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Analyzing administrative processes in a 3PL company

Mapping of administrative processes and identification of key time drivers

Master of Science Thesis in the Master Program, Supply Chain Management

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Chalmers Reproservice
Gothenburg, Sweden 2012

Abstract

As administrative services for 3PL companies can be very specialized and customer unique it can be difficult to estimate and specify the amount of administration needed for a future client. At Schenker Logistics Landvetter this has become one of the most problematic factors when quoting possible clients i.e. to estimate the manning need in the Control Towers (CT), where the majority of administration is performed. Therefore, the main purpose of this thesis is to analyze what drives time in the CT and how much. In order to fulfill this, two main sources of data were needed. Firstly, in order to increase the knowledge on what activities are performed in the CT, all processes for the customers covered in thesis were mapped and described in detail. This was made possible by observing the processes and interviewing the staff responsible for each customer, identifying which processes were executed and from there going through each step of the process in detail. Secondly, a time study was performed by measuring the time duration per process and identifying different time drivers from direct observation, interviews and time templates. These results were then consolidated in to a generalized framework that was used to create an algorithm that is supposed to calculate the basic CT manning need for a future client. This then leads to the discussion part of the thesis where improvement recommendations were suggested both in relation to pricing the CT function in a more precise and accurate way as well as general improvements identified by the CT staff and authors.

Keywords: process mapping, administrative processes, time drivers, pricing administrative services

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Preface

This Master thesis was performed at Chalmers University of Technology as a part of the master program, Supply Chain management. It was done in collaboration with Schenker Logistics Landvetter (SLL) which provided us with a great opportunity to apply our theoretical knowledge to a real life situation. There were many employees at SLL that assisted us during the thesis work and offered us valuable insight into how 3PL companies work today and therefore we would like to show our appreciation to them.

Firstly, we would like to thank our two supervisors at SLL; Nikolai Kolderup-Finstad and Milvi Piibeman which offered us a great guidance and support throughout the thesis work. We would also like to thank the amazing people in the control towers at SLL which provided us with explanations and valuable inputs. Furthermore, various other people at SLL offered us guidance and insight into different aspects in the company and thus we would like to express our appreciation to them.

Furthermore, we would like to thank our supervisor and examiner, Ola Hultkrantz, for directing us, providing constructive criticism during our research and for assisting us with various issues and questions.

Last but not least we would like to thank our families for their support and understanding which they have shown us during this demanding period.

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List of abbreviations

SLOG- Schenker Logistics
SLL – Schenker Logistics Landvetter
SLA- Schenker Logistics Arendal
CT- Control Tower
SD- Solution Design
POD- Proof of delivery
BDM- Business Development

List of definitions

Administrative process – is basically related to all activities that are needed to control and coordinate the flow of goods and information to and from the warehouse and ensure a smooth and reliable flow. This includes processes such as transport bookings, planning inbound orders as well as providing support to all main stakeholders, especially customers.

Bonded warehouse – is an area where goods can be placed in order to postpone the payment of customs fees.

Centiro – is SLL´s automatic transportation booking system.

Crystal reports- are reports designed by the IT-support that provide the CT with different statistical information on the warehouse operations that are necessary for various CT processes.

DB Schenker´s Web-TA – is the web portal for DB Schenker where it is possible to book and track shipments e.g. with Schenker Land.

Inventorying- is a verification of quantities kept in the warehouse.

KGH- is a company that manages administrative functions in the bonded warehouse which is located within the SLL warehouse for one of SLL´s customers.

Learning curve- is a specific time period which it takes both parties (the CT and a new customer) to get to know each other's work methods, communication ways, getting used to each other user interfaces etc. and thereby reach a standard productivity and man need in the CT.

Production – The main part of SLL´s warehouse where all handling operations are performed and goods are stored.

SAP- is a system which is e.g. used to approve invoices from transport companies and to create invoices for SLL´s customers.

Transportal - is an invoicing system which is used for e.g. transportation invoicing.

WMS- is the warehouse management system which is used at SLL.

1 Introduction

In this chapter an introduction is given to the reader which starts with a background to the issue. This will lead into a problem analysis where the issues facing Schenker Logistics Landvetter are discussed. Furthermore, the purpose, research objectives and thesis limitations will be presented.

1.1 Background

In recent years products have in general become more standardized and therefore companies have been forced to come up with new innovative ways to reach customers e.g. in forms of different services (Ford et al, 2003). Consequently, markets are developing towards more service orientation in order to improve their offerings and differentiate themselves from their' competitors (Christopher, 2011). This as well as emerging technologies has led to a power shift towards the customers (Stroeken, 2000). In relation with these rapidly evolving information technologies the internet plays a vital role in the power shift over to customers (Morris, 2002). This is because the internet provides a more transparent look at the market for customers, enabling them to have a good view over total offerings available (Stroeken, 2000). Therefore, customers are becoming more demanding in regards to quality, prices and services which further increases the difficulties of both keeping clients as well as getting new ones. Furthermore, purchasing decisions are gradually moving away from brand loyalty and thus customers don't hesitate to switch their commitment to other companies that provide superior services and products at competitive prices (Stapleton et al, 2012).

More specifically concerning the 3PL industry, which is the focus of this thesis, you will find the same developing trends in the last few years. Increased competition in the 3PL marketplace as well as more demanding customers (Langley, 2012) has put more pressure on 3PL providers to provide state-of-the-art services while still striving for cost reductions in order to be able to offer as competitive offerings as possible. Moreover, constantly developing information technology systems that e.g. allow companies to offer different kinds of administrative services such as transport administration have become a key tool for 3PL´s in providing innovative and differentiating services to customers. Consequently 3PL´s are able to provide opportunities to link supplier and buyer together and provide real time information on the status of products which enhances visibility and transparency in the material and information flow (Stroeken, 2000).

Furthermore, an important feature of the 3PL industry is the very different Customer Base in relation to the characteristics of the offerings needed for each customer as well as industry environments of these customers (Kolderup, 2012). This means that since operating within different types of industries, these customers will have very different needs and expectations and thus require different services. As stated by Lamb (2012) services that

many providers offer have great heterogeneity of in- and outputs and thus they tend to be less standardized and uniform. Consequently, it can be hard to define the time duration of each service offered and identify associated costs. Additionally, 3PL provider's work with customers with different information about their logistics processes, including the administrative work needed (Kolderup, 2012).

As a consequence of these various characteristics, 3PL providers will often have problems estimating the administration needed, caused by lack of information on what is needed to fulfill the needs of new clients (Kolderup, 2012). Because of these various issues it can be difficult for 3PL providers to price new services and quote new customers.

1.2 Problem discussion

Looking at the case company, the majority of the administrative work is performed in so-called Control Towers (CT). Quoting administrative work in the CT has proven to be very hard since the customer needs for administration can often be difficult to determine. Therefore, it can even be that Schenker Logistics Landvetter (SLL) is performing some administrative services that are not included in agreements with customers. Consequently, customer profitability can turn out to be considerably lower than assumed. This is especially caused by the difficulties in determining the actual administration needed for new customers until they have started working with them and understand what is really needed to fulfill their requirements. This is partly because SLL has customers with different characteristics and within different business environments, such as retail, fashion and industry, each with different needs and knowledge of what is needed. Furthermore, the high degree of specialization and customization of administrative services needed for each customer makes it hard to estimate how much administration is needed for new customers in general. Even for customers working in the same industry there can be differences in requirements they put on their 3PL provider which depends on numerous things. Finally, when quoting new clients, SLL can often have the problem that the customer does not know how much administration is needed to perform the distribution required. This can for instance be that the buying company has had another 3PL provider previously that took care of these services for them and have consequently never had to handle and/or define administration needed for its products.

Therefore it is important for SLL to increase knowledge of administrative work performed in the CT for different customers in order to have a better idea of how it will be for a future customer. Furthermore, SLL needs to be able to visualize what drives these administrative hours for different customers in order to identify different time drivers and to ensure quicker, more accurate and transparent quoting of administration for future customers.

1.3 Purpose and research objectives

As a result of the problem discussion, the main purpose of this thesis is to analyze what drives administrative hours in SLL control tower. Therefore the aim will be to gain deep understanding of all administrative processes of SLL that are executed in the CT in order to be able to describe these processes in detail and identify different time drivers. Additionally, the information will be utilized to provide a calculation tool which will be used to calculate the need for administrative services in the CT.

In order to fulfill the aim of the purpose the following research objectives will be addressed:

1. **Gain a deep understanding and visualization of administrative processes for SLL.**

2. **Perform a time study in order to identify different time drivers (what drives time and how much) for administrative processes in SLL.**

3. **Use information about different time drivers of administrative processes to make a calculation tool for quoting new customers.**

4. **Identify improvement possibilities in relation to the CT.**

5. **Examine how administrative services are priced today and how they can be rated in the future.**

In order to do this, all administrative processes of the customers covered in this thesis will have to be mapped in detail, which will provide an overall picture of the processes. These maps will serve as a framework for how administrative processes look like for different types of customers and make it easier to perform a time study and identify key time drivers of each administrative process.
This should enable the researchers to construct a calculation tool that would allow the solution design team (SD) to calculate the cost of administrative services for customers with varying demands and needs and consequently simplify the calculation of the administration work needed when quoting new clients.

Additionally the process descriptions and maps can be utilized to realize improvement possibilities to the processes enhancing efficiency and reducing costs.
By providing this it is believed that SLL will be able to offer better service to their customers since the company could demonstrate the cost behind the administration needed, provide more accurate estimation of manning need, spend less time on quoting administrative costs for new clients as well as cut unnecessary costs in administration, consequently providing more accurate and better offerings to their customers.

1.4 Delimitations

The boundaries of the study will encompass the administrative processes which are performed for four selected customers at the CT in SLL and the parts of the company that are directly connected to these processes. In order to have the scope of the study narrow enough to ensure deep description of each customer these four were decided. This was decided in cooperation with the company´s supervisor as well as the manager of the CT since they were considered to be very different, therefore covering much of the work performed in the CT.

1.5 Thesis outline

Literature review– In this chapter the theoretical framework from the literature review is presented. It should provide the reader with explanation of the main concepts in the thesis and serve as guidance to how the research was performed.

Method– The research study was performed with an inductive approach which is described in chapter 3. Furthermore, the gathering of information, data analysis and working methods are discussed. This is followed by a reflection on the thesis quality, in regards of validity and reliability.

Empirical data- In this part of the thesis the focal company, SLL, as well as the CT are presented. This is followed by a general overview of the main processes identified in the CT. Thereafter, each process of the four customers is mapped and described. Finally, it explains how the four customers are priced for the administrative services and time study results are presented (see figure 1).

Analysis- In this chapter the empirical findings from the time study and process maps are combined. Firstly, the most time consuming processes for each of the customers are presented which is followed by a discussion of time drivers. These time drivers are then generalized which serves as a basis for an algorithm which should enable SLL to calculate the administration need for future customers.

Discussion and recommendation- This chapter contains the main problems and improvement possibilities which were identified by the researchers, CT staff and other employees at SLL.

Conclusions- In this final chapter concluding remarks are given which take the thesis aim and objectives into account. This is followed by suggestions for future studies.

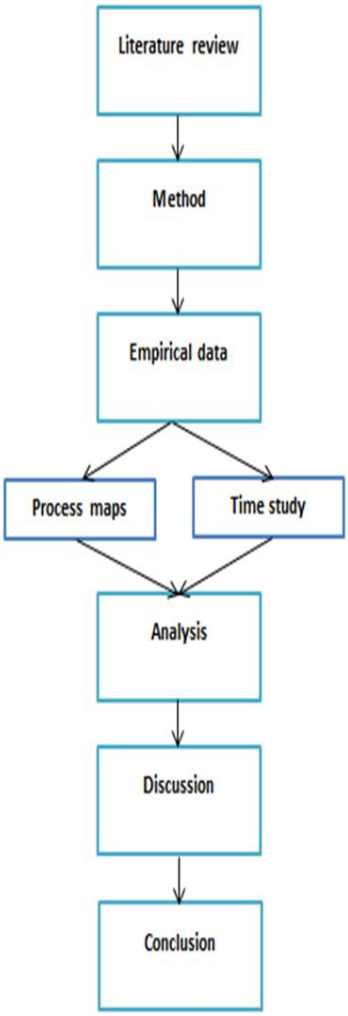


Figure 1. Outline of the thesis

2 Literature review

The theoretical framework that was written is intended to guide the reader and introduce and provide explanation on necessary concepts that are used in this thesis. By this the theory is not used in a traditional way to analyze the data gathered but instead provides a theoretical background on important concepts discussed. This should make it easier for the reader to understand how this research was performed and on what theoretical background it is based.

2.1 Processes

The following sub-chapter defines processes in general and provides an explanation how process mapping can be performed.

2.1.1 What is a process?

According to Keller and Jacka (1999) a process in its simplest form can be described as a combination of inputs, actions and outputs. Ewy and Gmitro (2010) further define a process as a series of actions which need to take place in order for an output to occur. Furthermore, these series of actions that occur serve a purpose, that is, they are designed so that the output satisfies a specific aim or goal or meets customers or stakeholders prerequisites and expectancies. According to Conger (2011) a process is the set of repeated steps or tasks that accomplishes some business function and may or may not be interrelated with other processes.

2.1.2 Process mapping

Process management is a crucial factor of the services that companies offer. By mapping processes, relationships between different parts within the organization become clear and it provides employees with an overall picture of its processes (Conger, 2011). By increasing the visibility of work performed, communication and understanding can be improved and it can also provide a common frame of reference for the employees involved in certain work processes (Damelio, 2009). Furthermore, process understanding is vital since companies cannot manage, monitor or improve what they don't understand and know. Processes are the basis of every functions of an organization and therefore any business improvements involve analyzing and improving processes (Conger, 2011). Consequently, by mapping their processes, 3PL companies enhance understanding of them and provide opportunities to improve them. However, when processes are designed or improved it is essential that the requirements of the customer are understood and fulfilled in the right manner. This can often be quite the challenge in the 3PL industry, since you will often have customers that do not understand their' needs e.g. concerning administration.

When process maps are used to illustrate the current state of work done within a company they show a snapshot of a certain combination of functions and in and outputs that are used by the company to create value for the customer. As a result, the maps assist with documenting the existing path to consumer satisfaction (Damelio, 2009). As stated by Christopher (2011), there can be substantial costs associated with satisfying customer

demand, however they are often not fully identified and understood by the organizations. As stated above process mapping can increase the overall understanding of different processes within an organization and thus provide an enhanced overview of costs for different customers and their profitability. This gives companies a better holistic understanding of whether their customers are as profitable as estimated or if there are some additional services performed that reduce the cost effectiveness of that customer.

