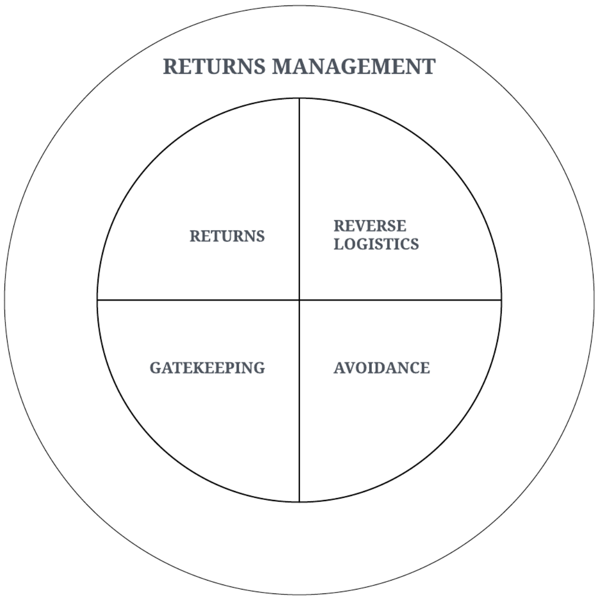


Figure 3.1: The returns management framework and its four perspectives.

"Reverse logistics" also refers to the process of transporting products from their intended point of destination backwards through the supply chain. In addition, the definition of reverse logistics includes the purpose of capturing value and ensuring proper disposal of the products entering the backwards flow (Rogers et al., 2002). Thus, in the term reverse logistics, activities such as refurbishment, remanufacturing, and recycling may also be included. Rogers and Tibben-Lembke (1998) define reverse logistics as:

> The process of planning, implementing, and controlling the efficient, cost effective flow of raw materials, in-process inventory, finished goods and related information from the point of consumption to the point of origin for the purpose of recapturing value or proper disposal (p. 2).

There are various options for recapturing value for returned products. Reuse, remanufacturing, and recycling are mentioned as the most common ones by de Brito et al. (2005). The most environmentally friendly option is reuse, followed by remanufacturing and recycling (Nuss et al., 2015). Lastly, the least friendly option, in terms of energy recovery and landfill, is disposal. However, in some high-value industries, such as within electronics, recycling is commonly implemented to cope with the heterogeneous quality of the backflows. This, as a result of the increasing prices in combination with the quick deterioration of product value.

Moreover, returns management covers more activities than the actual backwards flow of products. "Avoidance" concerns activities to minimise the number of returned items, by, amongst others ensuring high quality, and hence, customer satisfaction (Rogers et al., 2002). "Gatekeeping" relates to making decisions to eliminate cost of returns that are not allowed. That is, to minimise products being sent into the reverse flow.

3.2.1 Returns Management Process

The returns management process can be distinguished as one strategic and one operational part, where the strategic aspect of the returns management process seeks to establish a structure, according to which the operational process is conducted (Rogers et al., 2002). When considering returns management as a supply chain management (SCM) process, the management team which leads both the strategic and the operational processes, consist of various actors within the SC. Examples of actors usually involved in the management of the returns processes are managers from marketing, finance, production, purchasing, customer service, and logistics functions (Rogers et al., 2002; Mollenkopf, 2010). The day-to-day management of returns, however, is usually carried out by a team that may consist of roles from customers, suppliers, as well as 3PL providers. Moreover, Mollenkopf (2010) emphasises the importance of keeping this cross-functional aspect in mind and suggests getting the appropriate people and functions involved already from the start, to enable an effective integration of the reverse flow into the forward SC flows.

Strategic Returns Management Process

Rogers et al. (2002) presents six sub-processes included in the strategic returns management process: determination of goals and strategy, development of guidelines, returns network and flow options, credit rules, and framework of metrics, as well as determination of secondary markets. When applying returns management to warehouse operations, more precisely 3PL warehousing, the relevant strategic sub-processes are guidelines, returns network, and framework of metrics. That is since the 3PL's customers set the strategy, credit rules, and possible secondary market strategies without involvement from the third-party logistics provider. Hence, the result from these strategic sub-processes act as prerequisites for the 3PL provider, rather than affectable parameters. A summary of the sub-processes, where the affectable parameters are highlighted is presented in Figure 3.2. The parameters, which are affected by strategic decisions where a 3PL provider take part, are presented more in detail below.

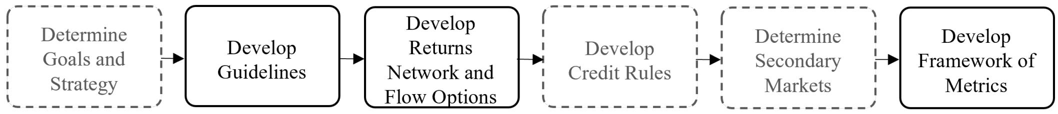


Figure 3.2: Strategic returns management process. Adopted from Rogers et al. (2002).

In the strategic part of the returns management, guidelines for the operational process must be established. The guidelines should cover avoidance, gatekeeping, and disposition, amongst others (Rogers et al., 2002). In a 3PL warehousing context, guidelines for gatekeeping and disposition are vital. Gatekeeping guidelines control what products should be accepted as returns and the aim of the guidelines is to detect unwanted returns as early as possible in the return flow (Rogers et al., 2002). Gatekeeping can beneficially be used in various points in the chain, besides the point of entry, to avoid unwanted cost. There are for example software, used at the point of sale, which detect whether a return can be accepted according to warranty policies. Besides, poorly managed gatekeeping can have a negative effect on the relationship between supplier and customer. Disposition guidelines seek to guide the operational process regarding the final destination of the returned items (Rogers et al., 2002). Disposition alternatives can include resale through secondary markets, recycling, remanufacturing, and transfer to landfill.

In deciding the reverse logistics network aspects, such as transportation modes and methods, level of centralisation, whether to outsource the operational process, and what type of returns are addressed (Rogers et al., 2002). Nuss et al. (2015) stress the importance of planning related to collection of returns and the returns channel, as it strongly affects the costs of the logistics structure. This is due to that, in contrary to the forward flow, the reverse flow follows a many-to-few network structure, implying product heterogeneity. Rogers and Tibben-Lembke (2001) found that returns processing at distribution centres are more efficient and effective when the process is separated from the forward channel. Regarding the centralisation of the process, Rogers and Tibben-Lembke (1998) emphasise that this implies further quality improvements.

Finally, the last sub-process of the strategic returns management process presented by Rogers et al. (2002) regards measurement and analysis of the returns management. Examples of metrics used to analyse the performance related to returns are return rates and financial impact of returns.

Operational Returns Management Process

With the outcome of the strategic returns management process as a base, the operational returns management process can be conducted. The operational returns management process is the day-to-day return activities. The operational returns management process, just like the strategic process, consist of various sub-processes. Rogers et al. (2002) presents the six sub-processes: receive returns request, determine routing, receive returns, select disposition, credit customer/supplier, and analyse returns and measure performance. The sub-processes are presented in Figure 3.3. Within these sub-process there are various activities to be carried out. When applied to a 3PL warehouse perspective, the sub-processes of the operational returns management process, and the concerned activities, form the operational handling of returns within the warehouse. Thus, making it closely linked to the operational steps constituting the returns handling process, which is the topic of the first research question of the thesis study. The sub-process, and the concerned activities will be discussed from a theoretical perspective, below.

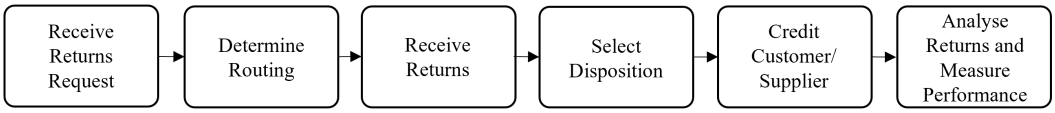


Figure 3.3: Operational returns management process. Adopted from Rogers et al. (2002).

The returns management process is initiated by a returns request by the buyer. That is, the point of entry of the return in the reverse flow, or the recognition of the return (S. Lambert et al., 2011). The request might be in the form of a consumer bringing an item back to the store or sending an email to the retailer, a store announcing a marketing return to the distributor, or simply a buyer sending the item back to the previous actor in the SC unannounced (Rogers et al., 2002). Genchev et al. (2011) argue that customer involvement is crucial in this initial part of the returns process. The benefits of an active initiation from the customer are both related to legislation, for example regarding hazardous materials, but also to Customer Relationship Management (CRM), as it enables a more accurate communication to the customer. Pre-noticing of returns do also enable faster returns processing times, which in turn lead to a less costly process. With pre-noticed returns, the customer can be guaranteed a handling time of less than 48 hours, a figure which is unrealistic for unannounced returns (Genchev et al., 2011).

Genchev et al. (2011) stress the importance of careful communication regarding routing to the customers. There are two main options when it comes to routing for returns, either predetermined and prepaid return freight, or the opposite, when the customer is charged with the returns freight. In either case, it is vital to ensure that the buyer understands where to ship the returned item. In many cases, the return area is separated from the outbound flow, and thus, the returns address might be one specific gate at the warehouse (Genchev et al., 2011).

When the returns first arrive, a thorough evaluation must be performed, where the products are verified, inspected, and processed (Rogers et al., 2002). S. Lambert et al. (2011) suggest grouping and sorting of the products after receiving the returns. The sorting is based on the subsequent processes. In practice, that implies an inspection determining whether the product is resalable, needs some kind of refurbishment, or should move on to disposal. This third step of the process is the most challenging process, due to the vast number of customer requirements and firm-specific processes and procedures (Genchev et al., 2011). Some of the exceptions making the process complex were stated by Genchev et al. (2011). One such is that there might be discrepancies between the return coming into the warehouse and the information provided by the buyer. Another is that the return might require individual treatment depending on the specific buyer.

The next step in the process is the disposition selection for the return. Disposition choices include refurbish, remanufacture, recycle, resell as is, resell through a secondary market, or send the product to a landfill (Rogers et al., 2002). Apart from these theoretical choices for disposition, Genchev et al. (2011) found additional options used in the industry. In full, ten disposition options were identified within active companies managing returns: return to manufacturer/supplier, return to stock, refurbish, repair, resell, balance inventory, refer to customer service, donate, reject, and liquidate. Disposition decisions may have significant impact on the performance of the returns management process, which means that clear guidelines and well-trained employees are essential to make the right choices (Rogers et al., 2002).

After selecting the appropriate disposition, the customer will be credited in accordance with the credit authorisation guidelines, developed in the strategic returns management process (Rogers et al., 2002). Depending on the guidelines, the customer might not be guaranteed a full refund. Some firms charge the return freight to the buyer or penalise the buyer when certain policies are violated (Genchev et al., 2011), implying even stricter requirements on the credit authorisation guidelines.

The last activity in the operational returns management process is the analysis and measurement of the performance. Genchev et al. (2011) presents six key metrics in evaluating the process: returns volume, returns type, returns value, percent of sales returned, resource utilisation, and for electronic and perishable industries also customer service. The aim of using these pre-determined performance indicators is to enable continuous improvement of the returns handling process, as well as the establishment of an adequate process control. However, there are a lot of constraints and difficulties as there is usually limited information available in advance (Genchev et al., 2011).

3.3 Supporting Resources and Processes

To support the returns handling process, different resources and processes are available. The relevant parts of these will be described in this section, starting with the supporting resources, followed by the supporting processes, including Customer Relationship Management and Planning and Control.

3.3.1 Supporting Resources

In terms of resources, there are various alternatives that facilitate and set the framework for a standardised returns handling process in warehouses, ranging from IT to employees, equipment, standardisation, laws, and sustainability efforts. These will be described below.

Information Technology
Information Technology has immense potential to improve the performance of activities within logistics and it is also a highly relevant aspect of reverse logistics (Daugherty et al., 2002). Since reverse logistics is characterised by a high degree of ambiguity while at the same time requiring quick handling time, accurate and efficient information exchange is important. Even more so as there are usually many actors involved in the returns process. However, the returns process is often considered secondary compared to other processes. Thus, scarce resources such as IT support are usually not invested in the development of returns management systems in the first place (Rogers & Tibben-Lembke, 2001). Nonetheless, Daugherty et al. (2002) argue that information systems support is a necessity of reverse logistics, although not solely on its own.

Other research has indicated that IT systems are commonly chosen and implemented based on forward logistics rather than reverse logistics (Huscroft et al., 2013). Although the activities of these flows are somewhat overlapping, for example transportation and warehousing, they do also differ substantially. The differences must be considered in the IT system if reverse logistics should be able to reach its full potential.

Moreover, some type of customisation and alteration of technology and systems are usually required to make them suitable to the resources (i.e., personnel, products, and processes) of the company (Huscroft et al., 2013). This is also supported by Richey (2005), stating that companies that are successful in managing reverse logistics have either created a customised technology that has been integrated into the company's infrastructure, or at least altered a standard solution to fit the needs of the company. Nevertheless, IT systems should not only be tailored to fit the company's own purposes, but it should also be integrated and compatible with key partners, if wanting to reap the benefits of the system (Huscroft et al., 2013).

Warehouse Management System (WMS)
New systems and technologies are constantly being developed. One such system is the Warehouse Management System, commonly known as WMS. A WMS is a software that facilitates management and control of the warehouse as it has information on all activities and the inventory, storage locations, and items in the warehouse (Bartholdi & Hackman, 2019; Rushton et al., 2017). Such information allows for better resource utilisation, as it is possible to arrange personnel, equipment and products based on this information. It is also an crucial factor for the planning and control of warehouses, which in turn can entail an increase in productivity (Faber et al., 2002), as well as speed and accuracy (Rushton et al., 2017).

The WMS must be integrated and communicate with other systems, such as Enterprise Resource Planning (ERP) systems or identification systems, to get access to information regarding customer orders for instance, while transferring information on e.g., goods receipt or dispatch (Faber et al., 2002; Rushton et al., 2017). Another interesting topic in connection to this concerns whether the WMS should be customised. A standardised WMS is less expensive and requires less time to implement. Having the same software in different industries and businesses also allows for easier upgrades (Rushton et al., 2017). However, according to Faber et al. (2002), this also means compromises between "the way a warehouse wants to work and the way the system allows the warehouse to work" (p. 382), thus affecting performance. Choosing the right type of WMS is therefore important for cost and competitiveness. Moreover, it is noted that returns handling differs a lot from forward flows, and hence, a separate, dedicated module for returns handling is beneficial (de Koster et al., 2002). Examples of WMS functions related to returns are the possibility to trace and monitor return levels and return types, or to distinguish damaged items that need some type of refurbishment, repacking, or disposal. (Clarus, 2019)

Electronic Data Interchange (EDI)
The WMS can be integrated with customer's systems, using electronic data interchange (EDI) systems. Briefly described, EDI is an instrument that enables information sharing between different tiers of the SC automatically (Mossinkoff & Stockert, 2008). The advantage with this is that transparency and flexibility increases. In addition, it facilitates accurate and timely information to be shared, also more efficiently than if personnel would have to do it manually (Rushton et al., 2017). Yet, it demands a structured and standardised format of communication to work properly in an inter-organisational setting.

Identification Technology
One method for identification is the traditional bar code. It is one of the most frequently used methods, as bar codes are inexpensive to print while allowing information about an item to be exchanged quickly and easily by scanning the bar code, either with a hand-held or a stationary reader (Baudin, 2002). Bar codes cannot be used to identify individual, unique

objects though. A technology that allows for this is instead Radio Frequency Identification (RFID) technology (Wyld, 2006). The technology in itself is not new, as it is based on radio waves, however it is becoming increasingly common in everyday objects. Except allowing for more information to be conveyed, it is also beneficial as the information on the tag can be updated, as RFID tags do not require line of sight, and as multiple items can be read synchronously.

Employees

Returns management usually requires a certain level of knowledge from employees. According to Richey (2005), it is desirable to have a separate return process where employees have particular responsibility and authority. The background to this is that although some parts of returns may be possible to standardise, there are still variations and "surprises" to some extent that the employee must be able to handle. For the parts that are more predictable though, formalisation with guidelines, procedures and rules should be in place, as formalisation is thought to improve performance by reducing uncertainty on *what* to do. However, there should still be flexibility as to *how* to do it.

Equipment

Since reverse logistics differs from forward logistics, supplementary resources are required (Glenn Richey et al., 2005). Except the above-mentioned, the returns management process also requires various kinds of equipment, such as scanners, printers, computers, and tools for refurbishment.

Formalisation

Other supporting resources are formalised structures and standards for organisations. According to Baum and Wally (2003), such structures are characterised by "explicitly articulated and written firm policies, job descriptions, organization charts, strategic and operation plans, and objective-setting systems" (p. 1112). However, research has indicated that it is still somewhat unclear to what degree formalisation efforts have a positive effect on performance (Richey et al., 2005).

Laws

Perhaps more of a constraining than supporting factor is laws and regulations. Nevertheless, this is an important perspective as it sets the framework for operations for returns handling. The most common law affecting returns is *The Act on Distance Contracts and Off-Premises Contracts (SFS 2005:59)* (Konsumentverket, n.d.). According to this law, consumers buying goods or services remotely have 14 days, counting from the day after receiving the item, to withdraw their purchase. It is the company’s duty to inform the consumer about this.

Regarding the refund time, the company should credit the customer without unnecessary delay, at latest 14 days after the customer announces that they would like to return the purchased item. Provided that the returned item has arrived at the warehouse, or that the customer can show that the item has been sent back (SFS 2005:59, n.d.).

Sustainability and Logistics

Sustainable development can be defined as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (United Nations, n.d.). This is yet another factor which sets the framework for logistics, as it has profound effect on the entire supply chain. Not only legislation by e.g., the European Union, but also sustainable standards and practices developed by industries and corporations, influence businesses and their operations (Villena & Gioia, 2020). Thus, the returns management processes are also affected to some extent.

A common model for incorporating all aspects of sustainability, i.e., the social, environmental, and economic aspects, into a business is the triple bottom line (TBL) (Dyllick & Hockerts, 2002). To be sustainable, companies must, apart from ensuring profit for its shareholders, also incorporate the interests of its stakeholders, meaning the actors affected by the company. The stakeholders can be anything from the employees of the company, including their motivation and skills, to societies and the infrastructure of these. The environmental aspect, on the other hand, refers to the way in which businesses relate to the consumption of natural resources, and the effects their business have on the ecosystem in the long run.

3.3.2 Customer Relationship Management

The growing demand for 3PL services has led to an increase in competition amongst 3PL service providers, entailing the need to seize and create opportunities for gaining a competitive advantage (Min & Jong, 2006). One way of doing this is by building lasting customer relationships, for instance through proper Customer Relationship Management. CRM is one of the key business processes in SCM, and it gives a structure for how the development, as well as maintenance, of customer relationships should be managed (Rogers et al., 2002). By establishing proper CRM, companies can differentiate themselves from competitors, which is especially important in environments characterised by high customer expectations and/or product offerings like those of competitors (Rushton et al., 2017).