2.1.3 How to perform process mapping

The process mapping strategy suggested by Keller and Jacka (1999) includes the following steps:

1. Establish process boundaries
2. Develop a data gathering plan
3. Interview process participants
4. Generate process maps
5. Analyze and use process maps

In regards to process boundaries it should be defined in terms of how the process starts and ends. Furthermore, all inputs and outputs should be listed. In the initial step of the data gathering the data which is needed to create the map is determined as well as the questions that should be asked and which individuals to interview. In the third step those individuals chosen are interviewed. The main purpose of performing an interview is to obtain information and to gain a deep understanding of how the process works. As the maps are developed potential problems and improvement possibilities are identified. When the maps have been generated they are analyzed.

Conger (2011) agrees with these 5 steps stated above although suggests that an initial interview with these individuals before the process boundaries are established can set the stage for the project and offer researchers an overview of the processes performed. Furthermore, the author argues that when the process maps have been generated they should be verified by those individuals that were interviewed. This is done to ensure that interviewees agree with the details and substance of the maps.

2.1.4 Process mapping techniques and icons

There are many mapping methods which can be used to create a process map such as Definition for Function Modeling (IDEF) and Business Process Execution Language (BPEL) (Conger, 2011). However, the generic method is most often used when mapping processes within a company. In the generic method a flowchart is used to illustrate the sequence of the steps that make up a process (figure 2).

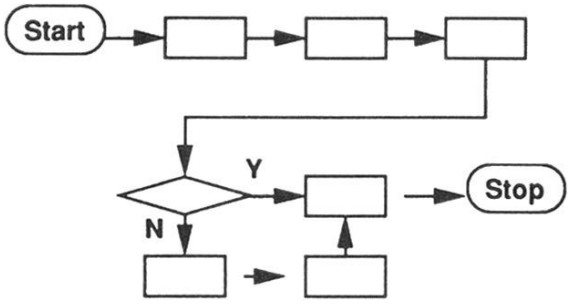
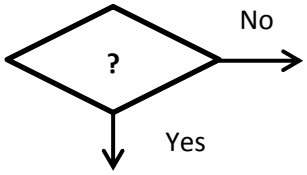


Figure 2. Typical flowchart (Damelio, 2009)

According to Damelio (2009) the more intelligence built in the chart the more useful and valuable it is. What is meant by intelligence is the use of icons that symbolize what takes place in the process. The icons used in process maps are graphics that illustrate different activities or data (Conger, 2011). Table 1 shows examples of icons that are used in process maps and their definition.

Table 1. Process map icons and definition (Conger 2011, Damelio 2009)

Icon	Definition and use
Start	The start icon signifies the event or condition that initiates a process.
Stop	The stop icon signifies the event or condition that ends a process.
	A plain, directed arrow depicts process flow, showing the sequence of steps in a process.
Process	A process box is used to show a step, or set of steps, in a process.
Data Store	The icon symbolizes digital files or databases.
	The combination of a diamond and process flow arrows represents a decision or condition which is shown in the diamond. One arrow shows the "yes" logic that occurs when the condition occurs whereas the other arrow shows the "no" logic that occurs when the condition is absent.

A swim lane diagram, which is the actual process map, has one row or a column (depends on whether the map is vertical or horizontal) for each individual, role, function or organization that interacts with the process (Conger, 2011).

Cross- functional process map is a combination of a flowchart, swim lane diagram and process icons which illustrate how work is performed in an organization (figure 3). Furthermore, it shows the steps (2) that create the process, the path (1) that transfer inputs into outputs and which actor performs each step in the process (3) (Damelio, 2009).

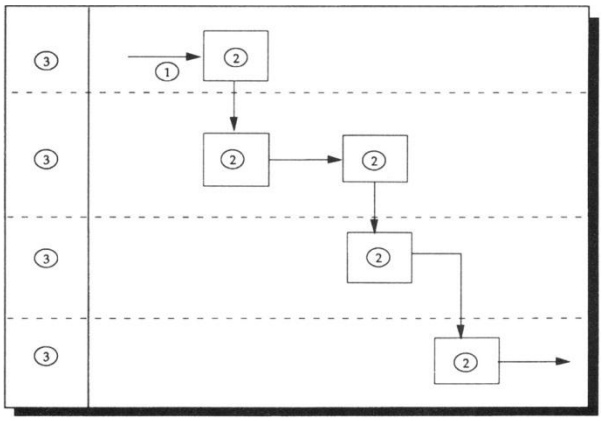


Figure 3. Cross- functional process map (Damelio, 2009)

According to Damelio (2009) a cross-functional map should answer the following questions:

- Which steps are required to generate a specific output?
- In which order are the steps performed?
- Who performs each step?
- Which handoffs or interfaces are between different functions?
- In what parts of the process do the handoffs occur?
- Which inputs are required and outputs produced in each step of the process?

2.2 Time studies

Ratnatunga et al (2012) discuss the estimation of time for labor hours in service organizations comparing different theory provided on these issues. There, they discuss that firstly, you need to understand that defining the labor hours in service companies can be much harder because of a much more diverse activities performed by the staff. Also these activities can vary substantially in frequency and time and are often not as standardized as e.g. manufacturing activities. Commonly this is done by estimating the percentages of time spent on different activities. Kaplan and Anderson (2007) do not agree with this definition, since it normally ends up in 100% time, consequently disregarding the idle time that exists in all operations and therefore estimating the theoretical capacity instead of practical capacity. Instead they encourage that the time for performing different activities should be measured/estimated in minutes/hours by direct observations, interviews and comparative information from the cost estimators. This however is argued against by several authors

such as Everaert and Bruggeman (2007) stating that observations by cost estimators can result in less correct measurements.

Furthermore, Kaplan and Anderson (2007) discuss how the idle time can be estimated. They state a rule of thumb that says that around 15-20% of the overall available time can be considered as idle, i.e. waste. Factors causing this can be maintenance and repair for machines. For employees; walking to the restroom, communicating with fellow staff, arriving and leaving workplace as well as general training are examples of factors that can be considered causing idle time. Then, in relation to the factors mentioned, normally a higher idle time (20%) will be associated with employees than machines (15%). Ratnatunga et al (2012) agree with this in their case study, where the case study company defined the normal capacity as 80% of the theoretical capacity.

2.2.1 Time drivers

When performing a time study on specific processes it is necessary to define certain factors that cause time to increase for activities performed in these processes. These are so-called time drivers. Everaert and Bruggeman (2007) define this in their discussion on the time-driven activity based costing method, were time drivers are an important part. There, time drivers are defined as characteristics that affect the time that will be consumed for that specific process or activity. Number of orders, order lines, shipments as well as characteristics such as type of orders, complexity and type of a customer are all examples of time drivers that will affect the time it takes to perform a specific activity.

There are many time drivers that influence how much time the CT employees spend on each process. The time drivers considered in this thesis are mainly two dimensional. The number of occasions performing each process is one of the dimensions whereas the other one is factors within the process that drive the time. The time drivers within a process can be manifold. For example, the type of order is one of these factors, as can be seen in the customer descriptions the time spent on each order type can vary substantially. Furthermore, the number of orders within one shipment can influence how long time is spent on the process.

2.3 Cross training

Cross- training is used to improve team flexibility and coordination (Levi, 2010). In cross training, members of the team are trained in the technical skills of two or more jobs and thus allowing the team to respond flexibly to changes in the work environment and to employee changes. Furthermore, it enables team members to gain a better understanding of different roles and interconnections in the team which in turn can lead to a shared view of how the team operates and the coordination which is needed in the team (Levi, 2011). According to Daft (2010) there can be many advantages associated with cross training such as it advocates an emphasis on collaboration and teamwork and it promotes a rapid response to changes in the customers' needs. However, it can limit in- depth knowledge and

skill developments since employees have multiple task to focus on. Thus it is important that employees are given the chance to maintain and develop technical expertise (Daft, 2010).

3 Method

This chapter describes how the study was conducted throughout the thesis. Furthermore, the working methods, gathering of information and data analysis are illustrated. Lastly, the method used will be assessed in regards to the quality of the thesis.

3.1 Research approach

According to Bryman and Bell (2011) there are five different types of research designs; experimental, cross- sectional, longitudinal, case study and comparative design. The choice between these five types depends on the purpose of the research. What differentiates a basic case study from these other four research designs is the emphasis on a limited situation or system (Bryman and Bell, 2011). A case study is described by Gilham (2010) as an investigation which enables the researcher to answer defined research questions. By seeking, abstracting and collecting different types of data within the case setting the researcher should get the best possible answers to the research questions. A fundamental characteristic of a case study is that the researcher starts by observing the context before theoretical notation is made. This is done to get an understanding of the research area and thereafter find the theory that is most related to the subject (Gilham, 2010). Since the main aim of this thesis is to gain a deep understanding of the administrative processes performed in the CT within SLL by applying the researchers' knowledge and theories to the subject, a case study design was chosen.

Furthermore, the case study was executed with an inductive approach. According to Bryman and Bell (2011) an inductive research study is a bottom up approach where the researcher makes an observation built on a topic of interest which theory is built on. Related theories are not considered until further along into the research. From this observation clusters of data or patterns begin to emerge which the researcher generates themes that come from the analysis of the data. By going back and forth between the data and the theory enables the researcher to make sense of his data. However, research is rarely entirely inductive since the researcher usually reviews and reads existing theory to be able to start his initial approach to data collection therefore the inductive approach entails a modicum of deduction (Bryman and Bell, 2011). To be able to begin the data collection the researchers started by looking into existing theory. This enabled them to understand how to obtain the data needed and how it could be used. However, to a large extent the existing theories were not considered until the majority of data had been gathered and the analysis was nearly completed. Therefore, the research study was done with an inductive approach with modicum of deduction. The research approach for the thesis can be seen in figure 4.

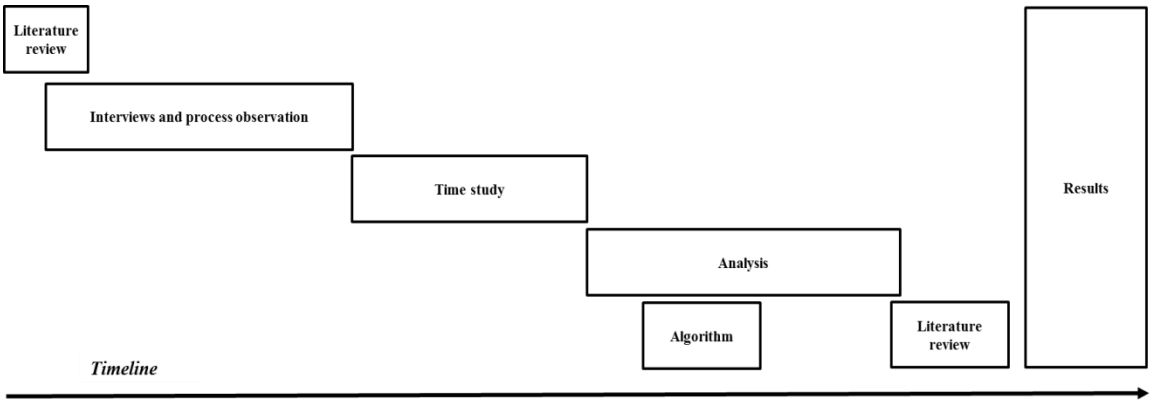


Figure 4. Research approach used in the master thesis

3.2 Data collection

Data collection and empirical research is usually divided into three categories; quantitative, qualitative and mixed research (Bryman and Bell, 2011). Gillham (2010) describes quantitative methods as those that include counting and measuring whilst qualitative methods focus mainly on information deducted from interviews and direct observation that enables the researcher to understand the context. Although qualitative data is most often predominant in case studies, quantitative data can enhance the overall study and since all data should be combined in the researcher's data collection a case study design is most often a mixture of qualitative and quantitative methods (Gillham, 2010). A mixture of both methods was used in the thesis in order to address the research objectives and fulfill the aim of the thesis. Gathering qualitative data through interviews and observation enabled the researchers to gain a deep understanding of the administrative activities performed at the CT and draw process maps as well as gather information on interesting discussion subjects. Thereafter, quantitative data was gathered through studying and measuring both variable and fixed time factors which enabled the researchers to formulate an algorithm.

3.2.1 Interviews and observation

In order to gain a broader picture of the activities performed in the CT the researchers begun by having short introduction meeting with all employees of concern in the CT, going through every customers flow in a general way. Thereafter qualitative data was gathered through process observation and semi structured interviews with numerous employees of interest in the CT and other departments within SLL. Bryman and Bell (2011) describe semi structured interviews as approach where the researcher has a list of questions which cover relatively specific topics. However, the researcher has some leeway to ask supplementary questions in response to what is seen as significant to the problem on hand. Therefore the emphasis should be mainly on how the interviewee frames and understands specific issues. By having this flexibility the researcher is able to adjust the emphasis in the research if important topics arise during the interview. Bryman and Bell (2011) also argue that direct observation is an effective method to obtain data needed and it enables the researchers to interact with employees and thoroughly understand the processes.

A questionnaire (see appendix B) for the interviews was formulated with the help of the SLL supervisor in order to ensure that intended data was captured. To gain a deeper understanding how each process worked, what drove administrative work and to identify decisions required and documents used for every step of the process, selected people of interest were interviewed. All interviews were audio recorded in order to assure that misunderstandings or interpretations would not occur. After every interview the recordings were played again, transcribed and analyzed. From the empirical data obtained during these interviews process maps were constructed and each process described in detail. Thereafter, a second interview with the employees was conducted in order to validate and finalize the maps.

3.2.2 Time study

The time study was performed by observing the activities that the CT employees in question performed. The time for each activity, within predefined processes, was measured by using stopwatches. However, as the time study was half way through the researchers noticed that many of the activities performed, at the CT, were not directly related to any of the processes that had been defined. This was mainly since all support functions had been defined as customer support and many of these functions were not directly related to the customer as such. However, the activities that were considered to be outside the customer support definition are necessary to be able to serve the customer as best as possible and keep the flow of material and information uninterrupted. Therefore, quite some time had to be spent on redefining processes before the time study could be continued.