To be able to create lasting customer relationships and improve customer service, logistics is usually fundamental, according to Rushton et al. (2017). More particularly, there is a highly relevant linkage between effective returns management and improved customer relationships (Mollenkopf, 2010; Glenn Richey et al., 2005). The reason for this is that if returns are properly managed, the returns experience can actually improve the customer service as well as reduce costs, according to Richey (2005). This emphasises the importance of taking returns management into account also on a strategic level. Nonetheless, an adequate amount of "thought, attention, and resources" (p.235) (Glenn Richey et al., 2005) is required. Furthermore, it requires an understanding of what the customer actually values and needs, to be able to provide products and services that are a perfect fit for those needs, while at the same time maximising profitability (Slack et al., 2016). Moreover, there is a requirement of understanding why the return occurs in the first place, which could be anything from the product being unwanted by the customer to defects of the product (Rogers & Tibben-Lembke, 2001).

3.3.3 Planning & Control

Operations planning and control is often considered difficult due to a high degree of uncertainty, complexity, and the extensive information flows generated by various actors in organisations (Slack et al., 2016). Nevertheless, it is a particularly important task and thus, aspects relevant to the thesis work will be presented below.

Three perspectives of Planning & Control

The objective of planning and control is to manage and adapt the allocation of resources and activities to ensure efficient processes that meet customer demand (Slack et al., 2016). This is achieved by e.g., scheduling, organisation, and coordination, as well as through the use of various systems. Furthermore, planning and control can be seen as one entity, or divided into two entities. Generally, if divided, planning concerns the formalisation of those events that are intended to occur, while control is more of a measure to cope with changes of those events.

Moreover, there are three levels of planning and control. These are related, as the higher hierarchical levels have an impact on the lower levels (Slack et al., 2016). The most long-term and aggregate is the strategic one, where the focus is on planning and not control. On this level, decisions mainly concern the structure and scope of operations, and the objectives of operations managers are of financial characteristics.

The next level is the medium-term, or tactical. This level is more detailed, and here contingencies and resources for operations are determined, and targets cover both financial and operational perspectives, according to Slack et al. (2016). The most short-term planning and control is called the operational planning and control. Here, the point of view is completely disaggregated and detailed, and operations managers have a focus on finding a balance between "quality, speed, dependability, flexibility, and costs of their operations dynamically on an ad-hoc basis" (p. 320) (Slack et al., 2016).

Planning related to Returns

Planning related to reverse logistics differ from forward logistics quite extensively and there are a lot of uncertainties connected to it, for instance regarding timing, quantity and quality of the products that are returned (Duong et al., 2022). Also, the approach in reverse logistics is much more reactive than proactive compared to forward logistics (Tibben-Lembke & Rogers, 2002). This is due to a lower visibility, as well as the fact that reverse logistics is usually initiated as a response to what individual consumers, or other downstream members, do rather than by the firm itself as part of their planning. Additionally, another factor influencing the complexity of planning and forecasting for returns is the fact that different products have diverse returns rates, for example because the simplicity of using a product varies, or because there is a higher tendency to regret the purchase of certain types of products than others (Tibben-Lembke & Rogers, 2002).

There are, however, some ways of coping with issues such as the above-mentioned ones. For instance, the level of return flows is often related to the outbound flows (Tibben-Lembke & Rogers, 2002). Hence, if there are various promotions that increase sales, there is a trend of increasing returns as well, although with a bit of a delay. Thus, it can be beneficial to bring information about such sales also to the management of reverse flows, and not only to forward flows.

Moreover, information systems are emphasised as important instruments for improving the efficiency of the operations of reverse logistics, as it allows for timely and accurate information to be exchanged between the various actors involved in the process of handling returns (Daugherty et al., 2002). However, as mentioned in section 3.4.1, there is a lack of recognition of the role reverse logistics has in organisations, which thus leads to a lack of investments in the necessary information systems. Hence, reverse logistics usually lack the beneficial trackability that forward flows have, according to Tibben-Lembke & Rogers (2002).

3.4 Summary of Theoretical Framework

To sum up the topics of the theoretical framework, Figure 3.4 is provided below. Returns management is the framework covering returns management as a supply chain activity, including the aspects returns, reverse logistics, gatekeeping, and avoidance, as described in section 3.2. The two main processes concerned by returns management are the strategic and the operational returns management processes, which are explained in further detail in section 3.2.1. Furthermore, the strategic and operational returns management processes are complemented by supporting resources and processes which both guide and restrict the returns management. In particular, the supporting resources and processes included in Figure 3.4 are specifically related to returns handling as a 3PL warehouse activity.

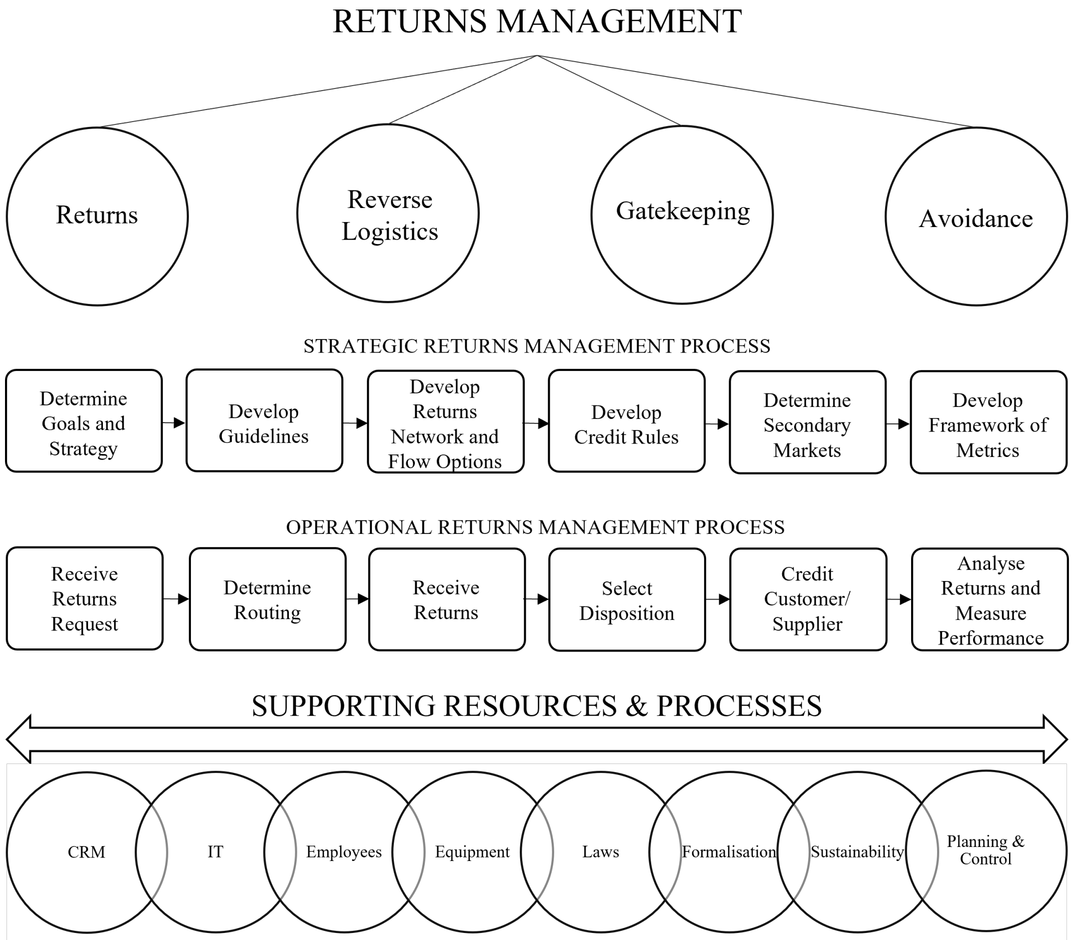


Figure 3.4: Summarised and interpreted theoretical framework relevant for the thesis work.

Returns management covers the supply chain activity related to returns, and thus, management of returns in all supply chain tiers. Consequently, when focusing on returns handling in a 3PL warehousing context, the returns management framework aspects is concerned only partly. In the subsequent parts of the thesis, the theoretical framework related to returns management and its processes acts as a basis for the case analysis of the returns handling at 3PL warehouses.

4 Presentation of Business and Case Context

This chapter presents a description of the business context and activities, including a more thorough explanation of the context for the returns handling process, since this process is the focus of the thesis. Furthermore, specific descriptions of the cases included in the study are presented. In total, 11 cases are included, spanning different Schenker sites, product categories and flows.

4.1 Business Context of DB Schenker Logistics

Schenker operate in a context where they have interactions with various actors along the SC. To illustrate this context and what is meant by the different terms used to describe these actors, Figure 4.1 is provided below. However, the figure does not illustrate the entire context of Schenker, but only the parts relevant for the study.

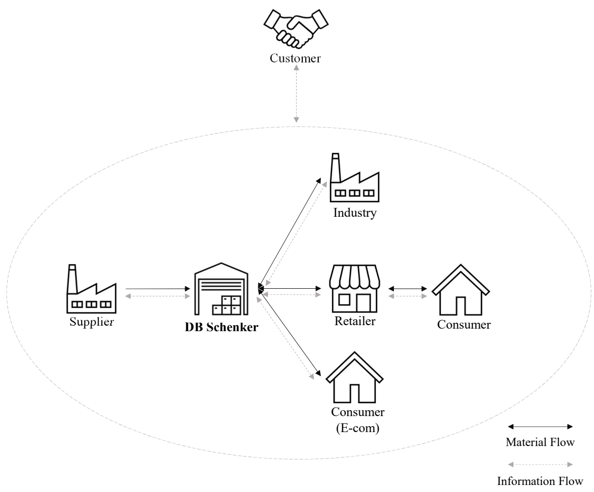


Figure 4.1: Business context of DB Schenker Logistics.

As Schenker is the focal company of the study, they will be the point of reference and thus, the interactions are described from this perspective. Hence, customers are referring to Schenker's customers, meaning the companies for which Schenker performs various logistics operations, previously mentioned as direct customers. The flow consists of information between the customer and their customers, suppliers, and Schenker, as can be seen in Figure 4.1. On the right-hand side, interactions between Schenker and their customers' customers, previously referred to as indirect customers, are illustrated. Indirect customers are industries and consumer from E-com channels, as well as retailers. The flows between these actors and Schenker mainly consist of material, as information usually flows between the direct and indirect customers directly. However, there are some cases where information is exchanged also directly between Schenker and the indirect customer, for example when returns are sent back directly to the warehouse without any pre-notification to the customer. Between Schenker and the suppliers the flows consist of both information and material, however, the material flow mainly goes downstream, from the supplier to Schenker, and not the other way around.

More specifically, in the context of returns handling, material flows include the goods being returned to Schenker's 3PL sites from indirect customers, while the information flowing between Schenker and the direct customer concerns e.g., status of the return and stock balances. For indirect customers on the other hand, information primarily regards return reasons and quantities.

4.2 Business Activities of DB Schenker Logistics

If taking an internal perspective of the returns handling context of Schenker, it includes various actors from the warehouse operations. First and foremost, production personnel, also referred to as "production" or "operator", performs activities such as inspection, repacking and labelling of returned goods, as well as correcting stock balances. In some cases, they also perform administration activities linked to the customer's systems. However, the contact with customers, both direct and indirect, is usually managed by the control tower (CT) function at Schenker. Such contact is most common whenever deviations occur, however, there are some direct customers for which CT is always involved in returns handling, regardless of if it is a deviation or according to common procedure. The tasks performed by CT varies between different sites though, from being a purely administrative function to a combination of production and administration, which thus affect the division of work between personnel. Moreover, supervisors and team leaders are part of the returns process, mainly for planning and control tasks, but also for general support. If there are any issues with e.g., the WMS, IT support in different formats is also available. Regarding the division of personnel between different customers of Schenker, the production personnel is usually devoted to a specific customer, while e.g., CT and supervisors usually manage several customers.

4.3 Case Descriptions

In the following section, descriptions of the cases, grouped into six categories, will be presented to provide an overview of their characteristics and peculiarities. All cases are listed in Table 4.1, where the sites, product types, and flow types for each case is specified. There are four sites, referred to as Site I-IV, and six product categories, which are interior, clothing, health care, electronics, beauty, gardening and pet items, and flooring. Regarding the types of flows, most of the cases included use an omnichannel approach, meaning that consumers, also referred to as indirect customers, can buy their products either through physical or digital web-based stores. Moreover, there are some case specific factors, such as varying product sizes, packaging types, direct customer requirements, and IT systems used by the direct customer. Nevertheless, the WMS system is the same across all cases, as Schenker uses the same one for all customers and sites. All cases will be described further below.

Table 4.1: List of the site, product type, and flow type for the cases studied.

Case	Site	Product type	Flow type
A	I	Interior	Omni
B	I	Clothing	Omni
C	I	Clothing	Omni
D	III	Health Care	Other
E	III	Electronics	Omni
F	IV	Electronics	Omni
G	IV	Electronics	Omni
H	I	Beauty	E-commerce
I	II	Beauty	Other
J	II	Gardening and pet items	Omni
K	I	Flooring	Consumer Retail

4.3.1 Clothing: Case B & C

Two of the case companies, Case B and C, are dedicated to the fashion and clothing industry, meaning that the goods usually are packed in plastic bags rather than solid consumer packaging. The products range from small accessories to coats. Case B is specialised on male fashion, and Case C offers a wide assortment to both male, and female. Schenker performs operations for E-com as well as stores in Sweden, thus having a mix between larger and smaller consignments. However, only the E-com flows of these cases will be considered since E-com returns constitute the majority of the return flows. All operations for these two cases are located in Site I. Furthermore, the inventory is separated into two flows, hanging goods and goods stored on shelves. Almost all returns for the two clothing cases are accepted, with few exceptions, for example underwear.

4.3.2 Electronics: Case E, F & G

Electronics goods are typically technological consumer goods ranging from small phones to significantly larger products, such as televisions or home appliances. One significant characteristics of electronics is the high value of the products. These types of goods are usually packed in solid consumer packaging.

In the study three cases of electronics flow were included: Case E, F, and G. Case E and F are the same company. However, their flow is divided into two storage facilities. Case E is located in Site III where larger items, such as the home appliances, are managed. Meanwhile the flow of Case F is, together with the flow of Case G, located at Site IV. These flows are better specialised on the picking of smaller electronic parts.

4.3.3 Beauty: Case H & I

Case H and I are both beauty companies. The product range for Case H is wide but it mainly consists of small items, packed in solid consumer packaging. The company offers sales both online and offline, however, operations at Schenker's 3PL site only concerns E-com for Sweden, Norway, Denmark, and Finland. The operations are located in Site I.

Case I also offers a wide assortment, however, the product size varies from small to somewhat larger products compared to Case H. This flow is operated from Site II and consumer retail constitutes the main distribution flow. In addition, some parts of the flow are distributed to beauty salons, where the products may either be used, or sold. Hence, the type of flow for Case I listed in Table 4.1 is "Other".

For both beauty companies included in the case study the goods characteristics imply some requirements on the flow operations. One such requirement regards the transporting and storage of the goods since some products are classed as dangerous goods. Another requirement is the batch management or the considerations to expiration dates of the products. This implies requirements on the storage since batches, with different expiry dates, cannot be stored mixed in the same load carrier. The reason for this is that the information on batch and expiration date is linked to the load carrier rather than the specific unique item. Thus, in the picking process, to ensure that the information regarding batch and expiration date on the picked item is the same as the information in the WMS, load carriers must contain only one single batch at a time.

4.3.4 Other Consumer Goods: Case A & J

Apart from clothing, electronics, and beauty, two additional cases with consumer goods were included in the study. These are Case A, located in Site I, focusing on interior design and smaller furnishing, and Case J, located in site II, offering various gardening equipment and pets' necessities, such as food or accessories. The packaging ranges from none to solid cardboard. For both of these two flows, an omnichannel approach is used for the distribution, where the companies offer sales through their own stores and websites. However, in terms of return flows, the majority of returns are consumer returns, and thus these are the returns that will be considered for Case A and J.

4.3.5 Health Care: Case D

The health care company included in the study, Case D, has a special flow where medical related products are stored until later being distributed to the homes of patients. Examples of products distributed in this flow is incontinence protection and nutritional supplements, distributed in consumer packaging. This implies neither a consumer retail, nor an omni, or industry flow. The return flow which is most similar to the health care return flow are returns sold through E-commerce. That is because returned products in the health care case are being sent back to the warehouse directly from the end-user, just like in the E-com cases. The operations are located at Site III.

Just like with the beauty products, some of the health care items require special treatment and/or storage, regulated by law. In a returns handling context that implies that the production personnel must know whether a product require certain special handling. One example of special handling might be requirements on storage in certain closed areas. Also, the products in the health care case do often require expiry date controls and batch management.

4.3.6 Flooring: Case K

Lastly, Case K is a flooring supplier with distribution from Site I to consumer retailers. The characteristics of the goods are large and bulky implying requirements on space and handling. The packaging is cardboard covered in plastic film, usually on pallets.

5 Results from the Empirical Case Study

The empirical study of the thesis work covered 11 internal cases, as well as 4 external benchmarked cases. The results from the study are presented below. Firstly, general findings including productivity figures for the internal cases are presented. Then followed by findings related to the current processes, divided into subsections for the operational process, information flow, and planning and control. Moreover, results from the benchmark are presented.

One outcome from the first phase of the study regards the selection of which cases to include in the study, i.e., the data collection, which the cross-case analysis stems from. The selection is based on the characteristics of the return flow of the different direct customers. More particularly, this concerns the number of returns managed, type of goods, and amount of time dedicated to the operations of returns. To gather this type of data, a questionnaire was sent out to the Operations & Account Managers for each site. The questions for each flow included the responsible supervisor, whether returns are managed, types of returns managed, i.e., E-com, retailer, or industry returns, how many returns that were managed during one specific month, as well as how many hours production personnel spent on returns.

A questionnaire with similar questions, however directed towards CT-administrators, was also sent out. For those direct customers where CT performs tasks not only for deviations but also for standard procedure returns, this was included in Table 5.1. To get a comparable result, January, which was the latest full month before the questionnaire was sent out, was chosen as a reference month. Based on the findings, the 11 cases with the highest number of returns were chosen to be a part of the second phase. The result of these 11 cases is presented in Table 5.1 below, with the highest number of returns on the first position and falling order.

Table 5.1: Returns volumes, time consumption, and productivity figures for the cases studied.

Case	No. of returns	Hours spent on returns	Minutes/return	Returns/hour
C	3863	354,28	5,50	10,90
D	1408	152,00	6,47	9,26
B	1207	99,38	4,94	12,15
F	1072	134,54	7,53	7,97
A	1041	56,00	3,23	18,59
G	412	57,48	8,37	7,17
E	320	38,00	7,13	8,42
I	296	116,60	23,64	2,54
H	188	36,73	11,72	5,12
J	119	50,00	25,21	2,38
K	53	82,00	92,83	0,65

When studying the findings from the questionnaire, the relation between number of returns and hours spent on each return is remarkable. The result shows, although with some exceptions, that the hours spent on each return decrease with an increased number of returns. Worth mentioning though is that these numbers may not be entirely accurate, especially for smaller flows, as one person being clocked in on the wrong process may entail an exceptionally large deviation. However, they give a direction and can thus be used to guide the choice of which cases to include in the study.

5.1 Empirical Findings: Operational Process

The presentation of empirical findings regarding the operational process is structured according to a number of steps, which are visualised in Figure 5.1. The reason for depicting all the studied processes in one and the same figure is that these steps could, with few exceptions or with some modification, be identified in all the studied processes. The figure illustrates the returns process in case of no deviations, i.e., the "happy flow". The physical process starts when the returns arrive and end when they are ready for put-away. Flow charts for each specific case are, however, illustrated in Figure A.1, A.2, and A.3 in Appendix A.

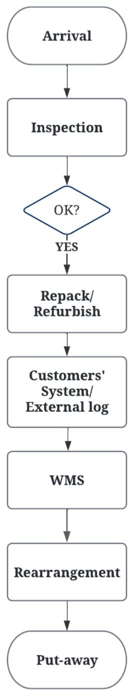


Figure 5.1: Flow chart of a compilation of the current operational processes, with regards to the happy flow.

5.1.1 Arrival

Most returns arrive at the warehouse with a delivery firm such as PostNord, DHL, Bring, Best, or DB Schenker, except for Case K, where a designated carrier is used. In none of the cases, information about the delivery is shared prior to arrival. This implies that there is no information about the number of incoming returns in advance, neither the time of arrival of the returns, meaning that there is a limited possibility to plan the operational returns handling in advance.

When the returns arrive, a person dedicated to arrivals unload the returns from the load carrier and contacts a person responsible for the corresponding return flow. For some cases, returns arrive unsorted, meaning that returns dedicated to various customers are mixed in the incoming load carriers. This is common for Case A, B, C, and H. Then, the returns are transported to the operational area, in which the specific customer's returns process is handled. For Case K, which returns come with designated carriers, the person responsible for arrivals must approve and confirm the arrival.

When returns arrive at the case-specific returns handling area, they are put into temporary storage in a designated location. Also, most returns are marked with the date of arrival, either on the load carrier, or in Case B, G, H, and I, on each individual parcel. In Case B, the time of arrival is also added. The reason is to create an internal order in which the returns should be handled. The type of temporary storage location depends on the dimensions of the goods. Shelves are used for small parcels in smaller quantities, such as the returns for Case H. For larger parcels and quantities, cages or pallets are used. Examples of this is Case C using cages and Case A, D, E, F, G, I, and J using pallets. For flows with spacious goods, for instance Case K, designated floor space is used for temporary storage of returns to be handled. Naturally, all temporarily stored returns take up floor space which is stated to be a somewhat problem, and a reason to deal with returns as soon as possible after their arrival. Examples of such flows, beside Case K, is Case D and F.

5.1.2 Inspection

The first step of the returns handling process is to retrieve the returns from the temporary storage, according to the order, in which they arrived. After retrieving the parcels, the inspection step starts with unpacking of the returns. Inspection includes both ensuring that the products sent back are approved as returns and that they are in a condition which is approved for returns. All the inspection criteria inspected for each case is listed in Table 5.2.

In most returns processes the first action is to ensure that the item returned was part of the order sent out in the outbound order, or a part of a return order sent by the customer. Some cases simply compare the returned item to the return note. However, Case A and H

Table 5.2: List of inspection criteria as well as corresponding cases for which they are considered.

Criteria	**Cases**
Item part of outbound order	A B C G H J
Item part of return purchase order/external return log	D K
Consumer packaging intact/item not used	A D E F H I J K
Item intact, clean and without smell	A B C
Item in assortment	J
Additional order specific information	A D H

require an additional physical handling step, in which an internal system is used to find the outbound order. In a similar matter, returned items for Case K must be checked against an external Excel log including all incoming returns. Moreover, for Case D, the inspection instead includes checking if the returned item(s) matches a return purchase order, sent from the direct customer.

In addition to match the returned items to the ordered items, the inspection process for some cases includes additional inspection activities. Case C is an example where the production personnel controls that the buyer's name and the invoice number match between the system and the return note. This implies an extra activity in the external system. In Case J, the inspection includes using the WMS to ensure that the returned item is a part of the assortment in the warehouse, since the return must be handled as a deviation otherwise. Another additional inspection, which require using the WMS regards product sterility for Case D. The reason why this must be checked is that a sterile product implies additional requirements on the inspection of the packaging, since the packaging for these products must not have been opened.

Moreover, the inspection step for Case A, D, and H include checking for additional order specific information. Examples of such information might be that a certain return should not be handled due to an agreement between the direct customer and the buyer. This type of information is either communicated through an internal system with a customer interface, an external log, or through the customer's system. In Case A and D, this inspection is conducted in the operational inspection step. The information is found in an external log for Case A, and in the internal system for Case D. Furthermore, if this type of additional order specific information exists in Case H, it will be communicated through the customer's external system. Thus, this inspection occurs at the external system registration step, at first, for Case H.

For the inspection of the condition of the returned items, the characteristics of the goods returned affect the inspection criteria. The inspection seeks to prevent accepting products that have been used by the customer. For products with consumer packaging, such as Case D, E, F, H, J, K, and some of Case A's products, this implies ensuring that the packaging has not been broken, at least not more than to an extent where it can be resold. For products, which are not packed in consumer packaging, inspection is somewhat more complex.

In cases with these types of products, such as for Case C, B, and some of A's products, the person handling the return must decide themselves whether the product should be approved for return. Some guidelines are set up together with the customer in the implementation phase to guide the decision. However, when observing the returns processes it became clear that the decisions, to some extent, depended on the operator for the returns process. Examples of products where the inspection is a critical part of the returns handling process are clothes. Since a consumer can try on clothes and still make a return, the decision on whether to accept a return is not crystal clear. The criteria set for acceptance of returns of clothes are usually that they should be intact, clean, and without smell.

Case I receives some returns in consumer packaging which follow the same inspection principles as the other consumer packed items. However, they do also receive broken electrical equipment regularly which must be inspected to ensure that they are approved for reclaim according to the guidelines from the customer.

Another flow that stands out in terms of inspection is the flow of Case G, where all returns are accepted, as long as the correct product is returned, regardless of the condition of the product. In this case, all returns where the consumer packaging is broken, the item is registered in a special way and put on a temporary storage before grading. The grading process is performed by a representative from the customer that visits the warehouse and decides what should be done with the returns separated from the happy flow to the grading process.

One factor influencing the inspection of the return is whether the parcel has been collected by the buyer. If it has not been collected, the inspection is usually less time-consuming and detailed, as the item(s) have not been used. Instead, the inspection concerns making sure that there are no transport damages. However, if they have been collected, the return note specifying the reason of return can guide the decision in case of any deviation, such as a consumer claim, a faulty picked product, or a transportation damage claim.

The inspection of the returned item determines whether the product should continue through the happy flow to the repacking and refurbishment step or deviate to the alternative flow path. Therefore, there is a decision step after the inspection step in the flow chart over the operational process, visualised in Figure 5.1. Returns that for some reason deviate from the happy flows are then handled in a deviation step described in detail in section 5.1.8.

5.1.3 Repacking & Refurbishment

After determining that the product is approved as a return, repacking and refurbishment is the next step of the process. Repacking and refurbishment actions performed in the cases of the study are listed in Table 5.3.

Table 5.3: List of repacking and refurbishment actions as well as corresponding cases for which they are conducted.

Repacking/refurbishment actions	**Cases**
Minor packaging touch-ups	A D J
New packaging	B C
Folding	A B C
Providing new identification tags	B
Packaging for future storage	A
Minor refurbishment activities	B C
Customer responsible for repacking/refurbishment process	G
No repacking or refurbishment actions	E F H I K

The repacking step is only occurring for products which are not packed in consumer packaging, i.e., Case B, C, and some products from Case A. One example of repacking can be folding of clothes or other garments. The folding is then performed after the production personnel's best ability. Case B and C, which both have clothes via E-com are two cases where a folding step with repacking into plastic bags is included in the returns process. Either repacking the piece of clothing into the same plastic bag as it had originally been sent in or using a new one if the original one is too damaged. For Case B returns, the repacking process also include ensuring that the item has both a hangtag and a tag on the plastic bag. This means that a return missing one of these tags require new tags as a part of the repacking process. However, this part of the repacking process is not considered a part of the returns handling process' happy flow and hence, the customer is charged extra for this as a VAS. Apart from the repacking at Case C and B, Case A require repacking for future storage, where all returns are repacked into either cardboard boxes or plastic bags before storage, which are later removed when the product is sent on a new order.

Furthermore, there are some cases, in which minor refurbishment is conducted, mainly for Case B and C. Examples of this can be to steam or ventilate pieces of clothing to remove odours or other deficiencies. However, such activities are not part of the happy flow, but rather on request from the customer. Moreover, usually in Case C, the personnel do the repacking for a load of returns and put them in a plastic tray before moving on to the system registration step. In addition, minor packaging touch-up activities, such as adding a bit of tape, can be done to the consumer packed returns, in Case A, D, and J.

Followed by the grading system, presented related to the inspection for Case G in section 5.1.2. Decisions regarding repacking and refurbishment for Case G is taken by a customer representative. This implies that the production personnel do not have to take any decisions regarding this. The reason might be the high value of the products.

5.1.4 External System/Log Registration

Some of the cases have processes which require that production personnel update customers' systems or external logs. The purpose is to either trigger a credit transaction to the indirect customer straight away by registering the return in an external system, or to provide the direct customer sufficient information, through an external log, to trigger the credit transaction. Whether external systems, logs, or no external entity is used depends on specific customer requirements. The use of external systems/logs registration is shown in Table 5.4. Case C, H, and J are cases where Schenker's personnel update the customers' systems directly. However, Case C is peculiar as this step is not performed in production, but instead by personnel in the local control tower at the site, in accordance with information provided by production personnel in an internal log. In Case A, B, E and F returns are only registered in the WMS. In these cases, the WMS used at Schenker's warehouse is integrated to the system of the customer through EDI.

Table 5.4: External system/log registration as well as corresponding cases for which they are used.

External system/log registration	**Cases**
External system	C H J
External log	D G I K
No external system/log	A B E F

For Case D, G, and I registration in WMS require a prepared purchase order. Either this already exists, or an external log is used to inform the customer on what has been returned, resulting in the customer preparing the purchase order which is then sent with EDI to the WMS. In the meantime, the returned item is stored temporarily. For Case I, an additional Excel log is also filled out with date of handling and date of put-away for extra follow-up possibilities. Case K uses an external log as well, but the purpose here is not to get a purchase order, but to provide the customer with a confirmation that the return is received.

5.1.5 WMS Registration

A step which is included in all the cases' processes is the step where the stock balance in the WMS is updated in accordance with the return order. The available options for this update is either "correcting stock balance" or "new delivery", as can be seen in Table 5.5. The latter is used by Case A, B, C, D, E, F, G, and I while "correcting stock balance" is used by Case H, J, and K. The difference between the two options is that correcting stock balance updates the balance for an existing location whereas with the new delivery option, the item is either allocated to a new location, or to a return compartment.

Table 5.5: WMS registration aspects for the cases studied.

Case	Registration method	Location destining	Rearrangement
A	New delivery	Return compartment	None
B	New delivery	Return compartment	To existing location
C	New delivery	Return compartment	None
D	New delivery	New location	To existing location
E	New delivery	New location	None
F	New delivery	Return compartment	None
G	New delivery	Return compartment	None
H	Correcting stock balance	Existing location	None
I	New delivery	Return compartment	None
J	Correcting stock balance	Existing location	None
K	Correcting stock balance	Existing location	New location

Furthermore, there are mainly three alternatives for initially destining a returned article to a warehouse location, namely existing locations, new locations, or specific return compartments, where only one return can be stored. Return compartments is the chosen alternative for Case A, B, C, F, G, and I, whereas new locations are chosen by Case D and E. The third alternative, existing location, is the chosen alternative for Case H, J, and K. However, this is not always the final location used for put-away of the returned item, as some rearrangement may occur, which will be covered in the next subsection.

An additional physical handling activity conducted as a part of the WMS registration operational step is when the production personnel produce a purchase order. In Case A, the process includes producing a purchase order manually in the internal system, which is later sent to the WMS via EDI. In Case E and F, the process includes producing an Excel file with the details of the return. The Excel is then uploaded to the internal system and in that way, a purchase can be created based on the Excel data, and the sent via EDI to the WMS.

5.1.6 Rearrangement

In some of the cases, rearrangement of the warehouse location previously chosen must be conducted to maximise the utilisation of warehouse locations and adapt to the available storage, as can be seen in Table 5.5. In Case B and D, the returns are rearranged from return compartments to existing locations, if one already exists, of course. By doing so, several locations are merged into one and thus the warehouse utilisation is improved. Case K, on the other hand, rearranges the returns from the existing location to a new location by splitting the item load. As Case K has larger goods that usually arrive as pallets, returns cannot fit into existing locations but must be split into two or more. This is done to minimise the need for moving goods around between pallets. Rearrangements like the ones mentioned for Case B and D also occur in some of the other cases, for example if the fill rate of return compartments is exceedingly high, however it is not a part of the common procedure to the same extent.

5.1.7 Put-away

When the returns handling is completed, the put-away process is initiated. This process can take different shapes depending on the goods to be stored. In Case A, D, E, J, and K goods are stored on pallets and then handled with forklifts, while in case B, C, F, G, H, and I, trolleys are used to put the goods back into storage. For spacious goods, put-away of returns are often prioritised, whereas for smaller items, this put-away is rather performed when the personnel are free. Furthermore, the put-away process depends on the warehouse location chosen in the previous step. However, these aspects are not included in the scope of the thesis.

5.1.8 Deviations

In case deviations are identified during the inspection step, the deviating returns are separated from the non-deviating flow for special handling. This occur in all cases in some way, however, what is considered a deviation or not, and how to manage it, depends on which customer is considered.

5.2 Empirical Findings: Information Flow

Information exchange is presented below in relation to the steps of the operational process of the returns handling process. The information exchange is divided into information inflow and information outflow. The inflow refers to external information used in the process. This type of information can come from either the direct or the indirect customers. The information outflow on the other hand is information that come out as a result of the returns handling process. The receiver of this information is usually the direct customer, which in a second step might forward parts of the information to the indirect customer as well. Typically, outflow of information is rather forwarding of inflow information than new information.

Further descriptions of the current information in- and outflow related to the operational returns handling steps are presented below. All information entities coming into the process for the different cases are listed in Table 5.6 and 5.7, whereas all information entities constituting the outflow for the different cases are listed in Table 5.8.

5.2.1 Current Information Inflow

As returns arrive in the warehouses, naturally information regarding time of arrival is obtained. The time of arrival is used in Case B as the customer requires so. In most of the other cases, the date of arrival is noted and used in the planning and control of the handling. In Case E, F, and J, the information regarding time and date of arrival is not noted, nor used in the process. In none of the cases, information regarding number of returns is obtained before the actual returns arrive at the warehouse.

Information on the actual returns is obtained first in the inspection step where the parcels are opened and checked. The information obtained in this step always concern the returned items, their quantity, and condition. In many cases, additional information such as an order reference, ordered items, return reason, and name of buyer is collected at this step.

Table 5.6: Information inflow entities related to the operational steps where they are obtained, for the cases studied.

Case	Operational step	Information entity
A	Arrival	Date of arrival
	Inspection	Order reference, ordered item(s), returned item(s), quantity, condition of item(s) (and packaging), return reason
	Ext. log	Additional order specific information
	WMS registration	Product number
B	Arrival	Date and time of arrival
	Inspection	Order reference, ordered item(s), returned item(s), quantity, condition of item(s), return reason, customer ID
	WMS registration	Product number
C	Arrival	Date of arrival
	Inspection	Order reference, ordered item(s), returned item(s), quantity, condition of item(s), return reason, invoice number
	Ext. system	Name of buyer, receipt number
	WMS registration	Product number
D	Arrival	Date of arrival
	Inspection	Order reference, returned item(s), quantity, condition of packaging and item(s), batch number, date of expiry, product sterility, additional order specific information
	WMS registration	Product number
E	Inspection	Order reference, returned item(s), product number, quantity, condition of packaging and item(s), return reason, name of buyer,

Table 5.7: Information inflow entities related to the operational steps where they are obtained, for the cases studied continued.

Case	Operational step	Information entity
F	Inspection	Order reference, returned item(s), product number, quantity, condition of packaging and item(s), return reason, name of buyer
G	Arrival	Date of arrival
	Inspection	Ordered item(s), returned item(s), product number, quantity, condition of packaging and item(s), return reason, IMEI-number, name of buyer
	Ext. log	Return order number
H	Arrival	Date of arrival
	Inspection	Order reference, ordered item(s), returned item(s), quantity, condition of packaging and item(s), return reason, name of buyer
	WMS registration	Product number
	Ext. system	Additional order specific information
I	Arrival	Date of arrival
	Inspection	Order reference, returned item(s), quantity, condition of packaging and item(s), batch number, date of expiry
	Ext. log	Return order number
J	Inspection	Order reference, ordered item(s), returned item(s), product number, quantity, condition of packaging and item(s), return reason, name and email of buyer, product in assortment
K	Arrival	Date of arrival
	Inspection	Return order number, returned item(s), quantity, condition of packaging
	Ext. log	Product number

The information on ordered items, collected in Case A, B, C, G, H, and J is used to connect the returns to the purchased items to determine whether the items should be approved as a return. In Case A and H this must be done in an internal system, where the order reference is used to look up the outbound order. In Case B, C, G, and J, a pre-printed return note is used instead. In those cases, the return note is sent out together with the outbound shipment. The note contains all purchased items, implying that the returned items can be matched to the note to determine whether the returns should be approved.

Information regarding the product number of the items returned can be obtained, in inspection step, from the return note, which is the situation in Cases E, F, G, and J. However, the most common method of obtaining this information for the returned items is the bar code on the packaging, alternatively directly on the item. In those cases, the product number is derived through the EAN in the WMS. Additional information such as batch number, date of expiry, or unique item ID can also be obtained from the packaging or item.