After spending substantial time observing the employees and measuring the time for activities it was clear that the researcher would not be able to observe and measure the time duration for all processes since some of the processes occur seldom. Therefore, the data needed to be obtained by other means. For those processes that the employees could define the process duration the data was gained by interviewing the employees and thoroughly defining time for each activity within the process. However, in some cases the employees were not able to determine the process duration because they varied substantially in both content and duration between days. Therefore, the data was obtained by having the employees fill out a time template for the process during a specific time period.

When data for all processes had been obtained the employees were asked to verify that the average times defined for each process were accurate.

3.2.3 Literature review

Theoretical data was gathered by reading books and articles from online databases, such as the Chalmers library database, Emerald and Google Scholar. In order to find books and articles on the databases that were relevant to the thesis work, keywords such as; process mapping, administrative processes and third party logistics, were used.

3.2.4 Other source of data

Empirical data used in the company description (chapter 4.1) was collected through the company homepage as well as through interviews with the SLL supervisor and CT manager.

3.3 Method assessment

The fact that time study data was obtained by various means, that is, through interviews, direct observation and time templates could affect the validity of the study. However, it is assumed that since the employees work with these processes from day to day the validity of the data gained from them was similar to the ones that had been obtained through direct observation. Additionally, since the employees verified that the average times established for each process were correct it further increased the validity of the study.

Furthermore, since the interviews and time study were conducted on English and the employees in question are Swedish it could be that the researchers were not able to obtain all information needed or some of the information was misunderstood. This could affect the validity of the study. However, since both parties were fully aware of this and the CT employees discussed and clarified points which were in question it is assumed that the validity of the thesis is not affected greatly. Furthermore, as the CT employees were asked to verify that the information obtained was correct afterwards it should further increase the validity.

As the interviews were semi structured it could be that the information obtained was diverse between different employees interviewed which could also affect the validity of the thesis. This is mainly since in most instances interviews took different direction depending on the employee in question. However, when the researchers had conducted all interviews and discrepancies were uncovered, additional questions were asked to even out the inconsistencies.

According to Bryman and Bell (2011) a reliability of a study is concerned whether its results can be repeated. By using the interview template which was constructed for the employees it is assumed that the study could be repeated. Furthermore, since the time study is described in detail the reliability of the study further increased. However, as the interviews were semi structured there were some topics discussed which were not in the template.

4 Empirical data

In this chapter the focal company (SLL), Schenker Logistics (SLOG) as well as the control tower within SLL will be presented. Furthermore, general processes are explained and support and problem solving function is described in detail. This will be followed by descriptions and maps of all administrative processes identified in the CT for the four customers, time study results and a description of how the four customers are priced today for the administrative services.

4.1 Schenker Logistics Sweden (SLOG Sweden)

SLOG Sweden is a daughter company of Schenker North, which consists of Sweden, Norway, Denmark and England. It is a pure third party logistics company which mainly focuses on warehouse handling. However, the company also buys and sells transport services in collaboration with many different companies (e.g. DHL, Schenker land and UPS) and thus is able to offer complete logistics solutions (Kolderup, 2012). SLOG Sweden has logistics centers at 5 strategic situated locations in Sweden (Jönköping, Skåne, Nässjö, Stockholm and Gothenburg) and total warehousing space of 130.000 m² at their disposal. Furthermore, it has approximately 400 employees and in 2011 the turnover was more than SEK 500 million. The company has around 60 customers in Sweden however, most numbers of customers are located in the warehouse in Stockholm and there is also where they have most of their administrative services (DB Schenker 2012).

4.1.1 Schenker Logistics Landvetter (SLL)

In November 2011 SLL moved into a new warehouse located close to the airport in Landvetter Gothenburg (figure 5). After an expansion which is assumed to be finished in the end of 2012 the total floor area will be 40.000 m² with additional 8.000 m² on a mezzanine. At the moment there are eleven customers managed in the warehouse. However, after the expansion the total number of customers will be 12 (Kolderup, 2012). These customers are quite diverse in regards of business characteristics and environment (e.g. industry, fashion) thus they have different needs in relation to warehouse and administrative solutions.

Figure 5. Schenker Logistics at Landvetter

4.1.1.1 Control Tower

The CT is a centralized planning and control department within SLL which enables an effective flow of information and coordination between different entities within the chain (figure 6). Furthermore, the department is responsible for executing main administrative services (e.g. tracking, transport booking and customs handling) for SLL´s customers. A large part of this concerns customer service or support, addressing various issues that occur, in order to ensure an efficient material and information flow. At the moment there are 8 employees in total working in the CT, seven of those being process owners and a CT manager which is responsible for leading and guiding the CT team.

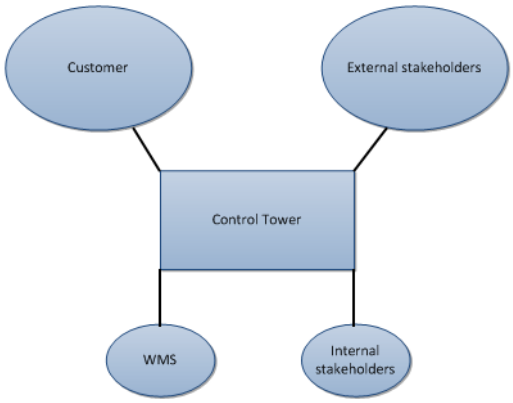


Figure 6. The CT is a centralized planning and control department within SLL

4.2 Main processes in the CT

Before going in to the mapping of all processes it is needed to provide short explanation on the main processes that are executed in the CT. Furthermore, as the support function is not defined in the same way as other processes, this will be described in more detail.

4.2.1 Inbound

The inbound process in the CT is generally split in two phases, a planning phase and receiving phase. Then the activities performed in the CT will be different whether it is a container or a truck that is coming in. These are merely connected to notifying production on an incoming shipment both before and at arrival but as well solving problems that occur.

4.2.2 Outbound

The outbound process is mainly associated with two main activities. Firstly, various types of transport bookings are performed by the CT depending on the requirements of each customer. Then for outgoing shipments that are going to a non-EU country, the CT is normally involved in providing the corresponding export documents before the shipment leaves SLL.

4.2.3 Returns

For goods that need to be returned from the Customer Back to SLL, for various reason such as wrong pickings, the CT is often enquired to book the transport for this.

4.2.4 Meetings

The CT along with other SLL staff normally has meetings with the customer a couple of time per month, where the most important issues at that time are discussed.

4.2.5 Invoicing

The CT is also mainly responsible for creating the invoices for customers. This can be divided in handling invoicing and transport invoicing. However, the transport invoicing is solely performed for the customers where SLL is responsible for the transport. This process is normally performed once per month.

4.2.6 Support and problem solving

As described in the method chapter, the support and problem solving function does not fall under any of the processes defined. Basically these are the activities that are not happening repetitively and can therefore not be related directly to a specific process that is characterized with defined activities and begins with a defined input and ends with specific output. These, were then placed under the same definition; support and problem solving, which was believed to cover the activities performed outside of the defined processes.

The support function is divided into four different categories depending mainly on from where the input is as well as the type of support that is performed. Together these factors describe the perhaps most important function of the CT that involves providing support to main processes and thereby ensuring efficient and smooth flow of goods and information from the point of inbound order entry until the goods arrive at the final destination.

4.2.6.1 Customer support

Customer support mainly concerns the CT being present for the customer, answering all kinds of questions and enquiries. These can be questions concerning status of orders, inventory status as well as pointers on faults performed by SLL such as wrong labeling. Here the input is normally from the customer´s side.

This can often be a quite time consuming function since the CT employee might need to deal with the same issue several times over a specific period of time. This is primarily because the CT employee will receive a question, look into it and provide with an answer, but often the customer wants a "better" answer or looks more closely into it and comes back with a new question. This also makes it quite hard to define customer support as a certain process with a specific input and output since one request can stretch over days, even weeks.

4.2.6.2 Internal support

This involves all kinds of internal communication that the CT has with e.g. production, IT support, and economics department and are necessary to ensure a smooth flow of information within the company. Here the input can be both from the CT as well as internal parties. For this process, the CT can spend substantial time with production, walking back and forth in production, discussing different problems that occur and finding solutions.

4.2.6.3 External support

External support is defined as all support that is offered to external parties other than the customer (e.g. transport companies, KGH).

4.2.6.4 Proactive support

Finally, proactive support means that the CT employee has the initiative on identifying issues needed to solve, such as problems with orders and either finding solutions to these, or contacting the right party needed to solve this. This is mainly performed to ensure that the flow of both information and materials is continuous.

Finally, these four factors can of course intersect and be interrelated. For example when working on an enquiry for the customer the CT staff will most likely need to communicate with the production staff in order to get correct information or discuss how this can be solved.

4.3 Process mapping and descriptions

This sub-chapter focuses on describing both visually as textually all different processes that are performed for each of these four customers in the Control Towers. However, for some of the processes, a process map does not contribute to a better understanding or explanation of the process and is better explained in a text description. Furthermore, improvement possibilities recognized by the CT employees are illuminated.

4.3.1 Customer A

Customer A is one of SLL´s newest customers, started in 2011 and is SLL´s second biggest customer in relation to turnover; with for example around 20 blue collar staff in the warehouse. Customer A produces all kinds of working clothes for numerous different industries such as heavy work wear, healthcare, hotels, restaurants, catering and more. Customer A has 250 suppliers that require a lot of work for the unloading of inbound shipments, repacking them and putting away to the shelves. This also means that number of articles is very high. As a consequence of Customer A´s characteristics, there is very much pick and pack performed for them and they have around 50 customers that are sorted into three different zones on the mezzanine in SLL in order to make the pick tour for the pickers shorter and more efficient.

4.3.1.1 Inbound

The inbound process for Customer A in the CT can be divided in two separate parts; the inbound planning process and the inbound receiving process.

Inbound planning

Concerning planning inbound orders, SLL requires that their customers send delivery notifications in advance since it gives them an opportunity to schedule their staffing capacity and to ensure that all inbound orders can be admitted in a quick and efficient manner. Consequently, the inbound process is initiated when the CT receives a delivery notification which today is normally coming from the transportation companies via email. The email

contains general information regarding the shipment such as; arrival date, number of pallets, order number and number of packages. The amount of information can however differ substantially and can for example contain only the number of pallets. When the CT receives the notification they normally email Customer A to make sure there is an inbound order for it and then notify production that the shipment is coming in. If there is no inbound order number on the notification the CT will request that Customer A makes sure that an inbound order has been entered in to the system. This is because SLL is not able to enter articles into the system until an inbound order exists for it in the system and Customer A has had some problems with entering all inbound orders in to the system prior the arrival.

Normally there should also be an arrival date on the delivery notification stating which date they will deliver the shipment. However there is no specific time slot dedicated for each delivery and the only restriction is that it is not possible to arrive with a shipment later than 16:00 each day since it is too close to closing hours (17.00). Therefore the trucks arrive on any given time between the morning and 16:00 or even the day before or after scheduled arrival day.

Before sending a request regarding the inbound order to Customer A, the CT notifies production about the inbound order and writes it on the notification board in the CT. This is done to ensure that everyone knows what is coming in the upcoming hours/days. If an answer is received from Customer A concerning the specific inbound order the CT forwards it to production, otherwise the shipment will arrive anyway.

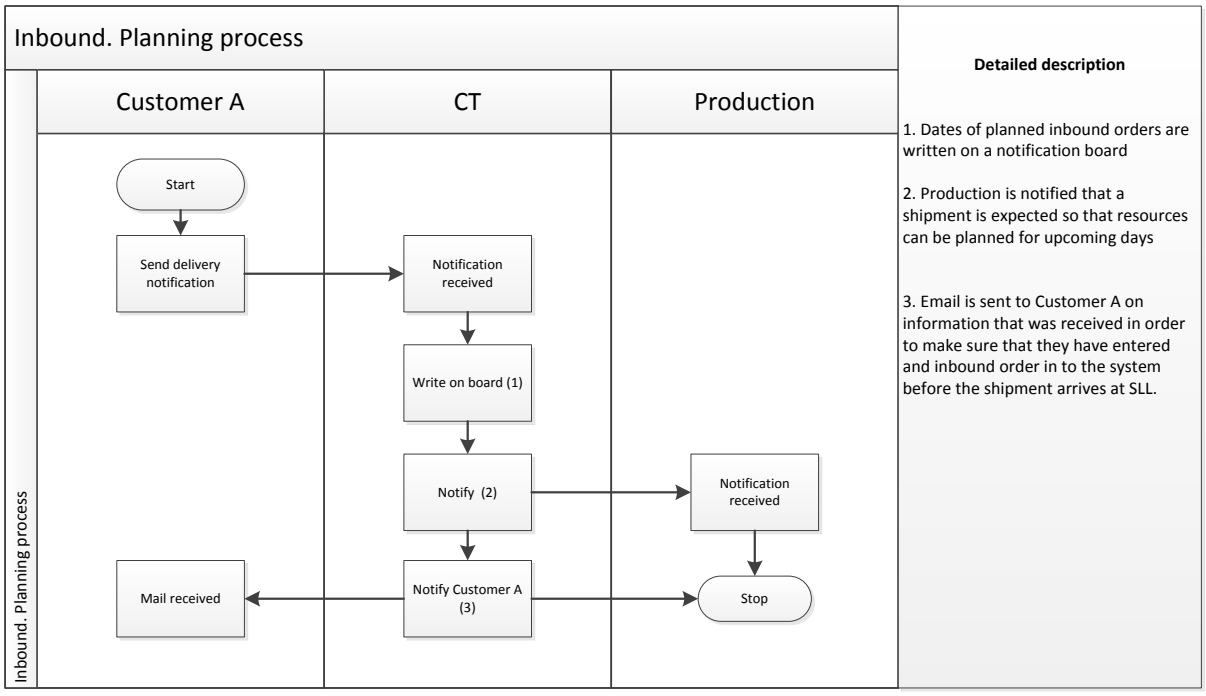


Figure 7. Inbound planning process

Inbound receiving

As there have been problems with Customer A placing in inbound orders there have been the same difficulties with getting them to send the delivery notifications as requested. This comes to the later part of the inbound process, where the truck arrives at production with the shipment. The process is initiated when the chauffer reports to the CT. The CT employee checks the notification board to see if the shipment has been advised. If not, the CT contacts production and checks if they are able to take it in. This depends on how busy production is at that time and how big the shipment is. If they are not able to receive it, the driver gets a new appointment the latest 24 hours later. However in most cases SLL tries to avoid this because of obvious inefficiencies and extra costs. Also, the CT employee logs this information in to excel that is used to inform Customer A on how many times the CT is not receiving a delivery notification. If the shipment is on the notification board, the CT sends the chauffer to the correct gate number. When arriving at the specific gate the chauffer hands over the shipment documents (waybill, purchasing order, etc.), production counts the number of colli´s (cartons, pallets, etc.) and if correct, confirms that it's the same amount as on the shipment document.