The condition of the item is information that must be determined for all returns by the person handling the return. This information regards defects on product or its packaging. To detect any deficiencies, the personnel are (in most cases) provided with inspection guidelines. Following the operational process, the subsequent activity is the eligible refurbishing or repackaging activity. Just like the inspection, this requires guidelines to ensure that the item going back into storage are in line with what the customer desires.

Another information inflow, present in Case A, D, and H, concerns additional order specific information. Examples of such information may concern situations where there is an agreement between the direct and indirect customer, making the return process a bit different as no transactions should be triggered. Furthermore, there are other information entities which are case specific.

5.2.2 Current Information Outflow

Information entities going out from the process are listed in Table 5.8. Information exchanged in all cases regard product number and quantity, which are vital in informing the customers about the updated stock balance. The order number/reference and reason of return is present in most of the cases. The order reference, or some other order specific reference, is a vital part of the system registration process. The reason for this is that it is this part of the information that connects the return to the correct buyer, thus enabling a refund to the right buyer. The reason for return is provided as most customers requires it for their handling. Apart from the above-mentioned information outflows, some other case specific entities are also present. The outflow of information from the WMS goes via EDI. In addition to WMS registration, Case C, G, H, I, J, and K uses external systems or logs for information outflows.

Table 5.8: Information outflow entities related to the operational steps where they are conveyed, for the cases studied.

Case	Operational step	Information entity
A	WMS registration	Order number, product number, quantity, return reason, type of stock balance
B	WMS registration	Order reference, product number, quantity, return reason, time of arrival
C	Ext. system	Order number, EAN, quantity, return reason
	WMS registration	Product number, quantity
D	WMS registration	Order reference, product number, quantity, batch number, date of expiry, time of handling
E	WMS registration	Order references, product number, quantity, return reason, time of handling
F	WMS registration	Order references, product number, quantity, return reason, time of handling
G	Ext. log	Order references, product number, quantity, condition of item(s), return reason, date of arrival, name of buyer
	WMS registration	Return order number, product number, quantity, IMEI-number
H	Ext. system	Order number, product number, quantity, return reason
	WMS registration	Order number, product number, quantity
I	Ext. log	Order reference, EAN, quantity, condition of item(s), batch number, date of handling
	WMS registration	Return order number, product number, quantity, batch number, date of expiry
J	Ext. system	Order number, product number, quantity, return reason, product in assortment, name and email of buyer
	WMS registration	Order reference, product number, quantity
K	Ext. log	Quantity, date of handling
	WMS registration	Return order number, product number, quantity

5.3 Empirical Findings: Planning and Control

As of today, the planning and control of the returns processes across Schenker's sites and customers is mainly based on the knowledge and experience of personnel with competence within the field. Moreover, none, or limited information is available about returns beforehand. Instead, visual indicators such as number of packages, pallets, and cages that have arrived at the warehouse are usually used for planning. In some cases, though, e.g., for Case C and H, the personnel planning is, to some extent, based on the prognosis of outbound flows such as picking and packing. The reason is that an increase in the outbound flow entails an increase in the return flow, delayed by a couple of days. Another factor affecting the planning and control of returns is the number of stations dedicated for returns, which in most of the cases is limited to only a few.

The frequency of returns handling varies from case to case. For Case C, F, G, H, and I, the intention is to perform returns handling every day, while for Case A, B, D, E, J, and K it is a few times per week, as demonstrated in Table 5.9. This is dependent on the volumes handled, as well as time requirements set by the customer. Furthermore, a common denominator for almost all observed cases is that there are a few dedicated persons involved in the returns handling process. The roles of these persons are commonly production support, more experienced production personnel and/or CT, which either clock in on returns, or on VAS. This is one of the few information entities available for evaluation and follow-up of the returns handling process currently.

Table 5.9: List of frequency of returns handling as well as corresponding cases for which they are applicable.

Frequency	**Cases**
Daily	C F G H I
A few times per week	A B D E J K

Moreover, in most cases, there are also some type of process standard or process routine for the returns handling process. In Table 5.10, the cases which have a routine according to the process standard are listed. However, the accuracy of these varies, as some have not been updated in a while.

Table 5.10: List of routine types as well as corresponding cases for which they are applicable.

Routine type	**Cases**
Routine according to process standard	C D E F G H I K
Another routine	A B J

Furthermore, guidelines do to some extent exist for inspection, repacking/refurbishment, and disposition activities. Currently, the guidance is more of a verbal agreement than printed guidelines. Refurbish and repacking guidelines can concern the folding of a garment, the labelling, packaging, and so on. In most cases, the guidelines have been formulated by the personnel handling returns as time has passed and as new situations have occurred.

Another interesting finding from the observations is that most customers have not set as strict and clear follow-up metrics and KPIs for return flows in comparison to other flows, for instance the outbound flow. Metrics that are used in other flows, and hence desirable even for return flows according to an interview with a solution design manager, are process capacity, productivity, and lead time. Currently, the person in charge of planning the returns process for production personnel, namely a supervisor or team leader, usually considers it as a source of elasticity in the overall planning process, which can either be stretched or squeezed depending on the situation in other processes.

All of this together entail that returns processes are not prioritised or planned for as strictly as other processes, but rather performed when there is time, as long as the time requirements set by the customer are met. Thus, there is a lot of dependence on the person in charge and the information available in advance. Additionally, there are also variations between customers and sites due to this, and this inconsistency in performance measurement makes it difficult to compare, standardise and plan for returns from an overall Schenker perspective.

5.4 Empirical Findings: Benchmark

In total, four cases were included in the benchmark study and the most interesting findings are presented below. Firstly, a brief context of the benchmarked cases is presented, followed by the operational returns handling process, the information flow, and the planning and control related to returns for the benchmarked cases.

5.4.1 Context of Benchmarked Cases

First and foremost, the context of the benchmarked cases is that they all are, at least partly, active within E-commerce. In the benchmark, it was E-commerce returns that were observed. The products handled were mainly clothing, and in addition some children's items, interior and beauty products, as well as sports equipment. One major difference compared to the cases studied at Schenker is that the benchmarked cases are all using in-house warehousing, which facilitate returns handling when it comes to decisions, as they are all taken in-house as well.

5.4.2 Operational Returns Handling Process of Benchmarked Cases

The first step of all the returns processes is obviously the arrival of the returns. In most cases the returns arrive in cages or on pallets from a distributor. Usually, the load carriers are placed in an order according to date of arrival, which is also noted on the load carrier. However, one of the benchmarked cases have a separate facility for returns handling as they handle extensive volumes. Thus, returns arrive at one facility and after inspection, repack/refurbishment and systems registration, the operator places the returns on a conveyor belt that sorts them depending on sizes, and then the returns are transported to the facility where put-away takes place.

When the operators begin with the returns, they pick the parcels or the full cage from the area where they are temporarily stored, starting with the returns that arrived first. In some of the observed cases, the team leader distributes returns to the operators depending either on the date of arrival, or in some cases based on the sending country. That is because returns shipped from a country farther away takes longer time to arrive to the warehouse and thus, longer time until the consumer receives the refund. Another way of distributing returns to the operators, used by one of the benchmarked cases, is to sort the returns depending on the packaging, i.e., plastic bags, boxes, and letters. A third parameter in the sorting is to sort according to size, due to different sized products being handled and stored in different facilities.

Just like for the internal Schenker cases, the returns are opened and inspected. The aspects inspected are both that the items sent back are approved as returns and the condition of the returned items. Whether the item is approved or not is decided by matching the item and the size of the item to the return note, ensuring that the item was a part of the outbound shipment. Additional inspection regards the condition of the item returned. Firstly, an ocular inspection is conducted, ensuring that the item has no damage or dirt on them. Then, additional inspection includes ensuring that zippers work, pockets are empty, the item does not smell, and that the returned item is not a copy or fake version. An additional control that the right item had been returned appear when the items are later scanned into the WMS system, implying that any deviations from the outbound shipment is discovered.

For some of the benchmarked flows, some kind of refurbishment and/or repacking occur. Clothes can be rolled, aired in ventilation cabinets, and cleaned with cleaning wipes to make them seem as new. Then the clothes are folded and put into either the old, or in some cases, new packaging. In cases where the item misses its tag, a new one is printed and put on the item. For high-value brands the process of repacking an item can take up to three minutes.

Next up in the process is to register the return in the WMS. All the benchmarked cases have a customised returns portal connected to their WMS. One of the cases managed to get about 60 % of their customers to register their returns in the customer portal before sending the return. This imply that the first part of the registration process for the production personnel could be eliminated. The typical registration process, in cases without pre-registration from the customer, include scanning the order number on the returns note, scanning the bar code on the product, and entering a reason for return. One case had a note with bar codes for the different return reason codes, enabling scanning the code instead of typing or choosing in a roll list. After registering the returns in the systems, the products are ready for put-away. In all cases, returns are put on new locations, rather than on the original ones.

In cases of deviations, either when the product is not approved for return, or when the condition makes the product unsellable, the return requires manual handling. In all the cases, the production personnel make a note on a post-it or printed deviation template with the order number and reason for deviation. The returned product, together with the note is placed on a shelf, sorted by the type of deviation. Later, either the person responsible for returns in production, the customer service unit, or the claims unit handles the deviating return.

5.4.3 Information Flow of Benchmarked Cases

Essential information that must be available before the production can start the registration of the return is the order reference. That is, a reference which connects the return to a customer, and to a specific order from that customer. This information is vital in the decision regarding whether the return should be approved, together with the condition of the item. Another such vital information is the identification of the product returned. That is either a bar code, RFID, or some other identification method, including information on article number, size, and colour of the returned item. Some of the cases require a reason for return in addition, however, the process proceeds regardless of if the customer has stated this information.

The information above, together with the quantity of items are then registered into the WMS. After the WMS registration, the customer gets information that the return has been handled and what amount of money will be refunded. In case of deviations, information about this deviation goes to the team leader, customer service, or claims team, depending on the type of deviation. After a decision has been taken, information about this decision and further handling instructions goes back to the production and to the customer.

5.4.4 Planning & Control of Benchmarked Cases

Common to all benchmarked cases, in terms of planning and control, is that they all had a team leader responsible for returns and their handling. That person was responsible for allocating the returns to the different returns stations, manage problems or deviations in the handling, and in cooperation with personnel planners ensure that sufficient personnel was working with returns each day.

The decision on how many persons is needed for returns handling each day is mainly based on the experience of the team leader. The team leader estimates the number of returns based on the number of cages and/or pallets arriving each day. Furthermore, the team leader has some experience on how the number of returns differ over the week, and also how the number will differ depending on the number of outbound orders a number of days earlier. This means that the team leader can, to some extent, foresee the returned volumes already before arrival which ease the planning of personnel. Moreover, the case which has managed to get around 60 % of the returns to be pre-noticed by the buyer before arrival, have some further knowledge about the incoming volumes. However, this information is not used for planning purposes in the current situation.

Returns handling is in most cases a working task which new employees are not assigned. In one benchmark case, the personnel rotated between all workstations, including the returns station, whereas the other cases used a special group of their personnel to returns handling. Typically, a person starts with packing, then picking and first after having good general knowledge in the warehouse and regarding the products, moving over to returns handling.

Restrictions related to time of handling the returns are used in some cases. Beside the legal aspects, the benchmarked cases aim to handle returns in a pace which allows refunding customers in accordance with what they have promised. That is within around 3-4 days from receiving the return. The most ambitious time limit observed in one of the cases was to finish all returns during the same day as they arrive at the warehouse.

6 Analysis of the Findings

In this section, the analysis is presented. First, components that must be included in the operational process, information flow, as well as for planning and control purposes to achieve a well-functioning returns handling process are presented. Thereafter, the proposed standardised process is presented, starting with the components, followed by the organisation, formalisation, and design of the process, finished off with the effects of this.

In the context of the thesis work, a well-functioning returns handling process refers to a process that is grounded on the findings from the empirical study, presented in chapter 5, supported by findings from the theoretical study, presented in chapter 3. The empirical findings acted as a basis for the cross-case analysis where multiple cases where studied and compared to capture insights, patterns, and best practises. These could then be examined, in relation to each other, to determine key process steps, communication requirements, and planning and control activities to address in the proposal of a well-functioning returns handling process.

Theoretical findings, on the other hand, complemented the cross-case analysis by providing additional, and more detailed, perspectives as well as theoretical insights to concern in the proposal of a returns handling process. In this way it increased the validity of the result from the cross-case analysis. Based on the learning from this, the analysis resulted in the determination of which operational steps, informational exchanges, and planning and control aspects to include in the proposed returns handling process.

To be able to propose a standardised returns handling process, the well-functioning process had to be developed by including the perspectives organisation, formalisation and design, in accordance with RQ4. Key aspects to consider related to these perspectives were identified based on insights from the case study, theory, benchmark, and the workshop. In addition, the workshop contributed to the validation of the proposed returns handling process.

6.1 Analysis of the Operational Process

To describe the components of a well-functioning returns process, an initiator must firstly be defined. Rogers et al. (2002) suggest that the operational returns management process is initiated when a returns request is received from the customer, as described in section 3.2.1. The request can either be in the form of a pre-notice of the return to be sent back, or in the form of an arrival of a return without pre-notice. Pre-noticed returns occur through a consumer announcing a return to the retailer or through a marketing return from a store to the distributor. The other option is that the consumer is bringing the item back to the store or sending it back to the distributor unannounced.

In most of Schenker's return flows, the returns request is in the form of a return being sent back without pre-notice from a buyer. In some other cases, the direct customer receives a returns request from the buyer. In those cases, theoretically, the process is initiated already at the time of receiving the request. However, the operational handling process at Schenker's warehouses begin first when the physical return arrives. In most of the benchmarked cases, just like in the internal Schenker cases, the returns are sent back without pre-notice from the buyer. In one of the benchmarked cases, up to 60% of the returns were pre-noticed prior to its arrival. In that case, the handling process of the return at the warehouse was somewhat shorter, as information on return reason and returned item(s) were already available in the system. However, no action was taken before arrival and thus, the operational handling at the warehouse was initiated by the arrival of the physical return, just like in the rest of the cases.

To sum up, the empirical study shows that the initiator of the current handling process is the arrival of the physical return, which is also supported by the theoretical process initiator. This means that the initial step of a warehouse returns handling process is a merge between the first three theoretical returns management process activities. This is visualised in Figure 6.1, which shows the theoretical returns management process, presented in Figure 3.3, on the lower hand and the operational components of a well-functioning returns handling process, identified through the study, on the upper hand. The highlighted theoretical activities are the ones related to the first identified component of the returns handling process. In other words, a well-functioning operational returns handling process initiates when a return arrives at the warehouse.

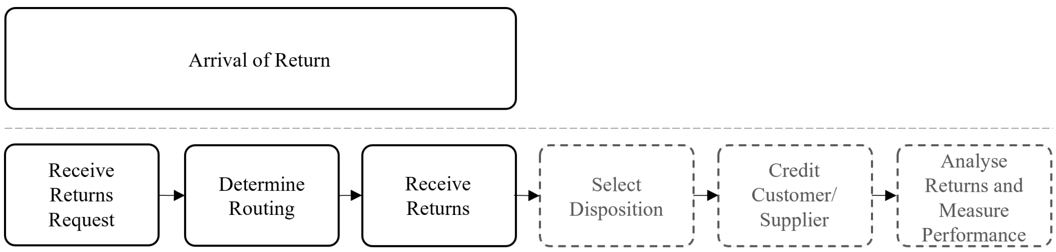


Figure 6.1: Initiator of the returns handling process in relation to the theoretical operational returns management process seen below the dotted line.

Furthermore, the execution of the arrival should contain arrival of returns to a designated warehouse gate for the specific return flow, in accordance with what Genchev et al. (2011) suggest. The gate number should be specified on the returns freight note, which in best case should be included in the outbound shipment. Furthermore, the returns should arrive sorted per customer, and not mixed. This is accomplished by using designated warehouse gates, and thus, different load carriers per gate and thereby customer. The important aspects to consider in the design of the arrival step in a well-functioning operational returns handling process are listed in Table 6.1.

Table 6.1: Aspects to consider in the arrival step in the proposed operational returns handling process.

Aspects	**Method of accomplishment**
Arrival to designated warehouse gate	The gate number should be stated on the return freight label.
Arrival sorted per return flow	Returns should arrive in one load carrier per designated warehouse gate, and hence, per customer.

The theoretical, as well as the empirical study, have shown that an inspection of the returns is required after arrival, to enable disposition selection. This implies that inspection is a vital first step after the initiating returns arrival in a well-functioning returns process. Moreover, findings from the empirical study show that any required refurbishment or repacking was conducted successfully immediately at the inspection step. Hence, in the inspection and repacking/refurbishment should be combined to one process step in a well-functioning returns handling process, as shown in Figure 6.2.

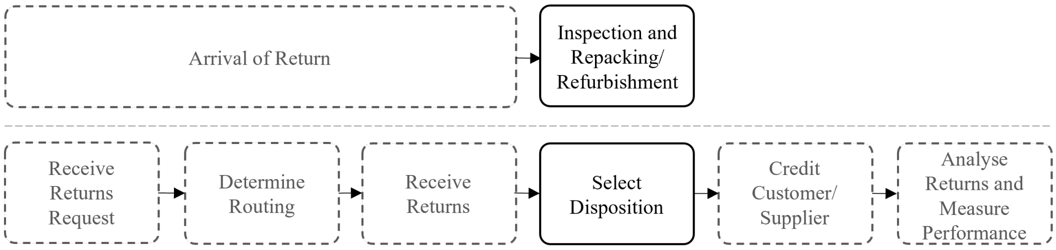


Figure 6.2: Inspection step of the returns handling process in relation to the theoretical operational returns management process seen below the dotted line.

The magnitude of the inspection in a returns handling process varies depending on the type of goods, packaging, and customer requirements, amongst others. Genchev et al. (2011) found the inspection to be the most complex activity in returns handling, due to these individual factors. Thus, inspection guidelines determine the magnitude of the inspection. Hence, the inspection guidelines should cover the inspection criteria that must be included, and these criteria should be formulated in accordance with the customers' requirements in the implementation project of the process. Moreover, disposition criteria should also be in place to guide whether a returned item should be resold or disposed in another way.

The physical elements constituting the inspection activity are scanning the order reference, scanning the product reference, and an ocular inspection of the returned item. The order reference is scanned to enable a systematic control that the return is allowed in terms of the set time limit. That is that the return has arrived within the time frame allowed by the customer. The system should be able to manage both scanning of shipment reference, outbound order reference, return order reference, or any other case specific reference which connects the return to the buyer. The product reference is scanned to enable a systematic control that the product returned was part of the outbound order or the return order, and thus approved as return. Furthermore, the systematic control should trigger a warning if there is any order or product specific information that entail that the return requires special handling. The ocular inspection determines the condition of the returned item and its packaging. The reason for return stated on the return note may guide the person in the ocular inspection. Moreover, all included activities related to the operational step of inspection are listed in Table 6.2.