After this, production types the order number from the shipment document into the WMS system to see if it is there. If production is not able to find the inbound order for this shipment, they place it on the warehouse floor and contact the CT asking them to solve this. Furthermore, it is happening occasionally that no order number or other information is on the shipment. This will require quite a lot of extra time for production, the CT and Customer A in trying to investigate what it is that was sent, from what supplier it came from, etc. so Customer A can either locate the corresponding inbound order in their system or create a new one, which then enables them to enter it in to SLL´s WMS. As it is today, production log the shipments with missing inbound orders in to an excel sheet with information given with the shipment, and forward the sheet to the CT around ones a day, both in order to require Customer A to enter these in to the system but as well to monitor if this is increasing or decreasing between weeks/months. When receiving the list, the CT employee forwards it to Customer A and asks them to fix the problem, either by placing an inbound order into the WMS via EDI or if it already exists, forward the order number to the CT so it can be identified. Finally when a reply has been received, the CT employee needs to look in to the system to make sure that all orders have been fixed before forwarding the notification to production. As can be seen, inbound orders are causing quite much problems for all parties involved since it can often be hard for Customer A to realize which order CT´s enquiry concerns and what articles to make an inbound order on. Consequently, it can take even a few days for them to respond to these requests from the CT, especially those that have no inbound orders or lack general information needed.

When the orders have been received in SLL´s WMS system via EDI, production can start entering the articles in to the system. First the system will show an unloading list stating exactly what is supposed to have arrived in that order. Production prints the list and counts

the cartons to see if the pieces in each carton match with how many they are supposed to be. When finished counting production prints out a label containing barcode and article number as well as information on exactly where to place each carton. This label is placed on each carton. When he has counted everything he reports the exact numbers into the system. This usually varies, especially in textile since suppliers are allowed to round up to their batch sizes to the ordered quantity +/-10%. However always when a mismatch is between the order quantity and shipment quantity, the CT is notified, which then forward this information over to Customer A. Finally, the cartons can be placed in the shelves.

Additionally, when registering the shipment into the system there can be some problems occurring that hinder it to be placed in the shelves and entered into the system right away. An example can be that one of the article numbers doesn't exist in the system. If this occurs, production needs to contact the CT which forwards the problem to Customer A and asks for the information needed to register the article into the system. When the information needed is received from Customer A the CT employee forwards it to the IT support which registers the information into the WMS system. When this is done the shipment can be finalized and placed in the shelves.

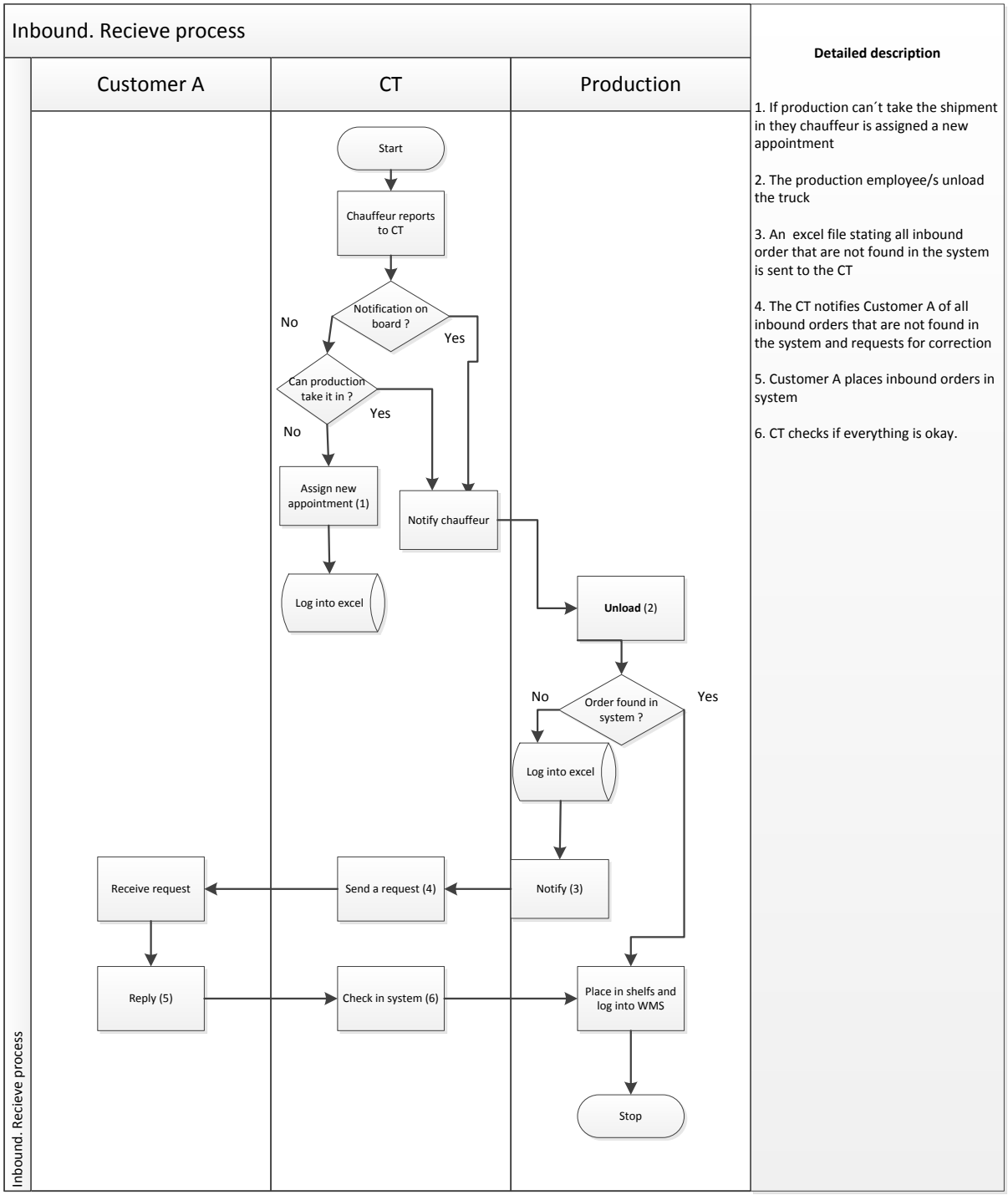


Figure 8. Inbound receiving process

4.3.1.2 Outbound

This chapter covers the main processes performed for Customer A´s outbound shipments.

Booking confirmations

First of all, Customer A manages their transportation through other transportation companies'. The majority of these transports are booked or confirmed automatically through Centiro when production has closed the shipment in the system. Consequently, CT normally has nothing to do with this. One example of this automatic confirmation is the

transport company Posten that comes each day of the week to pick up shipments. There, the booking of the transport has already been done but Centiro sends an EDI-file specifying the quantities, article numbers, etc. so Posten can scan the packages in to their system. Another transport company booked automatically is e.g. UPS standard.

However, there are two conditions where the CT needs to take part of this. Firstly this is for shipments going with the transport company Dachser. There, e.g. for shipments going to SAS Denmark and SAS Sweden, Posten normally do the transport. However, if these shipments are so called bulk shipments (over 12 packages or a whole pallet) the transport company Dachser is used to do the transportation, which then needs to be manually booked by SLL. This goes for all other shipments going with Dachser. This process is initiated by production seeing that a shipment needs to go with Dachser. Then the booking is sent manually by EDI-file to Dachser. Production then sends the same information to the CT by email and asks them to do a so called security booking with Dachser. This e-mail is then forwarded by the CT employee to Dachser. The reason for this security booking is that there is an issue that has come up sometimes that Dachser only receives the email but not the EDI file from production. In that case, Dachser informs the CT about it which looks in the system to see if it has been sent. If not, the CT employee contacts production and asks them to send the file.

Secondly, for shipments going to customers in Finland, Customer A requires that SLL uses the transport company Itella which comes daily to pick up shipments. Consequently, production sends the CT an e-mail each day regarding the freight quantity that needs to go with Itella that day. Thereafter, the CT sends an email (before noon) to Itella stating the amount that will be transported with them. Subsequently, Itella sends the CT the waybill which is printed out and sent to production.

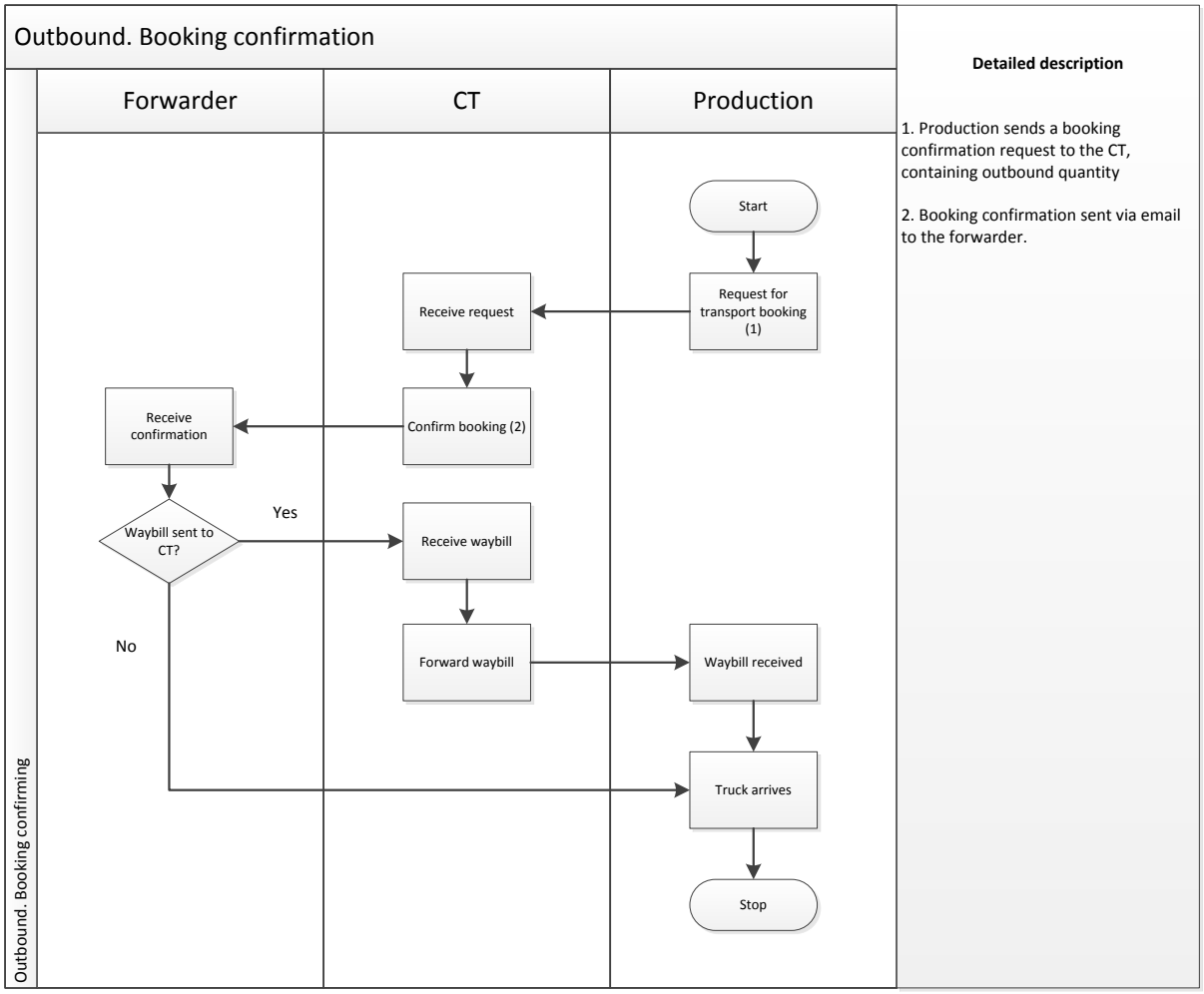


Figure 9. The outbound process for booking confirmation

Express transportation

When Customer A makes an outbound order they state if it is an express order. Once production has picked it, it is either brought to the CT or production emails the CT that it has been picked. The CT personnel logs into the system to find shipment information (weight, address, etc.) which is used to fill in the transport booking on the UPS website. Once the transport has been booked the personnel receives an address label. Then, usually the CT employee runs out to production with the address label or the package.

Moreover, there are non-frequent customers in Iceland and SAS China that the CT needs to book the transport for every now and then since they are required to be booked with UPS express. This is executed in the exactly same way as the express transportation process since it is with the same transportation company. However these shipments are not "express" shipments as others that are booked with UPS express and therefore do not require the same priority.

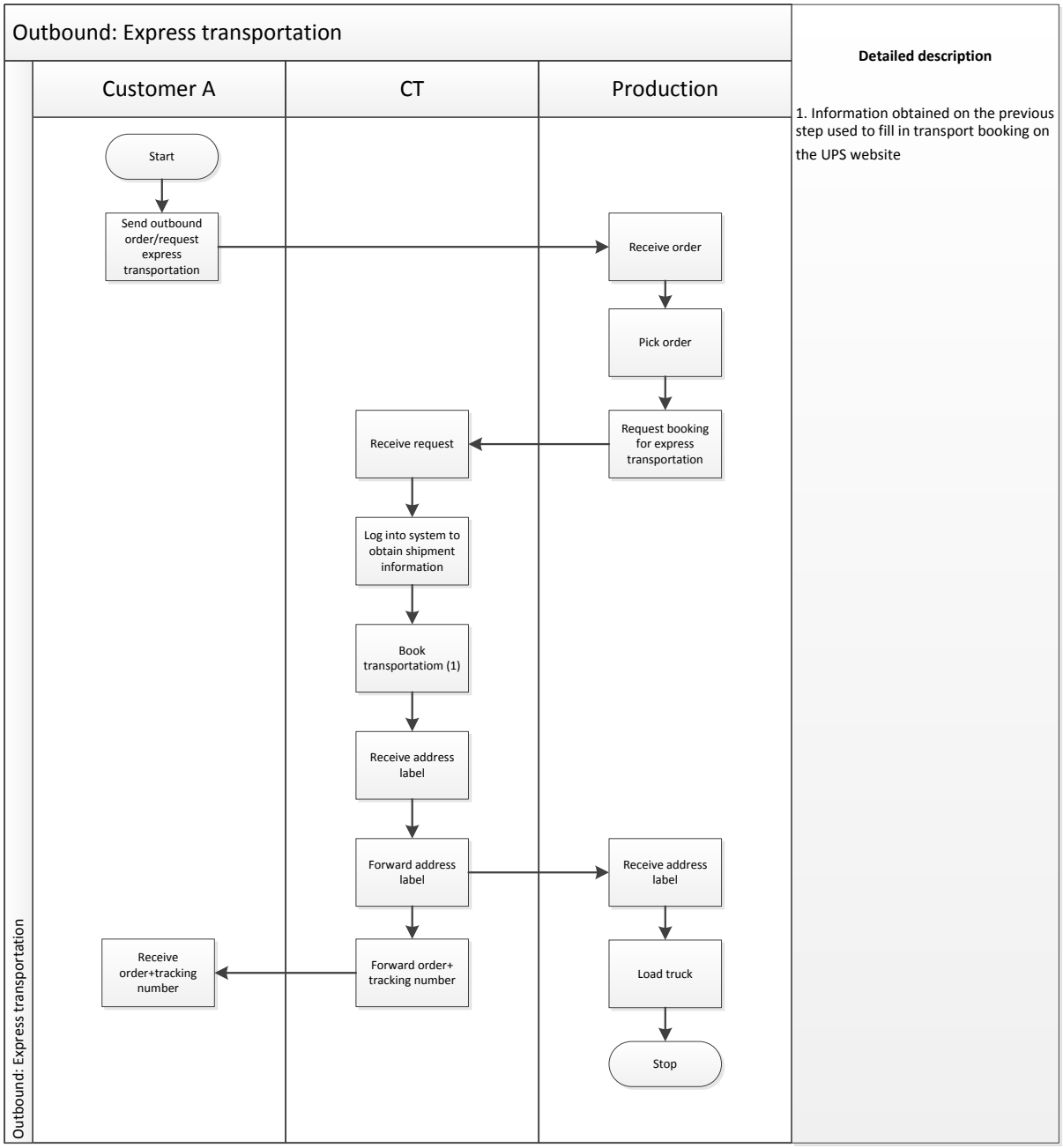


Figure 10. Express transport booking

Rush transportation

When Customer A needs a shipment to be transported within a very specific time limit such as a few hours, the company requests for a rush or BUD transportation. The main difference between this and a normal express transportation order is that the express order normally just needs to leave SLL the same day, while for rush transport; the shipment needs to be at the customer within one day, even within few hours.

The process is initiated when Customer A contacts the CT and informs them that a specific shipment needs to be sent urgently. The CT then contacts production in order to verify that the shipment can be picked within a specific timeframe. As soon as the order has been picked, production either brings it to the CT or sends an email with information regarding

weight and amount of packages on the shipment. Subsequently, the CT calls different transportation companies to check for prices and see if the shipment can be delivered within that specific time frame. In some instances Customer A requests to be contacted before the transportation is booked to get the price. If Customer A accepts the prices the transportation is booked otherwise it is booked with express delivery.

If Customer A does not ask for the price the CT books the transportation straight away. When it has been booked it is logged it into a excel file and all emails from Customer A regarding that specific shipment are saved as a precaution. Thereafter the shipment is picked up either from the CT or from production.

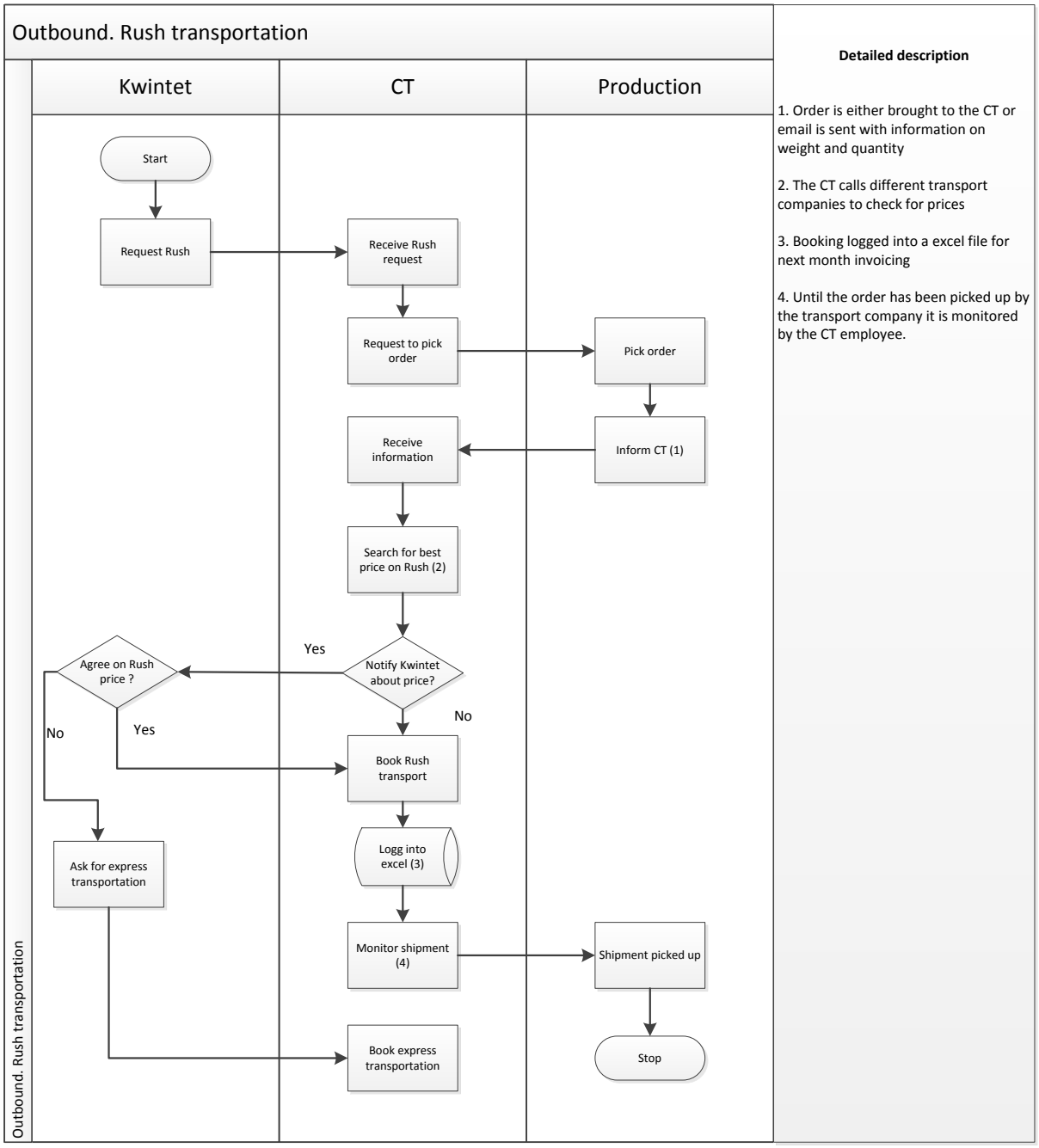


Figure 11. Rush transport booking

Export documentation

When shipments need to be transported outside of EU (Iceland, Norway, etc.) the CT has to contact Customer A in order to get export documents. The export documents for these shipments are always created at the departure date when the shipment has been picked.

The process is initiated when production sends the CT an email regarding non EU shipments with information about the weight and the "order picking numbers". Before Customer A is contacted the CT goes into the system to obtain the Customer A order number. A request for export documents is then sent to Customer A with all order numbers. Once Customer A has sent the export documentation the CT personnel makes few copies of it and forwards them to production. For shipments going to either SAS Norway (always leave on Mondays) and to Laksevågen (always leave on Tuesdays), this process is always performed once per week. Other non-EU shipments can be leaving at any given time and thus do not have fixed frequency.

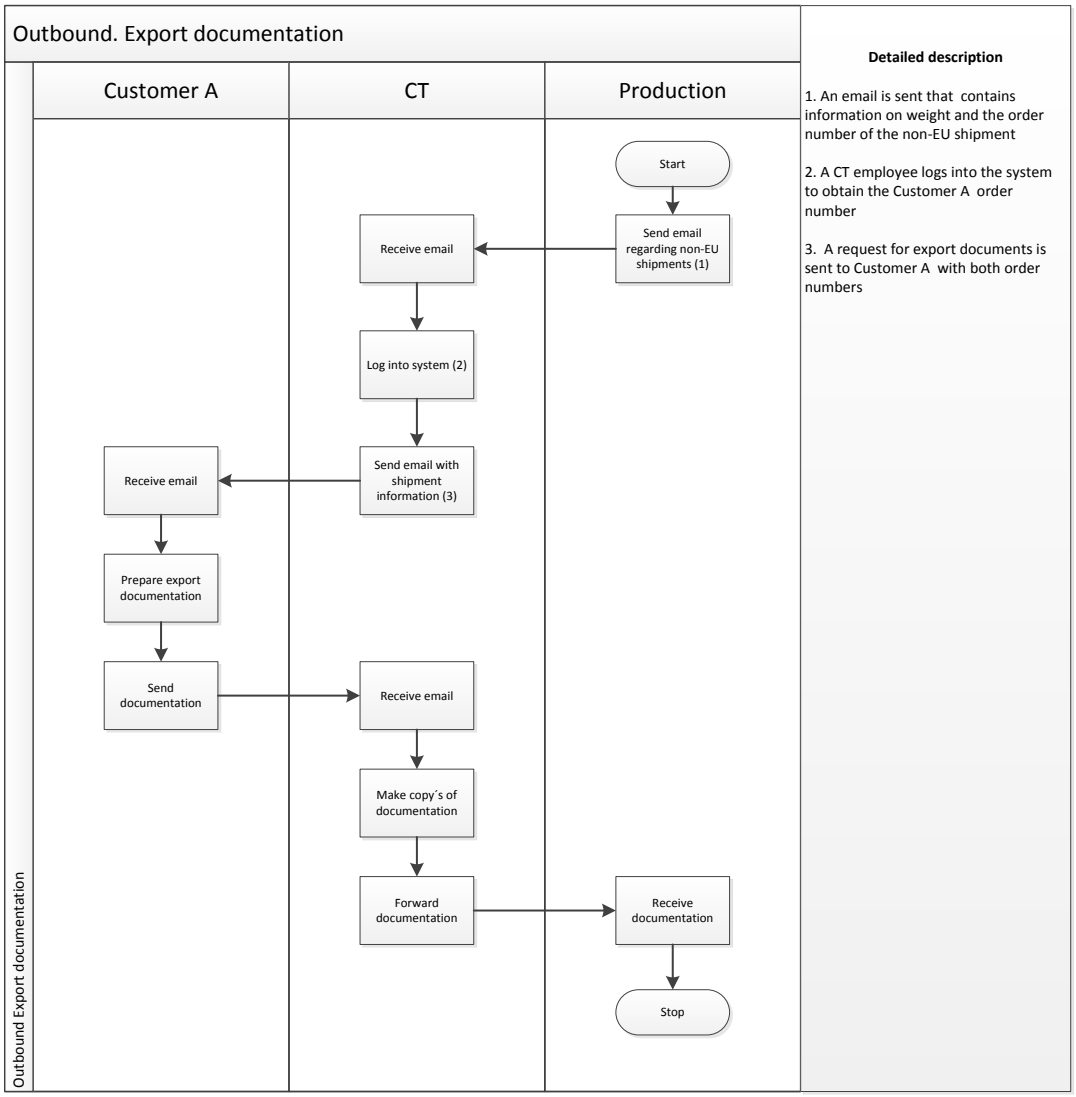


Figure 12. Export documentation for non-EU shipments

4.3.1.3 Return shipments

The CT is rarely notified when orders are picked incorrectly and returned. In most cases the information goes straight to production/stock manager. Although when the CT is notified via Customer A the information is forwarded to production which investigates the problem. Production then notifies the CT if the problem has been solved and the information is forwarded to Customer A.

4.3.1.4 Support and problem solving

As discussed in the time study chapter (4.4.1), this function is a very large part of the Customer A flow in the CT. This can be related to the fact that Customer A is a fairly new customer at SLL and consequently there have been some problems with them following the requirements set by SLL which has caused delays and inefficiencies in the flow. The support and problem solving for Customer A is split in four parts as defined for all customers. A large part of the support function is directed at answering and finding solutions to customer enquiries. However, quite much time is spent in communication with internal parties such as IT-support and especially production staff and stock manager. Then transport companies can have enquiries concerning several issues that are directed to the CT. Finally, normally when time allows, the CT employee works proactively with solving issues that might cause instability and delay in the flow.

Customer support

The customers support regards all types of questions and enquiries from Customer A that can arise at any given time. Concerning inbound this can be question regarding why an inbound order has not been entered in to the system. Another request could be concerning if the supplier has only sent part of a specific order and Customer A wants to check if they have received the rest, and if so, when they will be able count and enter it into the system. Concerning outbound, it can be questions such as; what is the tracking number of a specific shipment, why a shipment hasn't arrived at the customer and when it will arrive, if they sent the right quantity of the right order, etc.

Other enquiries can be that Customer A has a request for inventorying (stocktaking). Since Customer A pays an extra fee for this, the CT employee is required to notify its contact person at Customer A to get his approval before doing this. Furthermore, when inventorying is completed, the CT employee needs to take a copy of it, in order be able to show for it, if Customer A would have any comments on it when the invoice is sent each month. Inventorying is normally requested when there are some discrepancies in number of articles between Customer A and SLL. This can e.g. be that Customer A is charged for X number of articles by their supplier but SLL is not putting away the same amount. This can be because the supplier has labeled the packages wrongly causing SLL to enter wrong amount of articles in to the system.

Moreover, Customer A might request an order to be deleted (inbound or outbound). Finally, Customer A can have various “pointers” regarding mistakes such as badly packed pallets, wrongly labeled etc.

Internal support

This function is related to activities that are performed in cooperation with internal parties. For Customer A these are; IT-support, production staff and stock manager. Firstly, concerning IT-support this is mainly if orders get stuck in the system. If identified by IT-support, they contact the CT and let them known what is causing the failure. Then the CT employee needs to contact Customer A and ask them to fix this. This can for example be when an inbound order entered in to the system has an article number that has not been created in the system. For production and stock manager, this is merely related to order problems such as when an inbound order has not been entered into the system at shipment arrival.