Table 6.2: Activities included in the inspection step in the proposed operational returns handling process.

Activity	**Explanation**
Scan order reference	Enables systematic control that the return has arrived within allowed time frame.
Scan product reference	Enables systematic control that the returned item was part of outbound order or return order.
Ocular inspection	Determines whether the item should be resold or considered a deviation.

Hence the inspection criteria include correct customer, correct product, returned within set time limit, consumer packaging intact and product intact, clean, and without smell. For high valued items, additional inspection might be necessary to ensure that the returned item is not a fake version of the bought item.

Furthermore, the physical elements of repacking concern folding garments or clothes as well as repacking into a new bags or boxes if required. The physical components of the refurbishment steps include minor refurbishment of products, such as rolling garments or clothes, as well as minor refurbishment of consumer packaging, such as adding a bit of tape. All activities related to repacking and refurbishment are summarised in Table 6.3.

In addition, the magnitude of the repacking/refurbishment act as a basis for the pricing of the returns handling. This imply that some return flows might be more costly than others, but then also include further repacking/refurbishment activities. In flows where special additional refurbishment activities such as airing, steaming, or adding hangtags, occur for parts of the return flow, these activities should be considered VAS, and hence debited accordingly.

Table 6.3: Activities included in the repacking/refurbishment step in the proposed operational returns handling process.

Activity	Explanation
Folding	Applies to foldable items such as garments and clothes.
Repack into new bag or box	Applies in cases where the original packaging has been damaged.
Minor refurbishment of item	Includes minor touch-ups to restore the product into a nearly new condition.
Minor refurbishment of consumer packaging	Includes minor touch-ups to restore the packaging into a nearly new condition.

Theory suggest that the inspection should result in a sorting based on the determination on whether a returned product should be resold, refurbished, or disposed. The empirical study, however, showed that in practice, the inspection resulted in two flows: the happy flow and the flow of deviations. Hence, in a well-functioning returns process, the inspection should result in a sorting of the returns. In a Schenker context, where refurbishment and repacking activities are neither that time-consuming nor advanced, the items in need of refurbishment may follow the happy flow and thus be sorted accordingly. On the other hand, items that are in a condition which prohibit them from being put back into storage or returned items that should not be approved as returns, should be separated from the happy flow into a deviations handling step, as visualised in Figure 6.3.

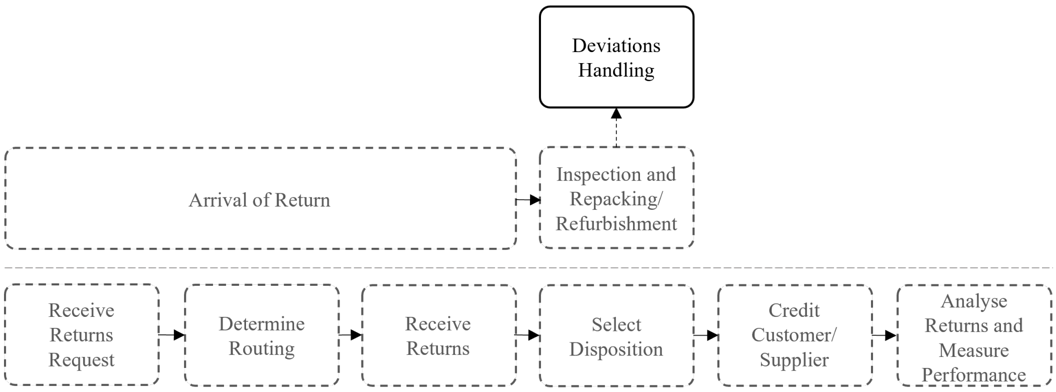


Figure 6.3: Deviation step of the returns handling process in relation to the theoretical operational returns management process seen below the dotted line.

Findings from internal cases as well as benchmarked cases have shown that the handling of deviations is best performed by personnel specialised in returns, and more particular in deviations related to returns. Hence, the returned items that imply deviations should be separated from the main handling process to a deviation handling process. To transfer the information on what type of deviation the item contains, some kind of note must be taken and brought to the return specialist. The empirical study has shown several ways of transferring such information. Either through post-it notes, deviation forms, or through an Excel log. The information on the deviation should include the order reference, product reference and reason for deviation. However, manual typing of deviations notes is time-consuming and thus, a deviation note should preferably be printed out from the system. That is that the production personnel scan the order and product references, chooses the deviation option in the system and a reason from deviation, and the note is printed. Naturally, there can be manual notes added to the printed ones, for further information. The activities related to sorting out deviations are listed in Table 6.4.

Table 6.4: Activities included in the sorting out deviations step in the proposed operational returns handling process.

Activity	**Explanation**
Printing deviations note	Select deviation, reason for deviation, and any additional comments.
Sorting the deviations	Separate the deviations from the happy flow and sort them according to the type of error.

Furthermore, some cases included in the study include sorting depending on the type of deviation and depending on who should handle that specific type of deviation. The different types of deviations are returns that deviate from the return order, has defect products, or products unauthorised as returns, for example due to exceeding the time frame set for returns by the customer. Furthermore, the error can be due to the handling in the warehouse, the supplier, the transporter, or the buyer. Hence, the deviations flow should be divided according to this. Additionally, in a pricing context, the happy flow should be defined and thereby unit pricing can be used, whereas hourly price should be applied to deviations.

According to theory, customer credit and performance measurement are suggested as the final steps of the operational returns process. In practice, however, the empirical study shows that in a 3PL context, the last vital step is the WMS registration. In fact, WMS registration is closely related to both credit customer and performance measurement. It is the system registration that triggers the data transfer to the customers' systems, which then enable the customer credit. In addition, the performance evaluation is based on key metrics, which are based on data entries from the registration. Hence, the physical step of system registration in the returns handling process in a 3PL warehouse replaces the theoretical steps of customer credit and performance measurement, as shown in Figure 6.4. Moreover, the physical registration process differs between the analysed cases. However, including the system registration has been proven vital in any well-functioning returns process.

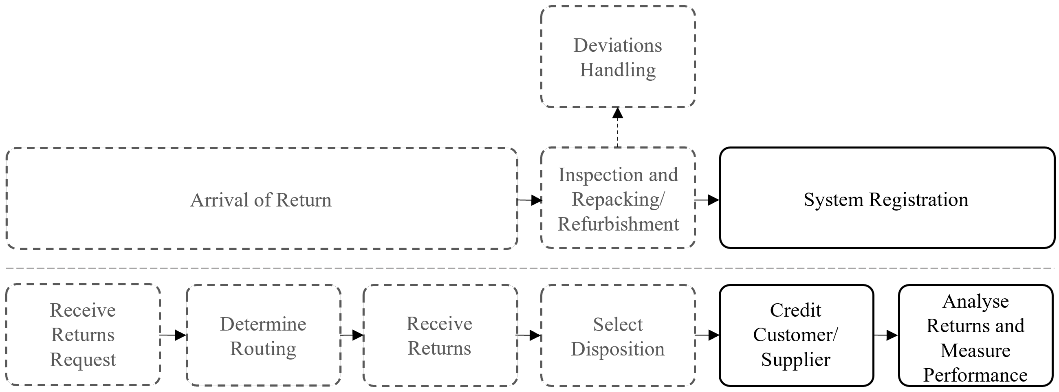


Figure 6.4: System registration step of the returns handling process in relation to the theoretical operational returns management process seen below the dotted line.

Findings from the empirical study have shown various alternatives for the design of the WMS' returns interface. Theory, however, states some desirable aspects. Firstly, a separate returns module is beneficial as the returns registration differ from the in- and outbound flows. In the benchmarked cases, such separate returns module is used, implying an efficient registration process. Hence, a returns specific WMS interface should be used in the returns process. Furthermore, Faber et al. (2002) stress the importance of connection between the WMS, ERP, and other systems, such as identification systems. In the 3PL context, this implies a connection to external customer systems. As EDI offers accurate and timely information sharing between different tiers in the SC (Mossinkoff & Stockert, 2008; Rushton et al., 2017), this, or similar instrument, is beneficial to use in a well-functioning returns process.

Since the order and product reference have already been scanned into the system in the inspection step, the additional activity to update the stock balance is the input of quantity and reason for return, as can be seen in Table 6.5.

Table 6.5: Activities included in the system registration step in the proposed operational returns handling process.

Activity	**Explanation**
Update stock balance	Input quantity, reason for return, and any required product specific information.

Moreover, empirical findings from benchmarked, as well as internal cases, have shown that the WMS interface must be compatible with information collection, and sharing, regarding batch numbers, expiry dates, and IMEI-numbers. The findings did also show that handling time of the return benefit from a limited need for manual data input. Hence, the WMS set-up should enable scanning bar codes for data inputs such as order identification, product identification, and return reason. Also, the system should register time of arrival and time of handling without manual input. The system should also register the reason for deviation for follow-up purposes, and there must be a function to register that a return has arrived although the item returned is not resalable. In addition, some cases have shown special solutions adapted to the specific flows, implying that the system or module used must allow some modifications. A summary of the necessary WMS functions related to each step and each activity are presented in Table 6.6.

Table 6.6: Summary of essential WMS functions related to operational steps and events, in a proposed returns handling process.

Operational step	**Event**	**WMS function**
Arrival	Arrival of returns	Register time of arrival
Inspection and repacking/refurbishment	Scan order reference	Matching shipment number, order number, or return order number to an outbound order or a return order and thereby determine whether the return has arrived in time.
	Scan order reference	Matching EAN or product number to an outbound order or a return order and thereby determine whether the returned item is a part of the outbound/return order.
System registration	Update stock balance	Update stock balance according to quantity. Register information on return reason and any required additional product specific information.
	Information transfer	Transfer information externally and internally.
Deviations	Printing deviations note	Print note according to scanned order and product references and chosen type of deviation.
	Follow-up of deviations	Register type of deviation
	Returning nonsalable items	Register returns without updating the stock balance.

After registration in the WMS, entailing adjusting the stock balance in the system, the operational process terminates and the put-away process initiates, as shown in Figure 6.5. Thus, the ultimate step in a well-functioning returns process is either an immediate transportation to a storage location, or a temporal storage, where the item awaits put-away, entailing the physical stock balance to be adjusted as well.

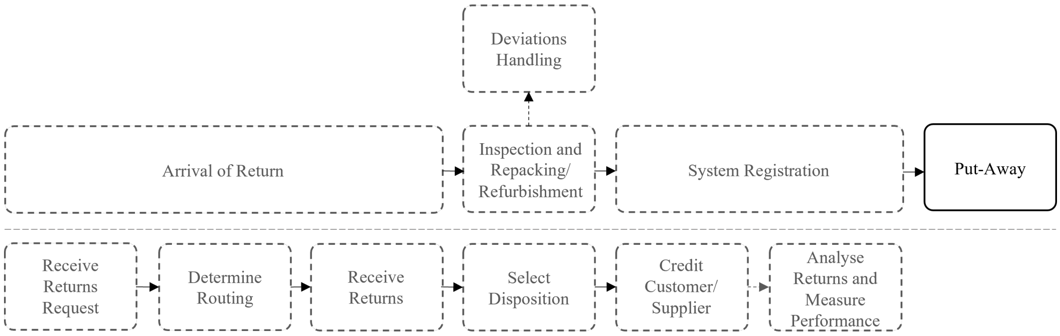


Figure 6.5: Put-away step of the returns handling process in relation to the theoretical operational returns management process seen below the dotted line.

6.2 Analysis of the Information Flow

The empirical study shows the problems of planning when not having adequate information prior to the arrival of returns, as highlighted in section 5.3. Thus, a well-functioning returns handling process should include an information inflow regarding the number of returns on the incoming load carrier. Furthermore, the information should also cover what type of return is considered, i.e., whether it has been collected by the buyer or not. Such information should automatically be provided by the distributors, through EDI (or similar), prior to the arrival of the returns. This information can improve the ability to plan for returns and thus also the efficiency of the returns handling.

Theory suggests that routing should be determined for the individual returns. Nevertheless, in a 3PL context, the routing is determined by the customer and thus not a vital part of the operational returns process. The empirical findings show no involvement in the determination of routing. However, as theory suggests, some parts of the routing determination should be addressed also from the 3PL perspective. Genchev et al. (2011) stress the importance of sufficient communication on routing to the buyer. To improve the communication regarding routing in practice, a return freight label should be available for all returns. This return freight label should include a specific warehouse port for each customer, entailing that returns are sorted depending on the different customers, and also arriving at the same port each time.

Empirical evidence indicate that the date and time of arrival is essential information to include, as the majority of the studied cases include such information, which can be seen in Table 6.7. However, as opposed to the current situation, where the date/time of arrival is manually noted, it should already be printed on all parcels/pallets upon arrival, if this information is required by the customer.

In the inspection step, a number of information entities must be available, or possible to determine. First and foremost, to minimise miscommunications regarding what order and product that has been returned, a pre-printed return note should be included in all outbound E-commerce shipments. From this return note, as well as through ocular inspection, information regarding returned item(s), condition of packaging and item(s), quantity, product number, order reference, and return reason, must be obtained. This is evident in all the cases, with a few exceptions, as can be seen in Table 6.7. In the empirical study, other information entities are also present, however, these are either highly case specific, such as the IMEI-number for Case G, or possible to obtain through other information. The name of the buyer and ordered item(s), used by 6 out of 11 cases, are examples of information that could be obtained through e.g., the order reference, and not as specific information entities. The benchmarked cases further emphasise the importance of the above-mentioned information, as order reference, information regarding the returned item, such as article number, condition, return reason, and quantity, are all necessary.

Table 6.7: Compilation of information inflow entities related to operational steps as well as corresponding cases for which they are obtained, identified through the empirical findings.

Information entity	**Operational step**	**Case**
Returned item(s)	Inspection	A B C D E F G H I J K
Condition of packaging and item(s)	Inspection	A B C D E F G H I J K
Quantity	Inspection	A B C D E F G H I J K
Product number	Inspection, WMS registration	A B C D E F G H J K
Order reference	Inspection	A B C D E F H I J
Date of arrival	Arrival	A B C D G H I K
Return reason	Inspection	A B C E F G H J
Name of buyer	Inspection, ext. system	C E F G H J
Ordered item(s)	Inspection	A B C G H J
Additional order specific information	Inspection, ext. log, ext. system	A D H
Batch number	Inspection	D I
Date of expiry	Inspection	D I
Time of arrival	Arrival	B
IMEI-number	Inspection	G
Customer ID	Inspection	B
Invoice number	Inspection	C
Receipt number	Ext. system	C
Product sterility	Inspection	D
Email of buyer	Inspection	J
Product in assortment	Inspection	J

On the contrary, the system registration step mainly concerns information that must be conveyed by Schenker to the customer, to enable credit the right buyer. Hence, the information exchange related to the system registration step regard the information outflow. The information entities constituting the information outflow identified in the empirical findings are compiled in Table 6.8. As can be seen in the table, the product number, quantity, order number/reference, and return reason are entities included in the outflow in close to all studied cases. Thus, this type of information should be included in the outflow of any well-functioning returns handling process.

Table 6.8: Compilation of information outflow entities as well as corresponding cases for which they are conveyed, identified through the empirical findings.

Information entity	**Case**
Product number	A B C D E F G H I J K
Quantity	A B C D E F G H I J K
Order number/reference	A B C D E F G H I J
Return reason	A B C E F G H J
Return order number	G I K
Time of handling	D E F
Date of handling	I K
EAN	C I
Batch number	D I
Date of expiry	D I
Condition of item(s)	G I
Name of buyer	G J
Email of buyer	J
Type of stock balance	A
Date of arrival	G
Time of arrival	B
IMEI-number	G
Product in assortment	J

Additional information entities that are conveyed from the system registration step concern return order number, date, and time of arrival and of handling, and information specific for a product or order. The return order number is somewhat equivalent to the order reference in the context of information outflow with the aim to credit customers, as this is a key to connect the return to a buyer. Therefore, this information entity should be treated similarly to the order reference in a well-functioning returns handling process. The time and date of arrival is information that should be available in the system, and it should therefore be transferred to the customer without any manual input. In a similar matter, the information regarding time and date of handling of a return, is a piece of information that arises with the process. More specifically, the system should register when the return is handled and thus, the information is available in the system and does thereby not need any manual typing. Product or order specific information such as batch number, expiry date, IMEI-numbers, and type of stock balance should be used for products and orders that require so. As this is information necessary in the WMS, the information is available and can easily be transferred without any further manual input.

Regarding the different solutions of system registration in the empirical findings, and hence information outflow, all the studied cases used WMS registration, at least partially. Additional information entities which are not exchanged through the WMS, but through an external system/log include EAN, condition of items, name, and email of buyer, and whether the product exist in assortment or not. However, these information entities are exchanged in no more than two cases at most, which indicate that there are other ways of managing such information. The EAN is strictly connected to the product number and thus exchangeable via the WMS. In all cases except Case G and I, which include condition of item in the external log registration, the condition determines whether the item should be put into stock or handled as a deviation. Hence, in a happy flow of a well-functioning returns handling process, the condition of item can be excluded from the information out-flow. That is since all returned items following the happy flow are in a condition enabling reselling of the item. Furthermore, the name and email of a buyer can be derived from the order reference and returned product that is not in the assortment should be considered a deviation. For that reason, these information entities should be excluded from a well-functioning returns handling process. Based on the above, an external system or log registration should not be necessary in a well-functioning returns handling process, from an information outflow perspective.

In all the cases, information transferred from the WMS was using EDI as transferring method. Furthermore, Mossinkoff & Stockert (2008) suggest that EDI is a flexible and transparent method of information exchange between different tiers of the supply chain. Therefore, outflow of information in a well-functioning returns handling process should, exclusively, be transferred automatically from the WMS to the direct customer through EDI (or similar), to minimise the handling time of the return in the happy flow. However, whenever extensive deviations occur, a more manual handling may be required, as well as involvement from the customer, and thus EDI might have to be complemented with direct contact.

In addition to the information transferred to the customers, information exchange in relation to the system registration step also concerns evaluation and measurement of the returns process, used by Schenker internally. Empirical findings emphasise the evaluation related to productivity and lead times. Hence, a well-functioning returns handling process should contain an information outflow with data on number of returns handled, as well as both time of arrival and time of handling. Moreover, evaluation of the distribution between happy flow and deviations, as well as picking errors, claims, and transport damages, are also highlighted as important in the cases. The first mentioned metric can be derived from the information on return volumes, in combination with information on the number of returns requiring deviation handling, which is available from the system registration step. Picking errors can be derived from the return reason, together with some information on stock balances and outbound orders. Hence, the cases may come across as very case specific as there are a lot of different information entities for essentially the same thing. However, this case specificity often stems from the limited standardisation, rather than customer demand.