External support

This function is the least time consuming for the CT employee in Customer A´s case and is mostly associated with giving answers to transport companies on various questions regarding the transport (e.g. address). However, since Customer A is responsible for the transport, they are responsible for most activities after the truck has left SLL (e.g. tracking shipments).

The CT employee is also contacted by companies that transport for SLL (e.g. UPS, Schenker Land). There can be various issues or questions that the companies bring up and in some cases the employee needs to contact production to be able to answer.

Proactive support

When time is available, the CT employee spends time on looking through problems that are on standby and sees if it is possible to find solutions to these, first by looking at it themselves, finding the source of the problem, and if they are not able to solve it, contact the correct person to do it. Furthermore, the CT employee looks through the system, discusses with production, etc. in order to make sure that everything is running smoothly. If problems are identified, the CT employee contacts the person that is able to solve this. Finally this can also be all kind of information that CT provides to Customer A in order to avoid misunderstandings. This can for example be if WMS sends wrong information to Customer A regarding stock status, inbound orders, outbound shipments, etc.

As can be seen from the description of this support function, the time that is consumed in the CT depends on how much is to do for the CT at each time. Therefore if less time is spent with the general processes; more time can be spent answering customer support questions, discussing with production and proactively supporting the customer in order to ensure that the whole flow is working.

4.3.1.5 Telephone meeting

Every other week a telephone meeting with representatives from Customer A is held. During the meeting recent or previous issues in e.g. inbound or outbound are discussed and improvement possibilities suggested. Also some general information updates are given by both parties. Then it depends a lot on the subject of each meeting how much the CT employee needs to do after the meeting, such as emailing different information or documenting new routines.

4.3.1.6 Invoicing

Since Customer A is a relatively new customer the CT is only involved to a small extent in the invoicing. For the main part it is done by the Customer A project manager.

In the end of every month the CT personnel collects all rush invoices and logs it into a excel file including the activities which have been performed that are not included in the contract. These are quite many today because of the problems that have been in this flow, e.g. for not entering inbound orders in to the system. The excel sheet is then sent to the project manager.

4.3.1.7 Overview of processes

Figure 13 provides an overview of all process defined for Customer A.

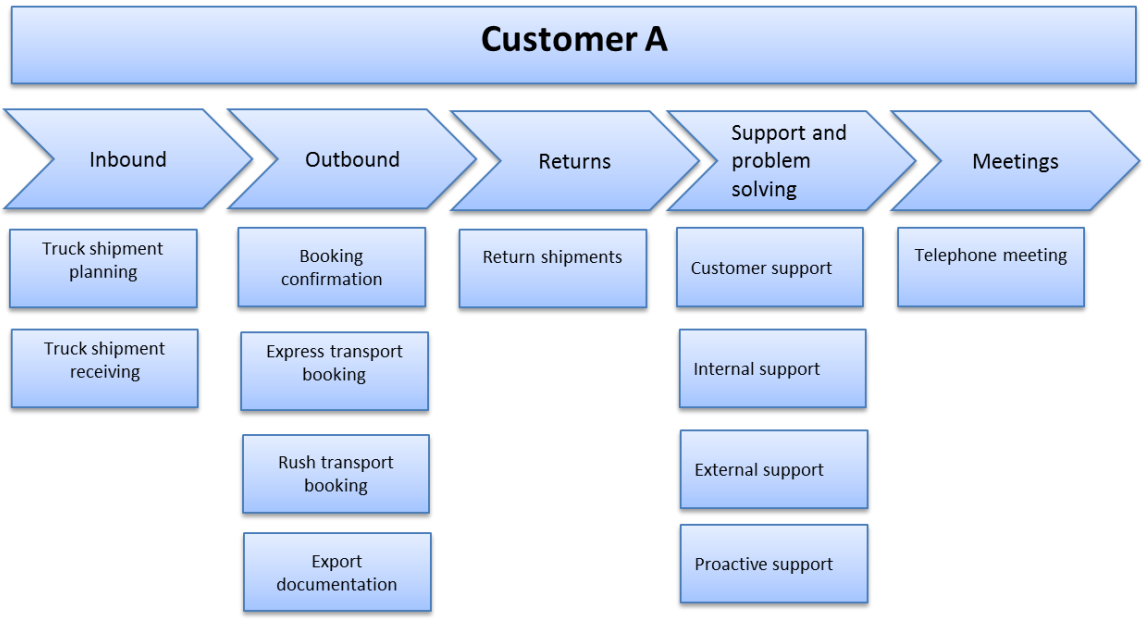


Figure 13. All processes identified for Customer A

4.3.1.8 Improvement suggestions by employees

In this chapter improvement possibilities recognized by the CT employee are illuminated.

Inbound

Like can be seen from the description of the process, there are many problems with the inbound process today, partly caused by Customer A, which can be hard for SLL to control or

resolve. One reason for this is that the requirements for sending delivery notifications and inbound orders have not become a standard routine for Customer A. The CT employee believes that this can for example be because there are many different parties responsible for notifying SLL for different shipments such as suppliers, transport companies as well as Customer A itself. Consequently, this process is taking substantial time for the CT, communicating with production and Customer A back and forth as well going into production discussing with them in order to understand the problems more thoroughly. In order to fix this SLL could simply not allow Customer A to send any shipments before they have put in an inbound order. As easy as it sounds it can however be challenging to implement in a real life situation but should benefit both parties if implemented successfully. Another way could be to put a limit on how many shipments can be taken in without a notification. Additionally, inbound trucks are not being given a time slot per day, but can be arriving at any given time which makes it harder for production to schedule their capacity. This should be changed so SLL would tell the transport companies when they could deliver the shipment.

However it also needs to be considered that Customer A is a relatively new customer and it can take some time to get the requirements that SLL puts on its customers in to a routine. During the first interview there had already been made some improvements regarding these issues and a month later when the observations were made it was clear that these matters have improved quite a lot. Firstly, Customer A has improved the number of inbound orders sent to SLL pre delivery. This is a result of frequent meetings between SLL and Customer A, where CT has pushed this. Also the CT has worked continuously on letting Customer A know each time they get a notification so Customer A can make sure that an inbound order has been placed. Secondly, Customer A has improved sending delivery notifications and is now mainly having their transport companies sending delivery notifications instead of three different parties. From this it can be assumed that this will continue to improve and the requirements that SLL puts on Customer A will hopefully have become a standard routine for Customer A in several months' time.

Finally there are improvement possibilities within SLL as well which mostly seem to be connected to better communication between production and the CT which would make the coordination of information between Customer A, the CT and production a lot easier and more efficient.

Meetings

A routine internal meeting with those that are involved in the functions connected to Customer A could possibly improve procedures as well as the information flow between different departments.

Invoicing

Since the CT has to invoice Customer A for every activity performed which is not stated in the contract they have to know exactly what is included in it. In order to make certain that

Customer A is invoiced for all additional functions the CT should have a clear listing of what is included in the contract. However some responsibility must also be put on the CT, to really try to understand what is included and what´s not and charge for everything that is not.

Some segments in the contract also have to be updated, since some procedures have changed considerably as well as the proportion between different procedures.

Return shipments

Since the CT is rarely notified about orders that have been incorrectly picked it is hard for them to see if there is any correlation between occasions and find improvement possibilities. If a standard procedure would be established it could lead to improvements in this sector. Reoccurring problems could possibly be eliminated which would lead to both parties gaining.

Also CT/SLL wants to be able to keep log on the wrongly picked articles to compare to the contracts. However this is a problem at the moment since Customer A is not able to provide this information currently.

Support and problem solving

The support function is a very big part of the Customer A flow. Because of the instability in this flow, Customer A has frequent enquiries many of which concern inbound orders. As discussed before this can be traced back to lack of organization at Customer A that result in faults. Furthermore, Customer A is a fairly new customer as well as a very big one which makes mistakes more frequent. It is believed that when they have settled better and routines have been defined more clearly, both at SLL as well as Customer A, the support function should not be as time consuming as today. However, in order for this to be possible some improvements need to be made. First, it needs to be demonstrated in very clear way why it is important for Customer A to set clearly defined routines for sending a delivery notification, entering inbound orders in to SLL´s system before arrival of shipment, etc. When this has been achieved Customer A will be forced to make changes in order to fix this, which could for example be done by having fewer persons responsible for these actions or even having a coordinator that would be responsible for the flow, making sure that nothing goes wrong. However, Customer A is a large and complex customer with goods coming from different places which make it harder to execute this.

4.3.2 Customer B

Customer B is a company that purchase and distributes fashion apparel such as Lacoste and Caterpillar in various countries in Europe and is one of the strongest in this area in the Nordics and Baltics. Customer B has been a customer at SLL for around five years. In relation to turnover; number of staff in SLL, inbound and outbound orders, etc. Customer B can be considered as a mid-size customer. Around 70% of their goods that go through SLL are repacked and sent from the warehouse within a short period. This means that there is quite

a lot of handling such as pick and pack performed for the customer. Additionally, as a fashion apparel distributor, there are considerable seasonal variations in volumes handled.

4.3.2.1 Inbound

For the inbound procedure at CT there are mainly two inputs depending on if it is a container or a truck shipment that is coming in. Then the truck shipment can be divided in to two separated phases, the planning phase and the receiving phase. In the planning phase there are two possible inputs; if the transportation is booked by Customer B or if the CT books the inbound transport. In the receiving phase there are also two possible inputs; if delivery notification was sent prior to the truck arriving versus if no notification was sent before the truck arrives at SLL.

Truck shipments planning

In some cases the CT employee books inbound transportation (shipments coming from Netherlands, Spain or Portugal). When the CT gets a booking request from Customer B an email is sent to the booking office at Schenker Land in Gothenburg. Usually Customer B is notified that the transport has been booked. When a delivery notification has been received from Schenker Land the CT employee writes the planned delivery on the notification board. The CT employee also gets a tracking number from Schenker and tracks the shipment until it arrives at SLL.

When Customer B handles the transport booking the process is initiated when the CT receives a notification from the transport company. The CT is usually notified by the transport company at least one day before the shipment arrives. Thereafter, the CT employee writes the planned delivery on the notification board, prints out a packing list from Customer B and hands both the list and the delivery notification over to production. This is done so that production can plan how many employees from the staffing agency Uniflex will be needed the coming day.

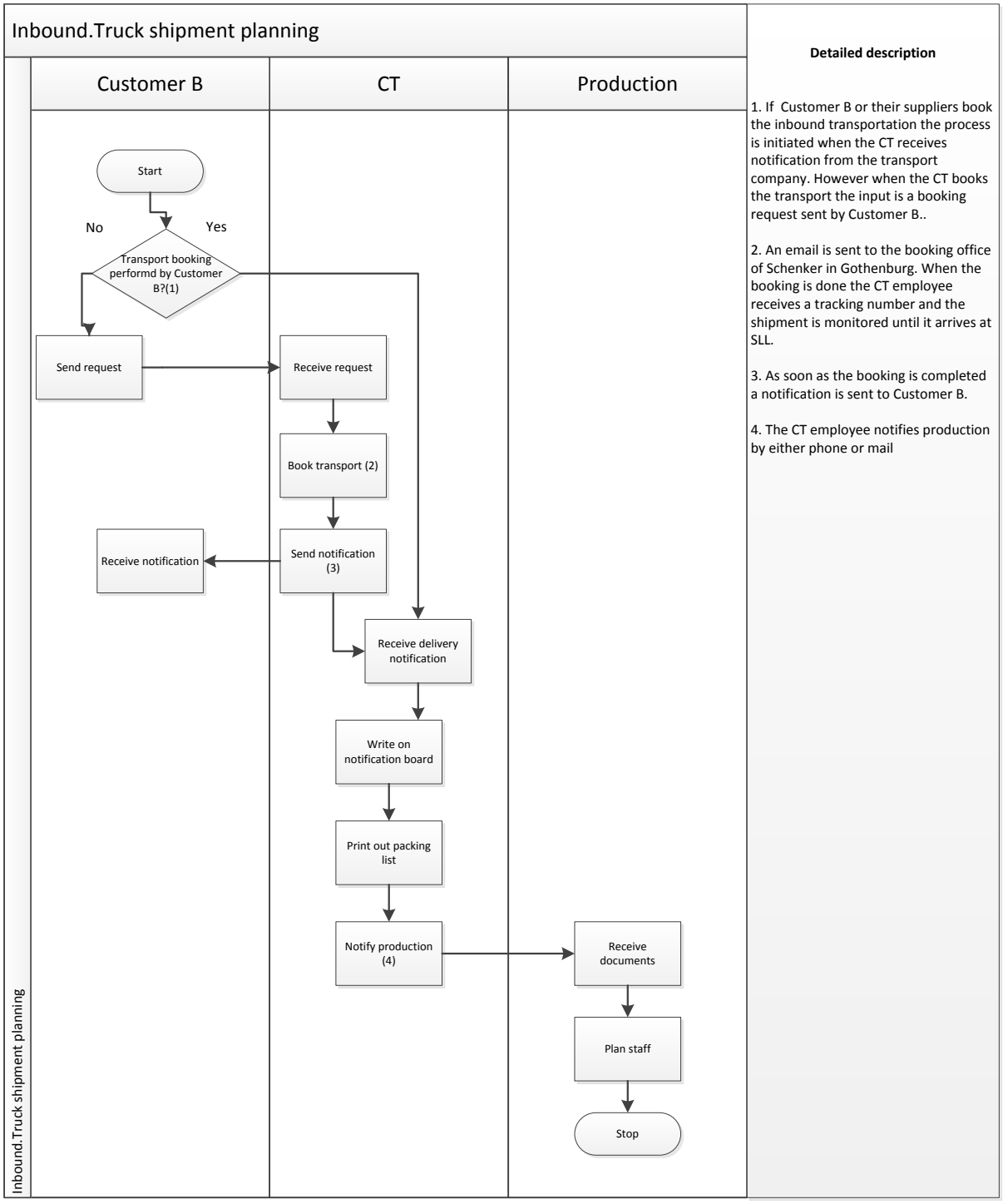


Figure 14. The planning process for truck shipments

Truck shipment receiving

When the truck arrives at SLL the chauffer comes to the CT and is informed which gate he should go to. The CT calls production to get information where the chauffer is supposed to go. However, if the CT does not get a notification from the transport company prior to the shipment arriving at SLL the shipment is taken in if it is small or if production is not too busy. Otherwise the chauffer is assigned another appointment.