6.3 Analysis of the Planning & Control

The planning and control of the returns handling process must be adequate if wanting to achieve a process that is well-functioning. Since both theory and the empirical study of the cases emphasise the complexity of the inspection step in the returns handling, proper control is important. This part of the returns handling is complex both because of customer specific processes and procedures, and also because information regarding the return provided by the buyer can differ from the actual return. Thus, inspection guidelines play a vital role in a well-functioning returns handling process. The guidelines must also include information on how to manage repacking/refurbishment and disposition. Due to the customer specificity, the guidelines must be developed in accordance with the direct customer.

To enable a higher degree of control, as well as facilitate the planning of returns processes, performance measurement must be in place, as you cannot manage what you cannot measure. This is also emphasised in the empirical findings where clear metrics and KPIs are lacking. Metrics that should be used to evaluate the returns management process are return volumes, type of returned products, value of returns, return rates, and resource utilisation/cycle time, which both refer to the time consumed per return handled (Genchev et al., 2011; Rogers et al., 2002).

The three metrics product type, returned value, and rate of returns, are connected to the strategical level of the process, determined by the customer to the 3PL company. However, the metrics related to the returns handling process in a 3PL perspective are volumes and resource utilisation/cycle time. The metric return volume includes both overall incoming volumes, as well as a distinction between the two types of returns, i.e., collected by buyer or not, as this is retrieved from distributors. This can help indicate workload and thus facilitate planning. Furthermore, empirical findings emphasise the importance of establishing metrics to determine capacity, productivity, lead time, and fulfilment of customers' time requirement for returns handling. Productivity can be equated with the metric resource utilisation/cycle time, mentioned by Genchev et al. (2011), as it is two ways of measuring the efficiency and effectiveness. Productivity refers to number of returns handled per unit of time, while resource utilisation/cycle time refers to time spent per return. Therefore, in a well-functioning returns process, return volumes, capacity, productivity/resource utilisation/cycle time, lead time, and level of time requirement fulfilment should be measured and evaluated. The definitions and area of use of the metrics are presented in Table 6.9.

Table 6.9: List of metrics, their definitions, and purposes, to be included in the planning and control of the proposed returns handling process.

Metrics	**Definition**	**Purpose**
Return Volume	Number of incoming returns per day.	Facilitates forecasting, planning and analysis over time.
Productivity	Return handling volume per unit of time. Including return orders and return order lines per unit of time.	Measure the efficiency and effectiveness of the process.
Cycle Time	Time consumed per handled return. Including time per return order and per return order line.	Measure the efficiency and effectiveness of the process.
Capacity	Maximal return handling volume per unit of time.	Evaluate whether the process performance is sufficient for the return volume.
Lead Time	Standardised process time consumption, i.e., time between the arrival of the return and the fulfilment of put-away.	Measure the efficiency and effectiveness of the process, including temporary storage.
Level of Returns Handled in Time	The percentage of returns that are handled within the time limit set by the direct customer.	Continuous evaluation of the level of returns handled in time.

For evaluation and follow-up reasons, mainly for internal use at Schenker, metrics regarding the distribution between happy flow and deviations, as well as picking errors, are also beneficial. These metrics can be derived from already available information, as mentioned in section 6.2.

Nonetheless, uncertainty is high for returns management (Duong et al., 2022; Dyckhoff et al., 2004), for instance due to the lack of available information, which constrains the possibility for planning and scheduling, as shown in the empirical findings. Yet, returns management cannot be treated as a side business performed whenever there is time, which is emphasised by theory as well (Cooper et al., 1997). Instead, there should be a dedicated returns handling process, where thorough planning and scheduling permeate the entire process, both on a tactical, as well as operational, level. This should be based on a combination of experience, prognosis, information, and the established metrics mentioned above. The information should cover e.g., upcoming sales and promotions, which usually affect the level of returns, and number of arriving returns from distributors, as mentioned in section 6.2. Prognosis discussions should be covered during customer meetings, to achieve forecasts similar to the ones for e.g., inbound or outbound flows. These should be refined over time, to include different perspectives and information, such as how different sales or seasons affect return rates.

Additionally, investments in IT systems must be made to facilitate the highly relevant and needed information exchange between actors of the returns handling, and functions required to achieve a well-functioning process. However, it is of utter importance to have a clear understanding of what customers actually value and require, to make proactive investments in the right areas, meaning that customer value will be created, and thus also competitive advantage.

6.4 Standardised Returns Handling Process

A standardised returns handling process is presented below. It contains all the previously mentioned components that a well-functioning returns handling process should contain, both physical components, information flow related to each of the steps, as well as standardised methods to plan and control the process. Furthermore, the organisation of the standardised process is discussed, followed by formalisation, including supporting guidelines, as well as the design of the process.

6.4.1 Components of the Standardised Returns Handling Process

The operational process is presented in Figure 6.6. The initiator is the arrival of the physical return, as discussed in section 6.1. The main step of the process is the inspection step where the return is inspected, and any required repacking or refurbishment is conducted. All returns which are approved in the inspection proceed to the system registration step, and then to put-away. The returns which are denied in the inspection step proceed to a deviation handling step.

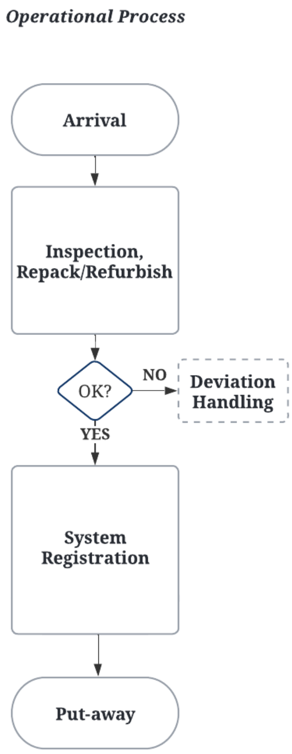


Figure 6.6: Operational steps of the proposed standardised returns handling process.

Information is required related to the operational steps. The in- and outflow related to these process steps are listed next to the steps respectively, in Figure 6.7. Arrows next to the information entities represent whether the information is collected into the process, i.e., the first two, or conveyed from the process, i.e., the last one. The information inflow related to the arrival of returns consist of number of incoming returns, which should be obtained already before the arrival of the actual shipment, and time of arrival. However, most of the information used in the process is collected in the inspection step where the parcel containing the returned item is opened. The information entities obtained from the opening and inspection of the return are order reference, product reference, product quantity, condition of product, reason for return, and any other product specific information.

The information outflow consists of information necessary to the customer which has proven to be the order reference, i.e., order number or any other reference to the returned order, the product reference of the returned item, the product quantity, reason for return, as well as time of arrival and handling. In addition, if the returned item requires any product specific information, such as batch number or expiry date, this is added.

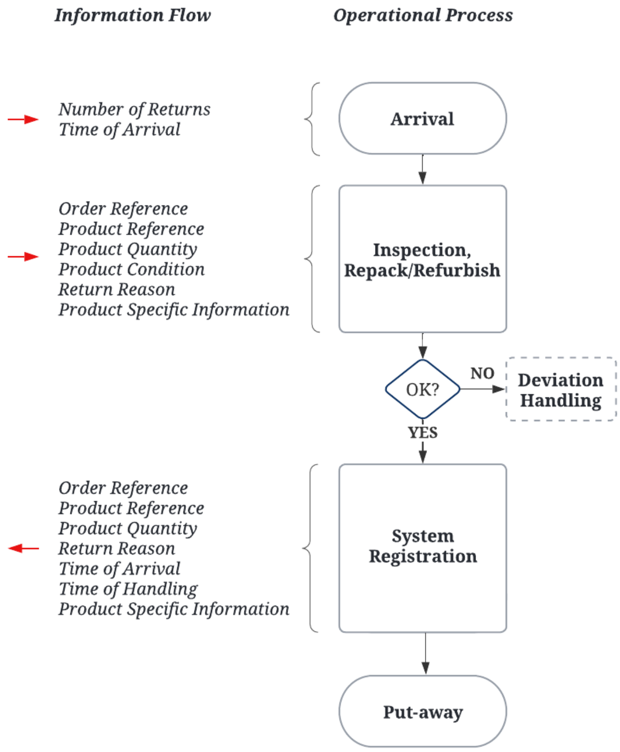


Figure 6.7: Operational steps and information exchange of the proposed standardised returns handling process.

Planning and control components in a standardised returns handling process aim to guide the process and constitute comparable performance measurement methods. The planning and control components which should be included in a standardised returns handling process are listed in Figure 6.8. The guidelines should cover inspection, repacking/refurbishment, and disposition. To enable follow-up and evaluation of the process, standardised performance metrics should be set. These metrics should then be used continuously, and for different customers, to enable comparing the performance of different flows over time. The metrics which should be used for all returns handling processes are return volume, productivity, cycle time, capacity, lead time, and level of returns handled in time, in line with the discussion in section 6.3.

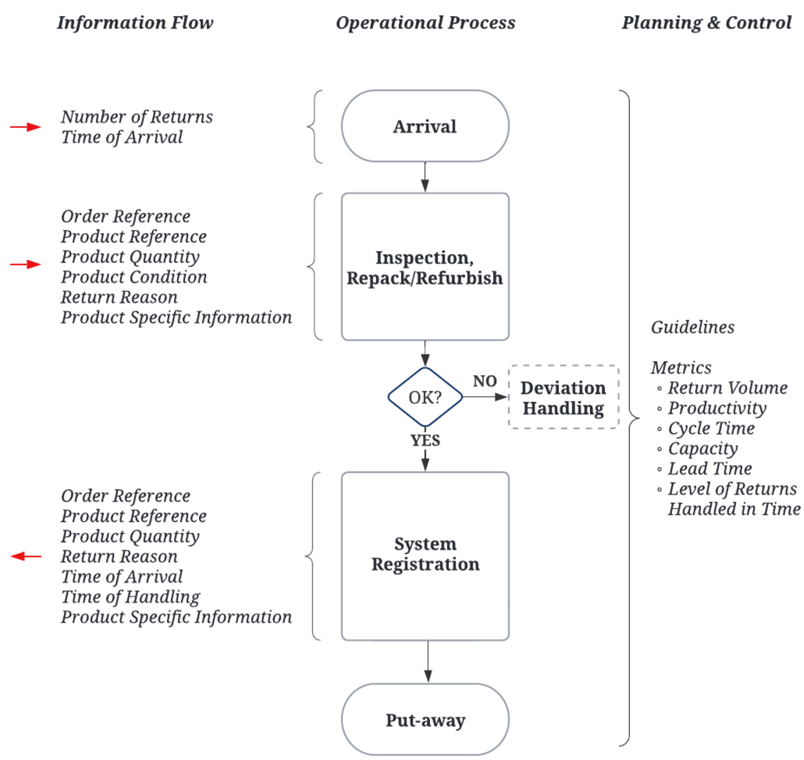


Figure 6.8: Operational steps, information exchange, and planning and control aspects of the proposed standardised returns handling process.

6.4.2 Organisation of the Standardised Returns Handling Process

The organisation of a standardised returns handling process and its management should have a clear structure. Empirical findings from the benchmarked cases have underlined the importance of having a person responsible for returns for each customer, referred to as a returns responsible. This person must be available and work closely to warehouse operations and the production personnel. Apart from scheduling and allocating resources correctly, the returns responsible should also have mandate and knowledge to solve issues or questions regarding deviations. Although guidelines are the decisive factor for when to involve the customer in deviations handling, the ambition should be to only involve the customer for odd deviations, whereas all other deviations are managed by the returns responsible. To achieve this, the customer should be highly involved in the implementation phase, to set the clear enough guidelines.

Regarding the organisation of production personnel in returns handling, the empirical findings on the time spent on returns presented in Table B.1 show that the handling time per return decreases with an increasing number of returns handled. This might be due to factors such as the individual learning curve, which refer to the fact that the people involved in the returns handling process becomes faster in their handling when they have more returns to manage. Moreover, the returns personnel should have knowledge on how to perform most tasks, including administrative tasks if required. This eliminates the need for a separate administrative function in the happy flow, which has proven to be an issue in some of the observed cases. Hence, the personnel working with returns must be properly educated, experienced, and equipped with clear guidelines, as expressed by Rogers et al. (2002). However, in situations where deviations occur, especially such deviations that require contact with direct and indirect customers, the returns responsible, and for larger flows possibly a few others with the correct competence, should handle the communication. This entails that the deviations flow should be separated from the happy flow.

6.4.3 Formalisation of the Standardised Returns Handling Process

Formalisation is beneficial to enhance the learning process for new personnel. To reap these benefits, and to ease the transition if moving from one returns handling process to another, detailed and standardised routines should be in place. For the same reason, the structure of the guidelines should be standardised as well. That is, the format of the guidelines should be the same for all return flows, as well as explicit and detailed. In addition, the interpretation of both guidelines and routines is facilitated by visualisation and thus, images and colours should be used to guide the reader.

Concerning the content of the guidelines, they aim to guide the inspection, repack/refurbishment, and disposition. Due to the complexity described in theory, and confirmed in the empirical study, a specific set of inspection criteria cannot be determined for any returns process. However, various inspection criteria that could be identified in several of the cases cover both determining whether the returned item can be approved as a return, as well as criteria regarding the condition of the item. Guidelines related to the decision regarding whether an item can be approved as a return is in theory referred to as gatekeeping guidelines. Moreover, guidelines related to the disposition, which in turn is closely connected to the condition of the item, is commonly referred to as disposition guidelines.

Rogers et al. (2002) suggests that guidelines must be established in the strategic part of the returns management process to support the operational handling. Hence, guidelines on inspection criteria, covering both gatekeeping and disposition should be formulated in the strategic part of the standardised returns handling process. This should be done in collaboration with the customer, to ensure that customer demands are considered, which, according to Slack et al. (2016) is important in CRM. Following this, sub-optimisation can be avoided.

Moreover, formalisation is beneficial not only for individual learning, but also for organisational learning purposes, as standardisation facilitates improvement and learning from previous experiences, something that is emphasised in the theoretical findings. To formalise the returns handling process, the guidelines must be visual, continuously updated, and standardised, i.e., meaning that they should be designed the same way for all customers. Furthermore, they must be comprehensive, yet reasonable for what is possible to execute in the returns handling process, and thus, the aspect of developing them in close collaboration between the 3PL and the customer is vital.

6.4.4 Design of the Standardised Returns Handling Process

Regarding the design of the process execution in the warehouse, the entire process should be separated from the in- and outbound flows, as this, according to the empirical findings, as well as Rogers et al. (2001), increases efficiency and effectiveness. Thus, there should be a number of stations dedicated to returns handling. However, there are fluctuations of the return flow similar to the fluctuations of the forward flow and therefore, mobile stations that can be used whenever needed should also be available. Additionally, equipment that must be available at each handling station are computers, bar code scanners, printers, and deviation notes. Also, some flow specific equipment such as tools for refurbishment and appropriate packaging material, should be provided at each station for the specific flow.

Furthermore, to ease the handling, the order reference and product number should be printed both in digits and with a bar code. This enables the production personnel to scan the information and thereby increases handling speed, while minimising typing and errors that could follow from manual typing. Another function that minimises errors and thus should be available is that after scanning the product number, a picture of the product should appear on the screen. Moreover, clear, and updated information, in the form of guidelines, covering inspection, repacking, possible refurbishment, and disposition must be provided by the customer.

In addition, the standardised returns handling process requires certain IT investments, for instance in WMS functions/modules that support operations and facilities information exchange required for planning and control purposes. Thus, also increasing efficiency and effectiveness of the returns handling.

6.4.5 Effects of the Standardised Returns Handling Process

A comparison of the empirical and theoretical findings has enabled an analysis regarding the possible effects of the proposed standardised returns handling process. Such effects regard effectiveness and efficiency related to productivity as well as customer relationships. In addition, the level of standardisation has been analysed and the results are presented below.

First, it is possible to decrease the number of operational steps that must be included in a returns handling process. Thus, effectiveness can be increased, as only the appropriate steps are included. Furthermore, the cross-case analysis enabled to increase efficiency as well, as patterns, critical characteristics and best practices of how these steps should be conducted could be identified. This is also in line with what theory says, i.e., that standardisation of returns processes decreases the time-consumption, while also aiding the detection and avoidance of errors (Rogers & Tibben-Lembke, 1998).

In the current situation, the use of guidelines formulated in collaboration with the customer is limited, which entail that there is room for improvement. Development of such guidelines can increase effectiveness in terms of customer relationships and communication. That is due to the mutual agreement on the amplitude of the returns handling and thereby avoidance of sub-optimisation. This enables exclusion of activities which do not bring any extra value to the customer, something that is emphasised as important by Slack et al. (2016). In addition, it could be concluded from the empirical findings that the use of multiple systems can be excluded. Hence, the way of communicating is limited to one channel in the happy flow, which increases the customer communication efficiency.

Moreover, with a standardised returns handling process, effects of for example organisational learning facilitate the productivity as well as communication, since knowledge from previous experiences is captured and utilised, as emphasised by Pyanyides (2007). Furthermore, the level of standardisation in the proposed process entails that it can be applied to various customers, existing, as well as new. This, since it rather guides the implementation of new processes than restricts it, as it still allows for case specific adaptation by adding components to the process. Although various case specific factors have been presented in the empirical findings, standardisation is still applicable, as there are indications that most of the case specificities in the returns handling processes are not actual customer demands, but rather a consequence of limited standardisation. To summarise, it can be concluded that the standardisation of the returns handling process can increase both efficiency and effectiveness of the process.

7 Discussion

There are numerous topics regarding the returns handling process that are interesting to discuss. The most relevant ones are covered below, including applicability of the findings as well as research methodology and fulfilment of the aim. Also, a discussion on sustainability in connection to the thesis work is provided. At the end, future recommendations are suggested.

7.1 Applicability of Findings

In the proposed solution, pre-notification of returns from consumers is not included. However, it would be desirable as this allows for information to be exchanged between the consumers and Schenker in advance of the actual arrival of the return. For instance, covering the return reason and the number of items in the parcel, which, together with the information from distributors, can counteract the uncertainty of incoming return volumes, including time of arrival, to a substantial extent. This can facilitate the planning of resource requirements for the returns handling process. Information on whether the return has been collected by the buyer or not, can further facilitate the planning. Moreover, it would also enable gatekeeping, as it would allow for identification of returns that are not accepted, or should not be handled for any other reason, even before they enter the warehouses of Schenker.

Nevertheless, it is rather difficult for a 3PL provider to demand pre-registration from consumers, since such requirements on consumers must come from a strategical level, i.e., from the customers of Schenker. Furthermore, even when pre-registration prevails, it is uncertain if the information available from this can be utilised properly, as it requires a high enough level to be valuable for the planning and organisation of the returns handling process. An example of the difficulty of achieving a high level of pre-registered returns is the benchmarked case where they, quite successfully, introduced the pre-register function. Yet, the level stagnated at around 60%. Thus, this has not been included in the proposed returns handling process.

Another discussion in terms of the applicability of the findings concerns EDI. To make use of such communication in the best possible way, the format must be highly standardised. This is more challenging in contexts where a lot of different actors are involved, such as for Schenker, as they have communication and information exchange with customers that all have their own demands. Thus, the ability to achieve such standardisation for communication will have an impact on the applicability.

If taking a more strategical perspective, organisational learning is truly relevant. As Schenker has experience from various contexts, there are a lot of experiences to reap the benefits of organisational learning from, which thus can strengthen their competitive advantage further. This is not only beneficial for existing customers, but also for new customers. If having established a well-functioning standardised returns handling process, it can actually have positive effects both on productivity and customer relationships. Since customers often turn to 3PL providers to get a suitable logistics solution, while not requiring much input or knowledge from their side, it is most likely appreciated if a well-developed and well-proven process is already available. At the same time, a standardised process implies a higher level of productivity, as previously discussed. Thus, the balance between customer demand and productivity is most likely easier to achieve if applying a standardised returns handling process.

Nevertheless, there are some potential risks of implementing a standardised returns handling process. Although the intention with the process is to provide the customer with a well-developed, well-functioning process that is possible to adapt, there might be the risk of having to put certain requirements on the customer, which could entail some conflict of interest. However, as one size does not fit all, meaning that customers will always have some specific requirements, there should be different degrees of standardisation, or rather flexibility and the possibility to adapt the content of the proposed standardised returns handling process to some extent, although at a cost, if the findings should be applicable.

Another strategic discussion regards whether to centralise the returns handling or not. This is mainly on a site level, meaning that all customers in one site are managed at the same location of the warehouse. Centralisation is favourable for achieving economies of scale and organisational learning. Nonetheless, there are numerous obstacles that must be overcome if it should be relevant. Primarily, a decision on where to put the centralised returns handling station must be made. As Schenker's sites are between 15 000 - 40 000 sqm, the transport distances may become long and time-consuming. It could be easier for implementations at new sites though, as the design can take this premise into consideration from the start. Moreover, if the products span a wide variety of categories, the requirements on repacking material, refurbishment tools etc. may become extensive. Also, the knowledge required for managing such a variety of products may become too complex, as the requirements likely vary between different customers. Thus, an idea could be to centralise the returns handling, but divide it into different categories depending on product characteristics.

In order to handle peaks and match the capacity promised to the customer, scalability is important. In the context of the proposed standardised solution, there are several discussion points regarding this. One of them is that the physical handling should be possible to separate from the system registration during peaks. This opens up the possibility for more operators to perform the time-consuming activities, such as repacking and refurbishment, while the system registration is performed by fewer operators, thus improving the computer utilisation. During exceptional peaks, such as Black Friday, there should be mobile computer stations available though, as previously mentioned. These should be shared between the return flow and the forward flow, to make the investment worthwhile.

Another point concerning scalability and separating the flow is that in the standardised returns handling process, some of the physical steps must be possible to separate, thus also opening up the possibility to introduce less experienced personnel which can perform the less advanced tasks. This is advantageous during peaks to manage high volumes. During business as usual there should, of course, also be elasticity to some extent, meaning that the process should be able to handle some fluctuations in the return flow.

Furthermore, for the findings to be useful, appropriate IT systems must be in place. This means that investments must be made in developing the current WMS system, or in buying already existing returns modules that can handle the functions required by the standardised returns handling process.

7.2 Research Methodology and Fulfilment of the Aim

The research methodology, its quality, as well as its ability to enable a fulfilment of the research questions, and thus the aim of the thesis, is discussed below. Topics covered are data sources, quality of observations, quantitative data, number of cases included, and workshop as a validation method.

Data was collected through various complementary sources. The literature was rather comprehensive including theory from books as well as research papers and some internet and newspaper articles. Hence, the theoretical data collection can be seen as sufficient to act as a basis for the analysis. Empirical data was collected primarily through observations of the current returns handling processes. However, the findings from the observations were complemented with more in-depth interviews, as well as secondary data and benchmarks. Considering that the analysis was based on multiple cases and data collected from multiple sources, the conclusions from the thesis should be regarded as reliable.

Theory regarding methodologies using observation as a part of the data collection methods suggest that the findings of the observations should be discussed with either the person being observed or another person with knowledge within the process or activity studied. To ensure the validity of the findings from the observations, a dialogue was held through the observation were the person being observed got to confirm the process steps and elaborate in occasions when needed. Furthermore, the findings from the observations were discussed in brief with supervisors and Operations Excellence Engineers to confirm the take-aways further.

The quantitative data collected in an early stage of the thesis work showed some inexplicable variations which can be assumed to be misleading. The reason might be that the collection of that data was gathered from different persons which may measure the time, and hence performance, of the processes differently. However, the aim of the quantitative data collection was mainly to get a brief idea on the productivity of the current returns handling processes, as well as to identify which cases to include in the study. Thus, these potential misleading variations should not have had any effect on the neither the analysis nor the conclusions of the thesis.

Given the time available, the extent of the number of internal cases included in the observations, i.e., 11, was sufficient. Also, theory suggest that a range between 6 and 10 cases is generally appropriate in a multiple case study, thus supporting this decision further. Nevertheless, to extend the analysis beyond the context of Schenker, 4 benchmarked cases were also included, which can be argued to improve the quality of the methodology as well.

Furthermore, a workshop was held to validate the findings of the thesis work. This included actors from Schenker with various positions and perspectives, thus validating that the findings were applicable and reasonable, while at the same time extending the perspective to some degree. This, together with the previously mentioned aspects, helped establishing a satisfactory quality. Thus, it can be said that the research methodology, and the quality of it, was sufficient to achieve the aim of the thesis work successfully.

7.3 Sustainability

With respect to sustainability and the triple bottom line, the findings of the thesis work may have several implications, although it was not the focus area. Concerning the economic aspect, a standardised returns handling process can entail an enhanced profitability due to lower costs. This may be stem from improved customer relationships, a higher productivity, or a combination of both, entailing a higher competitive advantage. Moving on to the social aspect, the findings may lead to an improved working environment for employees. This, since the employees will be properly educated, as well as provided with clear routines and guidelines. Moreover, a better planning and organisation of the process may reduce the stress, and thus increase the well-being. Finally, the environmental aspect, which is quite naturally affected. Although reducing the returns volumes is out of the scope of the thesis, putting the returns process under scrutiny may still lead to such outcomes. Furthermore, making the process more effective and efficient has environmental benefits, as resources are better utilised. This is also connected to the development of gatekeeping and disposition guidelines, which can improve the way in which returns are managed both before coming into the warehouse, as well as when they should be disposed.

7.4 Future Recommendations

To develop the findings further, there are possible areas that could be studied. For instance, it could be valuable to take an overall perspective of the returns handling, not only the processes within the warehouse. Thus, including the perspectives of direct and indirect customers, further investigating why returns occur, and how the return rates can be reduced.

Another topic concerns the use of identification technology, for instance RFID. Future research on how such technology could improve the information on returns, which would also facilitate the planning and control of returns, would be interesting. In connection to this, it would also be truly relevant to investigate how extensive the return flows must be to make such investments worthwhile. Future research that broadens the perspective, from the 3PL context to warehousing in general, could also be beneficial to understand and evaluate the differences and similarities between them.

If looking at Schenker more specifically, the future recommendation is to implement a standardised returns handling process, in accordance with the summarised conclusions presented under each research question in chapter 8. A suggestion is to follow step five to seven of the "approach for process design and redesign" by Rushton et al. (2017), mentioned in section 2.4. In addition to this, a number of decisions must be made. These include which investments to primarily focus on, whether to centralise the returns process or not, and if the proposed solution should only be implemented for new customers, or for some existing ones as well. To be able to answer this, quantitative studies are most likely required. Furthermore, the deviations handling (after the deviating return has been sorted out from the happy flow) and put-away is also suggested to be included in future research, as the effects of these factors have not been explored in the thesis work.

8 Conclusions

In this chapter, general conclusions that could be drawn from the thesis work are presented. Moreover, the research questions formulated with regards to the aim, as well as their answers, are presented below.

The aim of the thesis work was to develop a standardised process for the returns handling at DB Schenker Logistics' warehouses. To achieve this, a case study including 11 internal cases and 4 benchmarked cases was conducted. Furthermore, data was collected through questionnaires, interviews, observations, secondary sources, as well as literature reviews. Based on current theoretical and empirical findings, a proposal of a standardised returns handling process could be presented. Furthermore, it could be concluded that the effects of such standardised returns handling process entail increased effectiveness and efficiency in terms of productivity and customer relationships, as expressed in section 6.4.5. The answers to the four research questions, which were formulated to guide the analysis, are presented below.

Which operational steps should constitute the returns handling process?
Based on the cross-case analysis, including multiple cases, internal as well as benchmarked, supported by theoretical findings, it could be concluded that an operational returns handling process should be constituted of four operational steps: arrival of return, inspection and repacking/refurbishment, system registration, and put-away. Further detailed explanations of the proposed steps and their associated activities are presented in section 6.1. Furthermore, returns which are denied in the inspection step proceed to a deviation handling step separated from the subsequent operational steps.

Which informational entities should be involved in each step of the returns handling process?
With the analysis presented in section 6.2 as a basis, the information inflow determined for the arrival step concerns the number of incoming returns and the time of arrival. For the inspection of the returns, information covers order reference, product reference, product quantity, condition of product, reason for return, and any other product specific information. Information outflow occur in relation to the system registration step. The information entities that have proven to be vital parts of the outflow are order reference, product reference, product quantity, reason for return, and time of arrival and handling. Moreover, some additional product specific information entities might have to be added depending on the type of flow.

How should the planning and control of the returns handling process be conducted?
The planning and control of the returns handling process has been further elaborated in 6.3. From this, it can be concluded that guidelines for inspection, repacking/refurbishment, and disposition must be established. Furthermore, the metrics return volume, productivity, cycle time, capacity, lead time, and level of returns handled in time should be used to enable follow-up and evaluation.

How should the returns handling process be standardised?
As discussed in section 6.4.2, the organisation of a standardised returns handling process should include a returns responsible for each customer, as well as properly educated, and experienced personnel. Moreover, formalisation is an important aspect in order to standardise the process. Hence, the personnel should be equipped with standardised routines and guidelines, which should be comprehensive, i.e., cover all the operational steps and their activities, as emphasised in section 6.4.3. Another part of standardising the returns handling process concerns the design of the process. Primarily, it should be separated from the in- and outbound flows. Moreover, the returns stations should be provided with equipment necessary for the process, in line with what was stated in section 6.4.4. Also, there should be additional mobile stations available for managing peaks. Furthermore, throughout the information handling, the activities should be user friendly with minimal need for manual handling, although such functions require IT investments.

References

Badenhorst, A. (2013). A framework for prioritising practices to overcome cost-related problems in reverse logistics. *Journal of Transport and Supply Chain Management*, *7*(1), 10. (http://dx.doi. org/10.4102/jtscm.v7i1.113)

Bal, J. (1998). Process analysis tools for process improvement. *The TQM Magazine*, *10*(5), 342–354. (https://doi.org/10.1108/09544789810231225)

Bartholdi, J. J., III, & Hackman, S. T. (2019). *Warehouse & Distribution Science* (.98.1 ed.). The Supply Chain & Logistics Institute. Retrieved from https://www.warehouse-science.com/book/index.html

Baudin, M. (2002). *Lean assembly: the nuts and bolts of making assembly operations flow*. Productivity Press.

Bell, D. R., Gallino, S., & Moreno, A. (2014). How to win in an omnichannel world. *MIT Sloan Management Review*, *56*(11), 45–53. Retrieved 2022-03-30, from https://courses.helsinki.fi/sites/default/files/course-material/4482621/17.3_MIT2014%20Bell.pdf

Bell, E., Bryman, A., & Harley, B. (2019). *Business Research Methods* (5th ed.). Oxford University Press.

Britannica Academic, . (n.d.). *Epistemology.* Retrieved 2022-02-14, from https://academic-eb-com.eu1.proxy.openathens.net/levels/collegiate/article/epistemology/106052

Bryman, A., & Bell, E. (2011). *Business research methods* (3rd ed.). Oxford University Press.

Clarus. (2019). *Efficient Warehouse Returns Processes.* Retrieved 2022-04-26, from https://claruswms.co.uk/efficent-warehouse-returns-processes/

Cooper, M. C., Lambert, D. M., & Pagh, J. D. (1997). Supply Chain Management: More Than a New Name for Logistics. *The International Journal of Logistics Management*, *8*(1), 1–14. (https://doi.org/10.1108/09574099710805556)

Daugherty, P. J., Myers, M. B., & Richey, R. G. (2002). Information Support for Reverse Logistics: The Influence of Relationship Commitment. *Journal of Business Logistics*, *23*(1), 85–106. (https://doi.org/10.1002/j.2158-1592.2002.tb00017.x)

de Brito, M. P., Dekker, R., & Flapper, S. D. P. (2005). Reverse Logistics: A Review of Case Studies. In B. Fleischmann & A. Klose (Eds.), *Distribution Logistics* (pp. 243–281). (http://doi.org/10.1007/978-3-642-17020-1_13)

de Koster, R. B., de Brito, M. P., & van de Vendel, M. A. (2002). Return handling: an exploratory study with nine retailer warehouses. *International Journal of Retail & Distribution Management*, *30*(8), 407–421. (https://doi.org/10.1108/09590550210435291)

Duong, Q. H., Zhou, L., Meng, M., Nguyen, T. V., Ieromonachou, P., & Nguyen, D. T. (2022). Understanding product returns: A systematic literature review using machine learning and bibliometric analysis. *International Journal of Production Economics*, *243*, Article 108340. (https://doi.org/10.1016/j.ijpe.2021.108340.)

Dyckhoff, H., Lackes, R., & Reese, J. (Eds.). (2004). *Supply Chain Management and Reverse Logistics*. Berlin, Heidelberg: Springer Berlin Heidelberg. Retrieved 2022-03-21, from `http://link.springer.com/10.1007/978-3-540-24815-6` doi: 10.1007/978-3-540-24815-6

Dyllick, T., & Hockerts, K. (2002). Beyond the business case for corporate sustainability. *Business Strategy and the Environment*, *11*(2), 130–141. (https://doi.org/10.1002/bse.323)

Faber, N., de Koster, R. B., & van de Velde, S. L. (2002). Linking warehouse complexity to warehouse planning and control structure: An exploratory study of the use of warehouse management information systems. *International Journal of Physical Distribution & Logistics Management*, *32*(5), 381–395. (https://doi.org/10.1108/09600030210434161)

Frisk, S. (2021). E-handelsboom orsakar miljöproblem – en tredjedel returneras. *SVT Nyheter*. Retrieved 2022-05-18, from `https://www.svt.se/nyheter/vetenskap/e-handelsboom-orsakar-miljoproblem-en-tredjedel-returneras`

Genchev, S. E., Glenn Richey, R., & Gabler, C. B. (2011). Evaluating reverse logistics programs: a suggested process formalization. *The International Journal of Logistics Management*, *22*(2), 242–263. (https://doi.org/10.1108/09574091111156578)

Glenn Richey, R., Genchev, S. E., & Daugherty, P. J. (2005). The role of resource commitment and innovation in reverse logistics performance. *International Journal of Physical Distribution & Logistics Management*, *35*(4), 233–257. (https://doi.org/10.1108/09600030510599913)

Huscroft, J. R., Hazen, B. T., Hall, D. J., & Hanna, J. B. (2013). Task-technology fit for reverse logistics performance. *The International Journal of Logistics Management*, *24*(2), 230–246. (https://doi.org/10.1108/IJLM-02-2012-0011)

Hübner, A., Holzapfel, A., & Kuhn, H. (2015). Operations management in multi-channel retailing: an exploratory study. *Operations Management Research*, *8*(3-4), 84–100. (https://doi.org/10.1007/s12063-015-0101-9)

Hübner, A., Wollenburg, J., & Holzapfel, A. (2016). Retail logistics in the transition from multi-channel to omni-channel. *International Journal of Physical Distribution & Logistics Management*, *46*(6/7), 562–583. (https://doi.org/10.1108/IJPDLM-08-2015-0179)

Johansson, L.-G. (2018). *Introduktion till vetenskapsteorin* (4th ed.). Thales.

Konsumentverket. (n.d.). *The Act on Distance Contracts and Off-Premises Contracts.* Retrieved 2022-03-25, from `https://www.konsumentverket.se/languages/english-engelska/for-businesses/the-act-on-distance-contracts-and-off-premises-contracts/`

Kuada, J., & Kuada, J. (2012). *Research Methodology: A Project Guide for University Students* (1st ed.). Samfundslitteratur.

Lambert, D. M., & Cooper, M. C. (2000). Issues in Supply Chain Management. *Industrial Marketing Management*, *29*(1), 65–83. (https://doi.org/10.1016/S0019-8501(99)00113-3)

Lambert, S., Riopel, D., & Abdul-Kader, W. (2011). A reverse logistics decisions conceptual framework. *Computers & Industrial Engineering*, *61*(3), 561–581. (https://doi.org/10.1016/j.cie.2011.04.012)

Min, H., & Jong, J. S. (2006). Benchmarking the operational efficiency of third party logistics providers using data envelopment analysis. *Supply Chain Management: An International Journal*, *11*(3), 259–265. (https://doi.org/10.1108/13598540610662167)

Mollenkopf, D. (2010). *Reverse Logistics - Effective Returns Management in an Integrated Supply Chain.* Retrieved 2022-03-08, from `https://www.scmr.com/article/effective_returns_management_in_an_integrated_supply_chain`

Mollenkopf, D., Russo, I., & Frankel, R. (2007). The returns management process in supply chain strategy. *International Journal of Physical Distribution & Logistics Management*, *37*(7), 568–592. (https://doi.org/10.1108/09600030710776482)

Mossinkoff, M. R., & Stockert, A. M. (2008). Electronic integration in the apparel industry: the Charles Vögele case. *Journal of Fashion Marketing and Management: An International Journal*, *12*(1), 90–104. (https://doi.org/10.1108/13612020810857961)

Muijs, D. (2011). *Doing Quantitative Research in Education with SPSS* (2nd ed.). SAGE Publications. (https://dx.doi.org/10.4135/9781446287989)

Nuss, C., Sahamie, R., & Stindt, D. (2015). The Reverse Supply Chain Planning Matrix: A Classification Scheme for Planning Problems in Reverse Logistics. *International Journal of Management Reviews*, *17*(4), 413–436. (https://doi.org/https://doi.org/10.1111/ijmr.12046)

Panayides, P. M. (2007). Effects of Organizational Learning in Third-Party Logistics. *Journal of Business Logistics*, *28*(2), 133–158. (https://doi.org/10.1002/j.2158-1592.2007.tb00061.x)

Richey, R. G., Chen, H., Genchev, S. E., & Daugherty, P. J. (2005). Developing effective reverse logistics programs. *Industrial Marketing Management*, *34*(8), 830–840.