In the afternoon, production hands over a list stating all shipments that have been unloaded and stored in the shelves. The CT employee uses this list to fill in a excel sheet stating the date which the shipment was received and when it was stored, which is then sent in the end of the day to Customer B with the priority list.

In some cases new article numbers have not been created in the system prior to the shipment arriving or Customer B does not generate an inbound order or picking lists. Production manages these matters in most instances by contacting Customer B and requesting that problems are resolved.

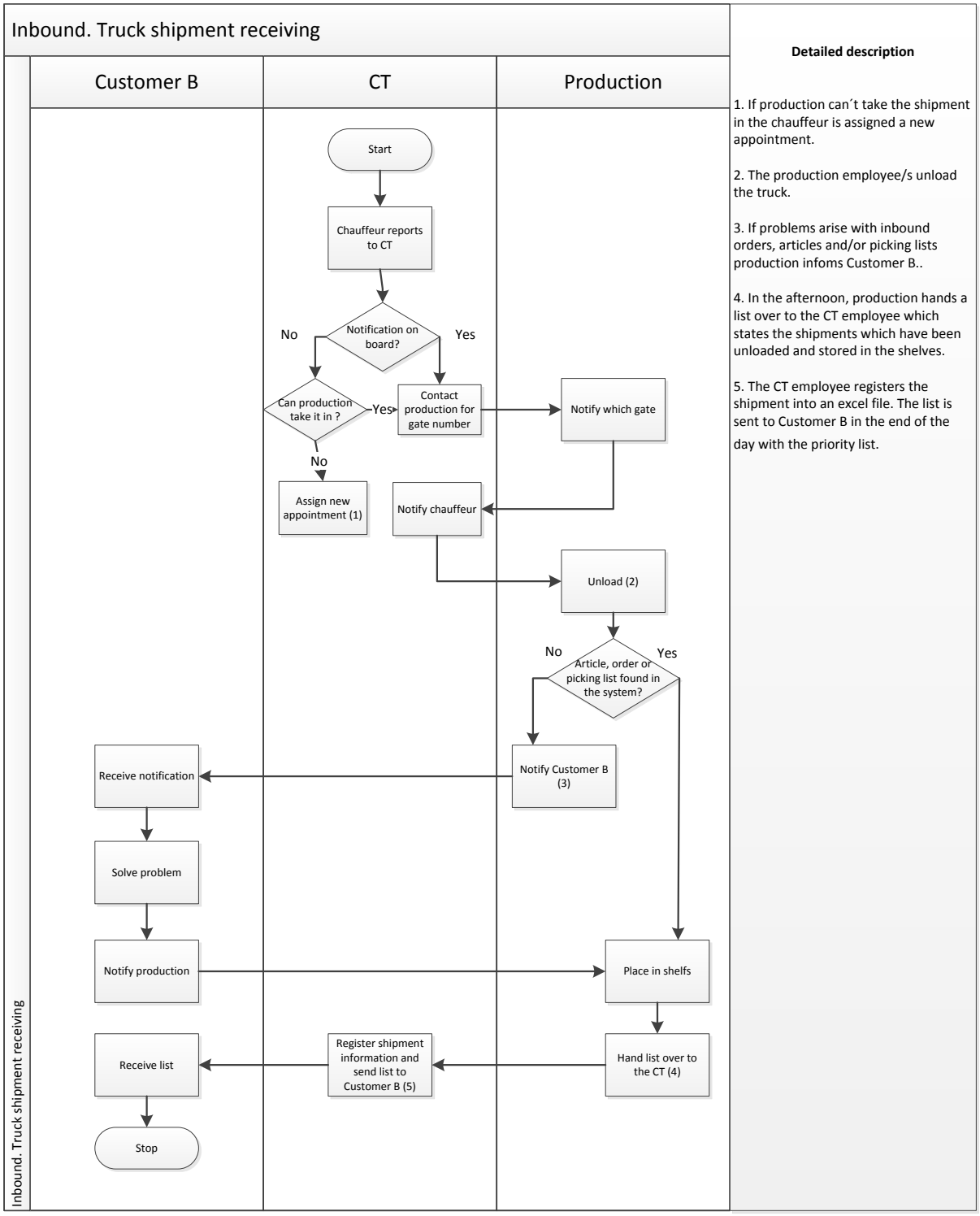


Figure 15. Receiving process for truck shipments

Container shipments planning

First of all, the CT receives packing lists from Customer B for containers that will be arriving in the future. These are then printed out when a notification from Schenker air & ocean (SA&O) is received. In the notification they state when the container will be arriving at the

port and inquire when the container can be delivered to SLL. The CT contacts production to ask when they are able to receive the container and thereafter notifies SA&O.

All container shipments originate from non-EU countries and thus need to be either kept in a bonded warehouse or custom cleared before arriving at SLL. Three of the brands that Customer B has in SLL are placed in KGH´s bonded warehouse and others are customs cleared by KGH. KGH is a company that manages administrative functions in the bonded warehouse which is located within the SLL warehouse. By having the goods in a bonded warehouse Customer B does not have to pay customs fees in Sweden if they are sent straight from the bonded warehouse to non-EU countries. Also by having the goods in a bonded warehouse, Customer B is able to postpone both the payment of the customs fees as well as the decision on whether to customs clear the goods or not. This can e.g. be if the goods are not sold and need to be "destroyed" or like mentioned before if they are sold to a non-EU country and therefore don't need to pay customs fees in EU.

KGH gets the notification from SA&O at the same time as the CT. If the shipment is placed in the bonded warehouse, KGH makes the customs documents and send them to the CT when they have received the notification from SA&O. Thereafter, the CT employee hands the documents received and the packing list to production. However, if the shipment is placed in SLL´s warehouse KGH custom clears it before it arrives.

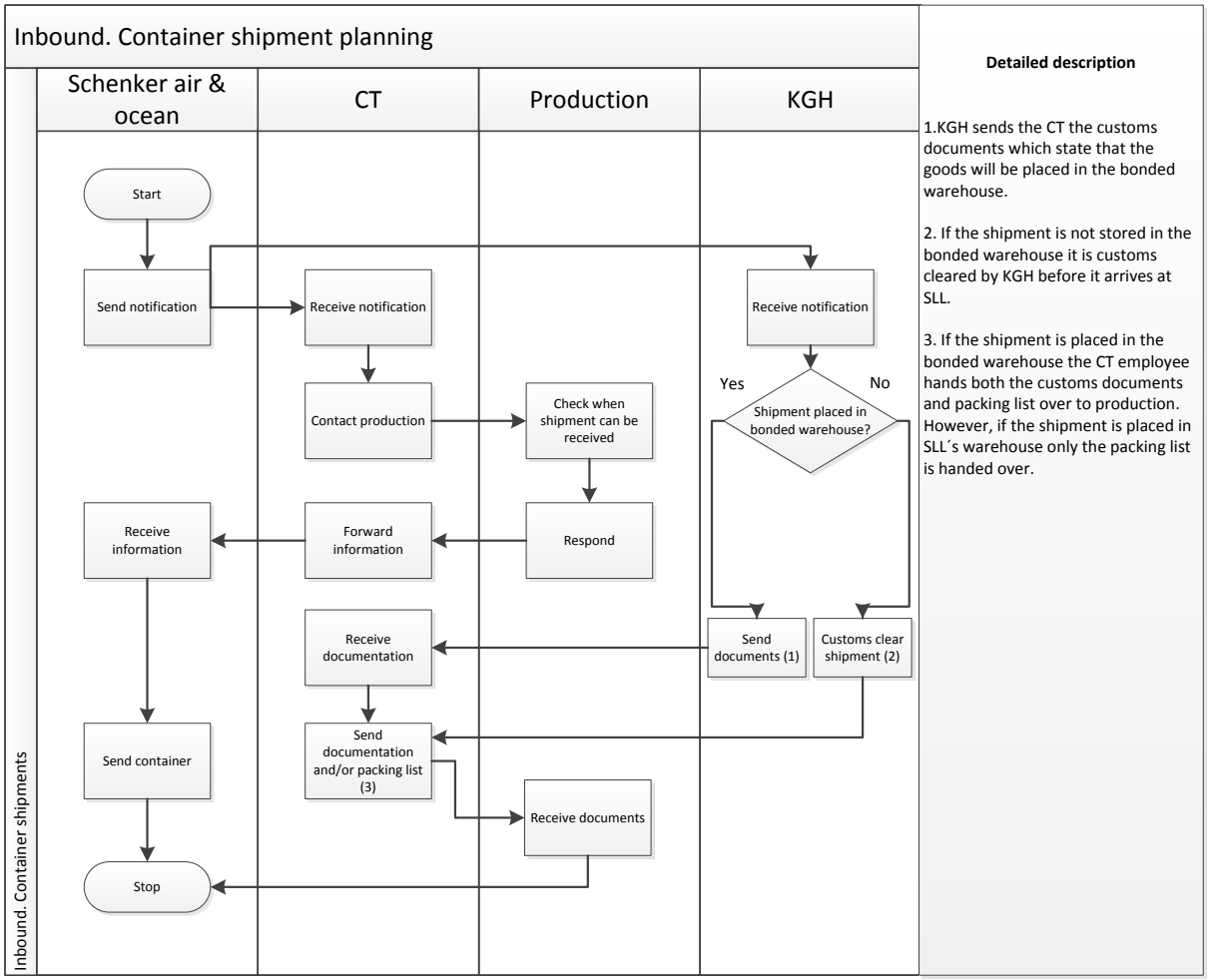


Figure 16. Planning process for container shipments

Container shipment receiving

When the container arrives at SLL and the chauffeur reports to the CT the staff checks the notification board and informs the chauffeur which gate to go to. Thereafter, the chauffeur drives up to the assigned gate where the container is emptied and the articles entered into the system. When production unloads the shipment they have to check it against the documents and see if the number of cartons is right and thereafter sign it. That document is then forwarded automatically to Customer B via EDI and mailed to KGH. Then if there is a problem with the inbound shipment such as if an article number is not found in the system normally production handles it in cooperation with Customer B.

In the afternoon, production hands over a list stating all shipments that have been unloaded and stored in the shelves. The CT employee uses this list to fill in a excel sheet stating the date which the shipment was received and when it was stored, which is then sent in the end of the day to Customer B with the priority list.

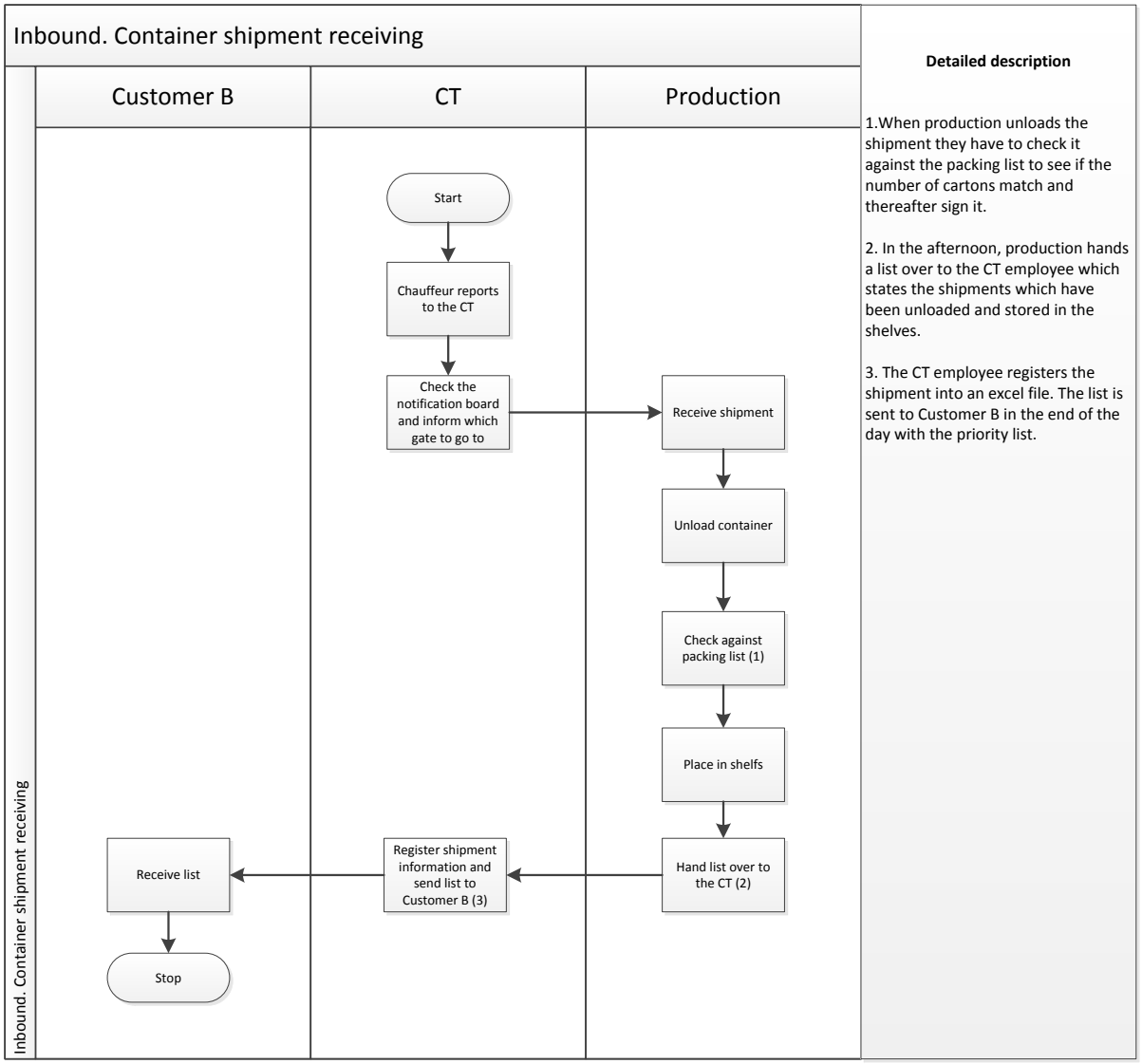


Figure 17. Receiving process for container shipments

4.3.2.2 Outbound

For the outbound process of Customer B there are mainly three procedures that have been identified that can be described separately. Firstly, Customer B sends the CT a priority list that needs to be updated each day. Then the CT has regular procedures that need to be executed in relation with customs documentation, both for non-EU as well as EU customers. Concerning the transportation booking, it is mainly handled by production. However, the CT does it for specific customers like mentioned below.