Robert Baum, J., & Wally, S. (2003). Strategic decision speed and firm performance. *Strategic Management Journal*, *24*(11), 1107–1129. (https://doi.org/10.1002/smj.343)

Rogers, D. S., Lambert, D. M., Croxton, K. L., & García-Dastugue, S. J. (2002). The Returns Management Process. *The International Journal of Logistics Management*, *13*(2), 1–18. (https://doi.org/10.1108/09574090210806397)

Rogers, D. S., & Tibben-Lembke, R. (2001). An Examination of Reverse Logistics Practices. *Journal of Business Logistics*, *22*(2), 129–148. (https://doi.org/10.1002/j.2158-1592.2001.tb00007.x)

Rogers, D. S., & Tibben-Lembke, R. S. (1998). *Going Backwards: Reverse Logistics Trends and Practices*. Reverse Logistics Executive council.

Rushton, A., Croucher, P., & Baker, P. (2017). *The Handbook of Logistics and Distribution Management* (6th ed.). London: Kogan Page. Retrieved from https://2masteritezproxy.skillport.com/skillportfe/main.action?assetid=125527

SFS 2005:59, . (n.d.). *Lag (2005:59) om distansavtal och avtal utanför affärslokaler.* Retrieved from https://www.riksdagen.se/sv/dokument-lagar/dokument/svensk-forfattningssamling/lag-200559-om-distansavtal-och-avtal-utanfor_sfs-2005-59

Slack, N., Johnston, R., & Brandon-Jones, A. (2016). *Operations Management* (8th ed.). Pearson.

Speelman, C., & Kirsner, K. (2005). *Beyond the Learning Curve: The Construction of Mind.* Oxford University Press, Incorporated. Retrieved 2022-04-26, from http://ebookcentral.proquest.com/lib/chalmers/detail.action?docID=3052240

Stock, J. R., & Mulki, J. P. (2009). Product Returns Processing: An Examination of Practices of Manufacturers, Wholesalers/Distributors, and Retailers. *Journal of Business Logistics*, *30*(1), 33–62. (https://doi.org/10.1002/j.2158-1592.2009.tb00098.x)

Tibben-Lembke, R. S., & Rogers, D. S. (2002). Differences between forward and reverse logistics in a retail environment. *Supply Chain Management: An International Journal*, *7*(5), 271–282. (https://doi.org/10.1108/13598540210447719)

United Nations. (n.d.). *The Sustainable Development Agenda.* Retrieved 2022-03-31, from https://www.un.org/sustainabledevelopment/development-agenda/

Villena, V. H., & Gioia, D. A. (2020). A More Sustainable Supply Chain. *Harvard Business Review*. Retrieved 2022-03-31, from https://hbr.org/2020/03/a-more-sustainable-supply-chain

Wyld, D. C. (2006). RFID 101: the next big thing for management. *Management Research News*, *29*(4), 154–173. (https://doi.org/10.1108/01409170610665022)

Yin, R. (2014). *Case Study Research* (5th ed.). SAGE Publications.

Zacharia, Z. G., Sanders, N. R., & Nix, N. W. (2011). The Emerging Role of the Third-Party Logistics Provider (3PL) as an Orchestrator. *Journal of Business Logistics*, *32*(1), 40–54. (https://doi.org/10.1111/j.2158-1592.2011.01004.x)

Appendix A

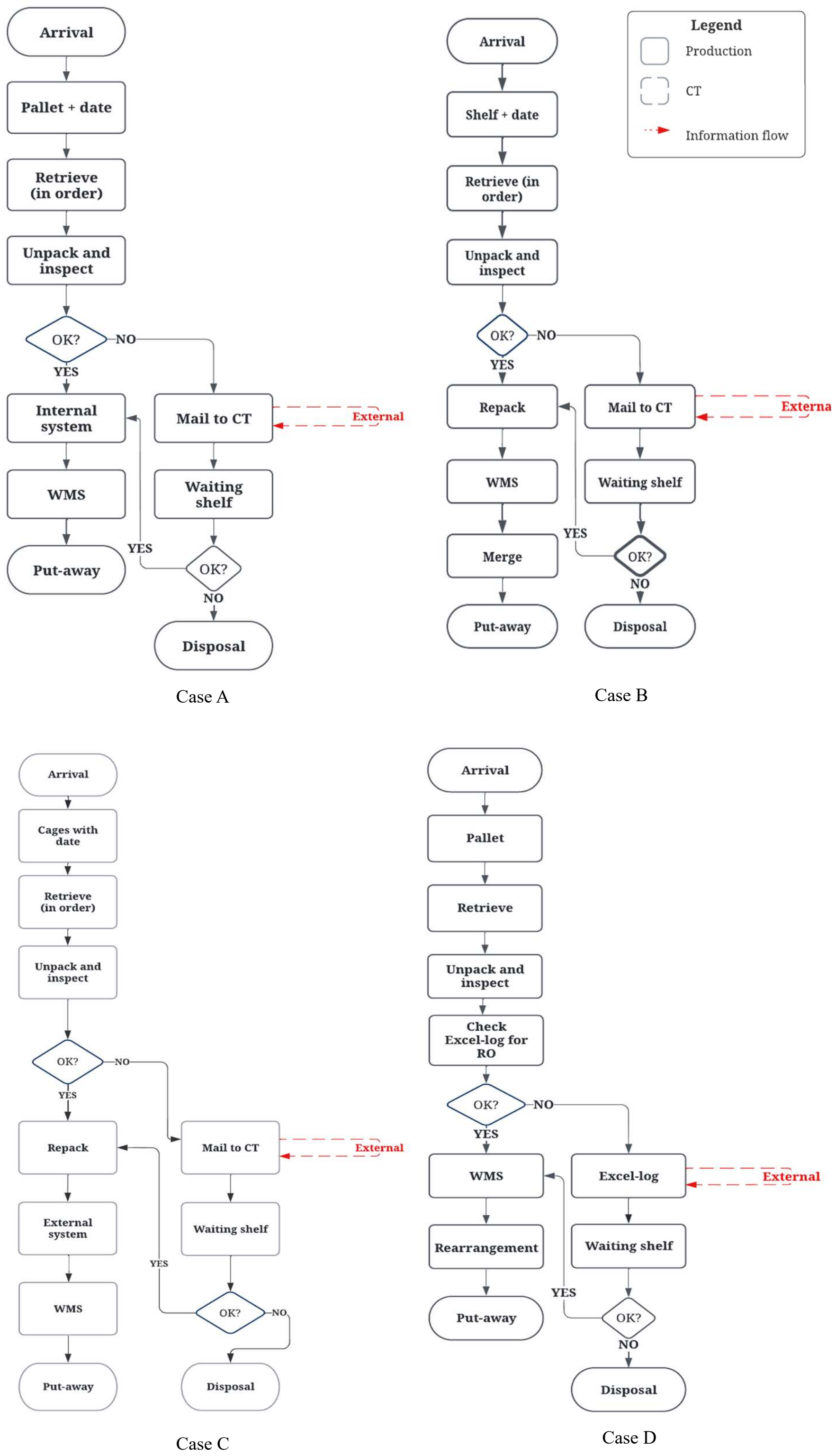


Figure A.1: Flow Chart of Returns Handling Process for Case A, B, C, and D

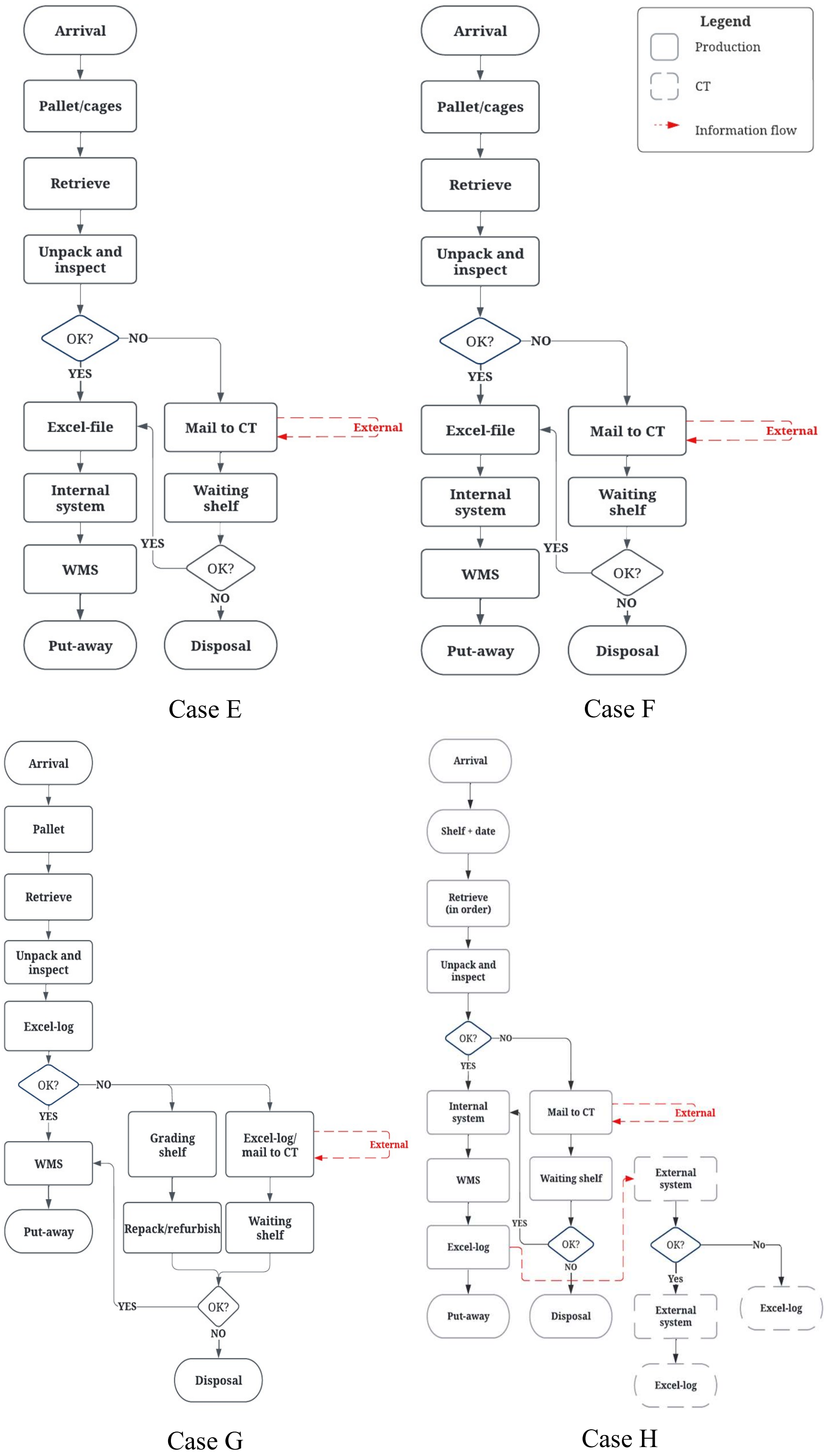
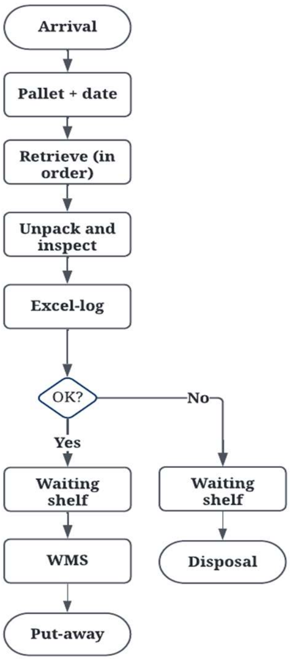
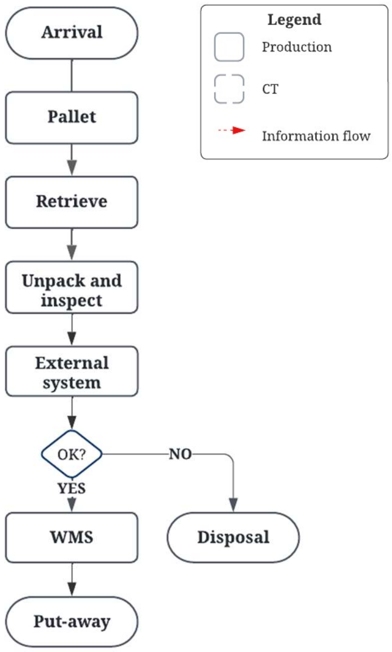


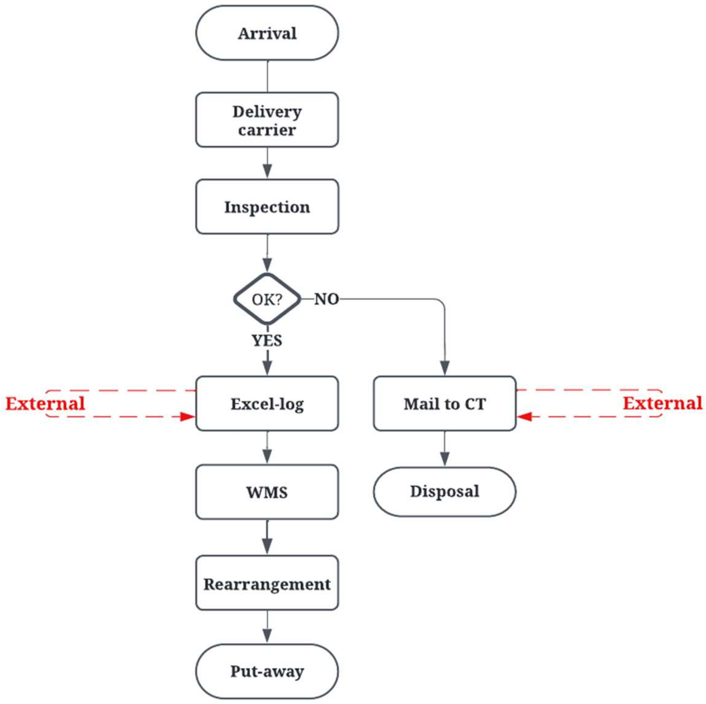
Figure A.2: Flow Chart of Returns Handling Process for Case E, F, G, and H



Case I



Case J



Case K

Figure A.3: Flow Chart of Returns Handling Process for Case I, J, and K

Appendix B

Table B.1: Questionnaire to Operations & Account Managers

Question
Responsible supervisor for customer x?
Is there any returns management for customer x?
If yes:
What type of return flow is it for customer x (E-com, retail, industry)?
How many returns were managed during January 2022 for customer x?
How many hours were spent on returns January 2022 for customer x?

Table B.2: Questionnaire to Control Tower (CT)

Question
Responsible person for customer x from CT?
Does CT have any returns management for customer x?
If yes:
Does CT manage all types of returns or deviations only for customer x?
How many returns were managed during January 2022 for customer x?
How many hours were spent on returns January 2022 for customer x?

Appendix C

Table C.1: Description of the roles of the people included in the thesis work

Role	Description
Production Personnel	Works with various, daily warehouse operations such as picking, packing, goods receipt, and returns handling.
Supervisor	Responsible for managing and controlling all warehouse processes within its mission, including personnel. Also, together with other operational management of the site, responsible for ensuring a cost-effective and qualitative production.
Team Leader	Works closer to warehouse operations than the supervisor. Ensuring that the team executes operations correctly, based on the allocated resources and time frames set by the supervisor.
Control Tower	Manages most of the contact with the customer, as well as administrative tasks and planning/follow-up related to operations, and invoicing.
IT	Responsible for the WMS, implementation of new solutions as well as development of existing ones.
Operations Excellence Engineer	Works with process analysis and continuous improvements of current production systems at the different sites.
Solution Design Manager	Responsible for the design, development, validation, and cost estimation of logistics solutions for potential and existing customers. Also supports the business development function in new sales.
Operations & Account Manager	Has an overall responsibility of ensuring that the site delivers the agreed logistics services in a safe and cost-effective way, with high productivity, quality and level of service.
Superuser	Supports production management with first line support, maintenance, and specification of necessary IT development, as well as associated IT support, to ensure a cost-effective and qualitative production.
Production Support	Supports various warehouse operations. For instance, examines and adjusts stock balances if deviations occur and manages claims from consumers.
Change & Demand Manager	Similar to Operations Excellence Engineer but with more expertise within the WMS.

Appendix D

Table D.1: Topics covered during workshop

Topic	Discussion point
Arrival of returns	How should the returns arrival? (What can be demanded from the carriers?) What information is necessary? From whom? How? When? What controls the prioritisation order? What information should be required for each specific return?
Inspection and repack/ refurbishment	What should be conducted in terms of repacking and refurbishment? What must be inspected? How should the guidelines be formulated?
System registration	What functions must the WMS consist of? How can external system registration be excluded? What information inflow is required? What information outflow is required?
Put-away	What happens with the returned product after the system registration step?
Deviations	How should the deviations be sorted? What types of deviations exist? How should the deviations be handled? When should the customer be involved in the deviations handling? How should the customer be debited in terms of deviations handling?
Planning and Control	What metrics are required for planning and follow-up of the returns process? How can forecasting be applied and used in the returns process?
Design & Organisation	How do design the process for scalability and handling of peaks? What equipment is required at the returns handling stations? Is it possible to centralise the returns handling? Who manages returns? Who does the planning of the process?

Appendix E

Table E.1: Topics covered during observations

Step	Operational Process	Information Flow
Arrival	How do returns arrive? Pre-notified? Return note?	Number of returns arriving at warehouse?
Retrieve	In what order?	
Inspection	Requirements from customer? Mandate of production personnel to determine if a return is approved? Can decisions regarding control/disposal be made based on existing guidelines?	
Repack/Refurbish	To what extent?	Are there guidelines?
WMS	Which system? How are stock balances changed?	When are customer transactions triggered?
Customer's System/ External log	Log or specific system?	Any conversations in happy flows?
Put-away	New or existing location?	
Deviations	Any problems-shelf? Disposal?	Who is contacted and when?
Measurement/Performance	Productivity? (Number of returns? How much time is spent?) Time requirements? (Number of days? Is it followed?) Capacity? (Peak seasons etc.)	
Planning/Control	Who perform returns handling? Divided into customer service and production or combined? How are returns handling planned? By whom? When are returns handled? Priority compared to other flows?	
Other	Is the return flow divided depending on product characteristics etc.?	

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