Outbound priority list

A priority list is sent to SLL via email from Customer B every day. The priority list is received by both production and the CT. Since orders are picked by the batch picking method at SLL (groups of orders are picked at the same time to minimize repeated visits to the same product bin location) the priority list will say what batch should be taken first. Customers

that require special handling are also displayed on this list. This can be if articles need to be packed or marked in a special way. Then, the CT receives automatic mail from the system seeing how many pieces or assortments are left to pick in every batch. Using this information, the CT employee goes in to the priority list every afternoon, updates it and sends the updated list to Customer B. Customer B then uses this update and coordinates with new customer orders and sends a new list back, normally the same day.

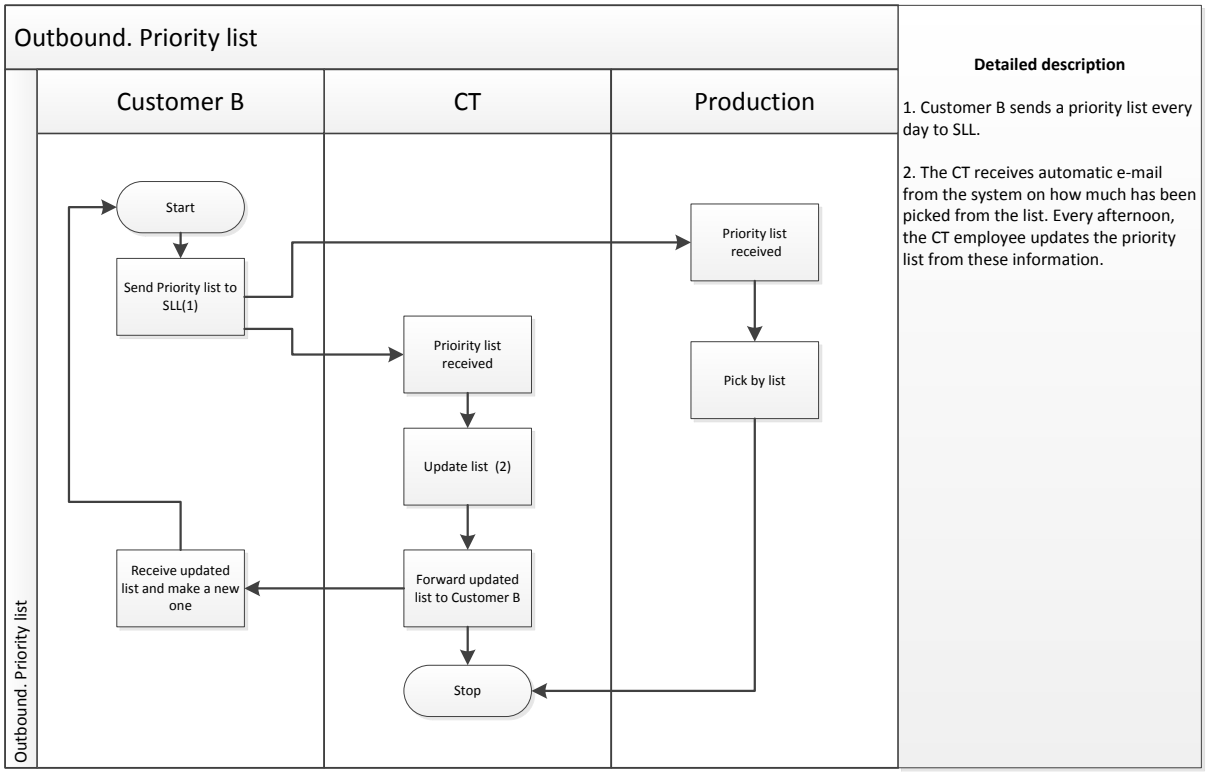


Figure 18. Outbound process- priority list

Outbound export documentation for non-EU countries

Concerning outbound orders for non-EU customers, the CT does transportation bookings for non-frequent customers, such as customers in Iceland or Greenland. For Iceland they book transport with TNT (smaller shipments) or Samskip (bigger shipments by ship) and for Greenland the transport is booked with transport companies in Denmark.

The input then is when production ends the picking of an outbound shipment in the system. Subsequently, KGH receives info on that shipment usually straight away. For shipments going to Iceland and Greenland, the CT employee needs to contact Customer B to get a proforma invoice which is dispatched to KGH. Thereafter, KGH creates the export documents and sends it to the CT and they print it out. After that, transport is booked with the corresponding transport companies mentioned above.

Shipments going to Norway are transported with UPS which comes every day and thus does not need to be booked by the CT employee. However, the employee needs to notify UPS how many pallets will be shipped each day. The CT employee receives information regarding the quantity from production and thereafter notifies UPS. For shipments going to Norway, production needs to access the Crystal report to obtain a proforma invoice. The invoice is then sent by mail to KGH which makes the export documents and sends it to the CT. The CT employee finally prints it out and gives to production which put them with the pallets going out.

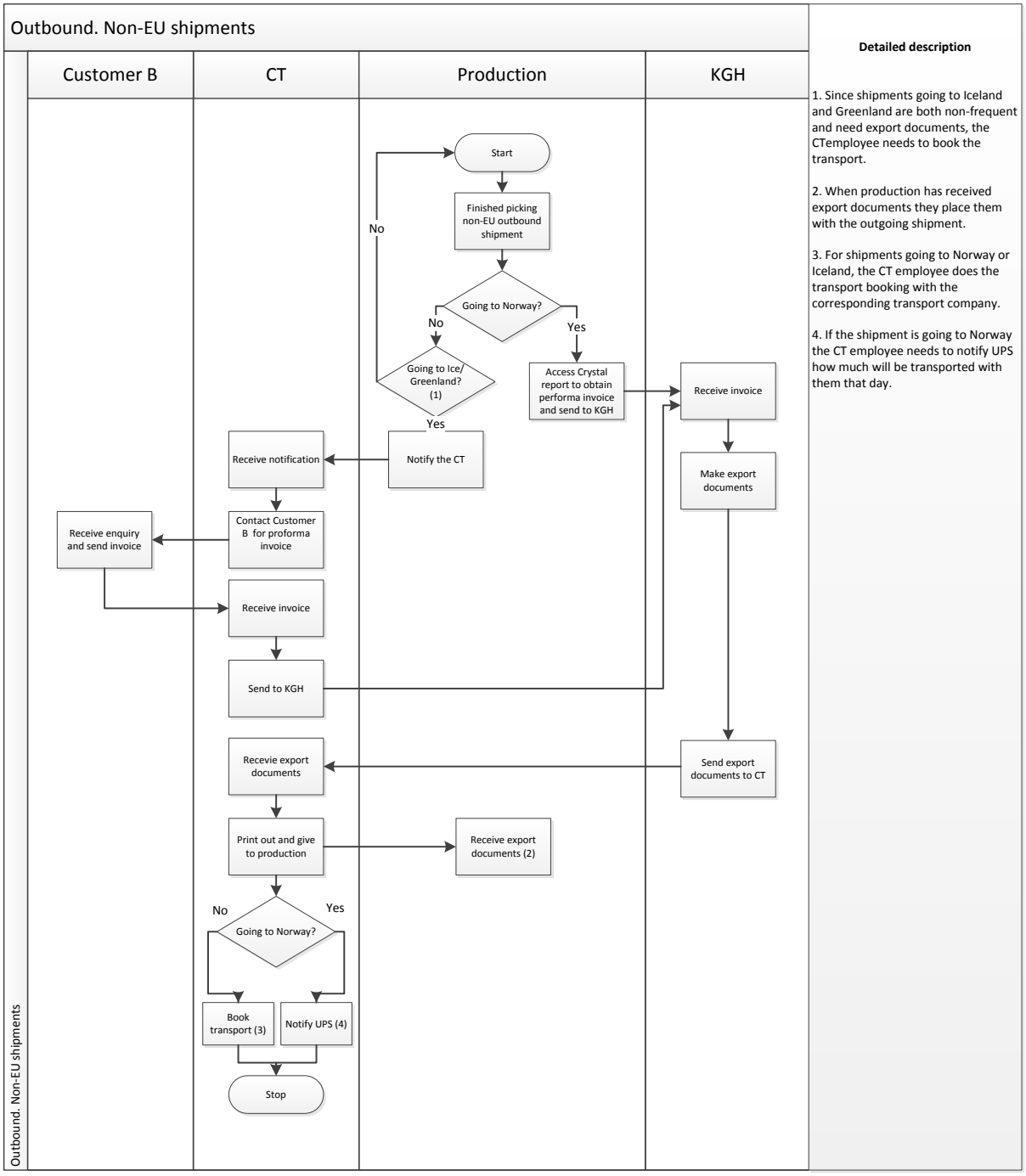


Figure 19. Outbound process- export documentation for non-EU countries

Outbound customs clearance for EU-countries

For EU customers KGH needs to do the customs clearance for the brands that are located in the bonded warehouse. Therefore, every day when production has finished picking all shipments for the day they let the CT know that they have closed everything in the system. The CT employee then notifies KGH which makes the customs clearance for the shipments that are going to EU countries. When KGH has finalized the customs clearance documents the CT is informed and the shipment is ready to be transported. For EU countries, production then performs the booking of the transport. Concerning express transport, Customer B is mainly covering it themselves.

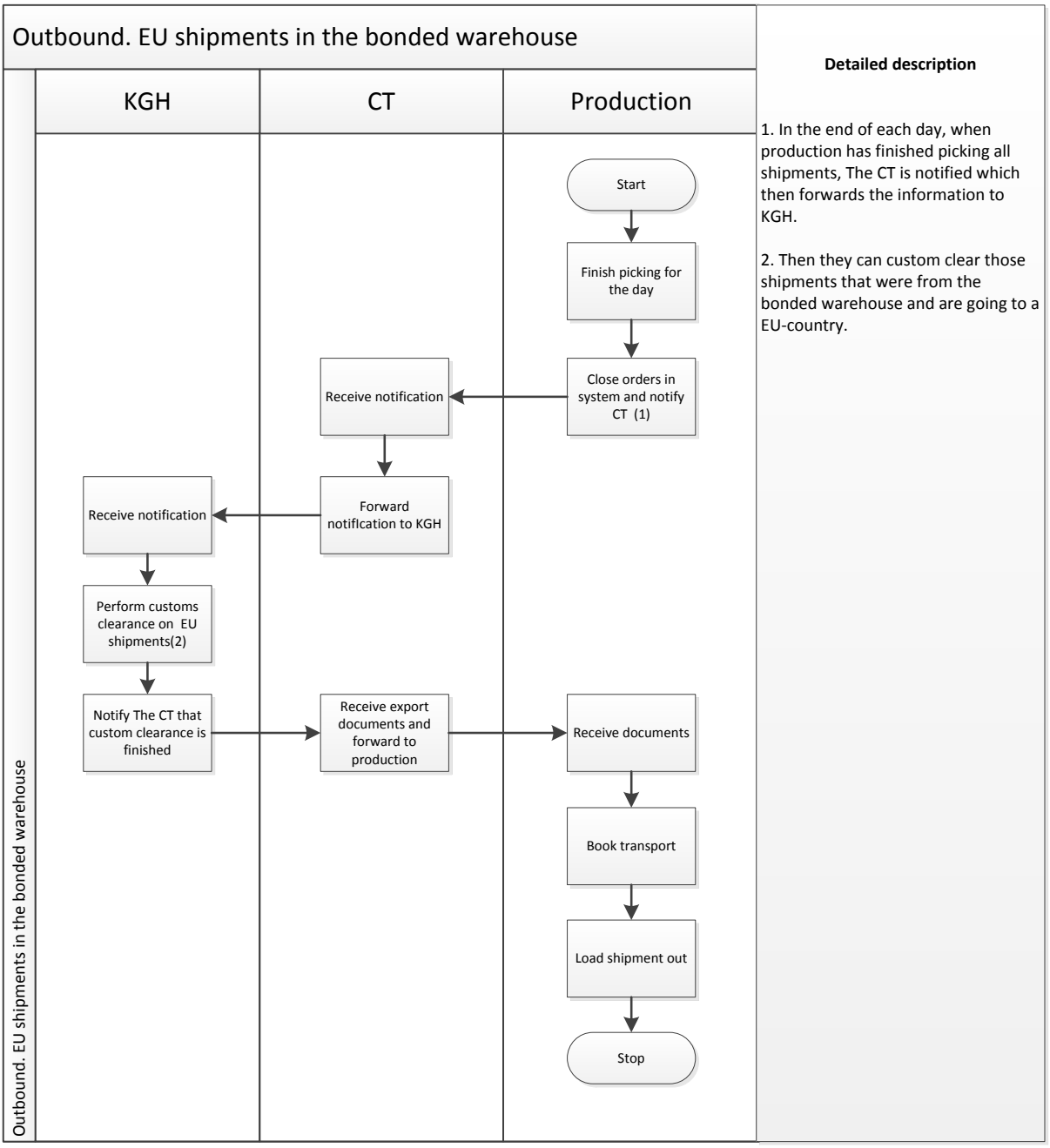


Figure 20. Outbound process- customs clearance for EU-countries

4.3.2.3 Return shipments

If products are not sold in the Customer B stores they can be sent back to SLL. In some cases the CT books these incoming shipments. In those instances, Customer B sends an email to the CT requesting booking for the transport. When the CT employee has booked it Customer B is notified via email. However, in most cases Customer B takes care of these bookings. Concerning wrong pickings at SLL it is mainly production that is involved in solving these issues with Customer B which normally books the return transports themselves.

4.3.2.4 Invoicing

The invoicing is performed by two CT employees. One handles the transport invoicing whilst the other one manages the invoicing for the handling.

Transport invoicing

During the whole month the CT employee receives invoices from Schenker Land department for the transport performed for Customer B. Normally, the CT employee completes the first four steps of the invoice procedure in Transportal continuously during the month. The procedure can take substantial time since the CT employee needs to go through all the data in Transportal for every invoice and make sure that all figures are correct. However, if the figures are incorrect the employee needs to solve it and thus the time spent on each transport invoice can increase significantly depending on how many figures need to be corrected. Furthermore, since Schenker Land is the only forwarder in Transportal the CT employee needs to calculate the freight manually for other transport companies'. At the end of the month the fifth and final step is completed and an invoice template is sent to the economic department where it is merged with the handling invoice and sent to Anders Lennartsson, operation manager, for approval.

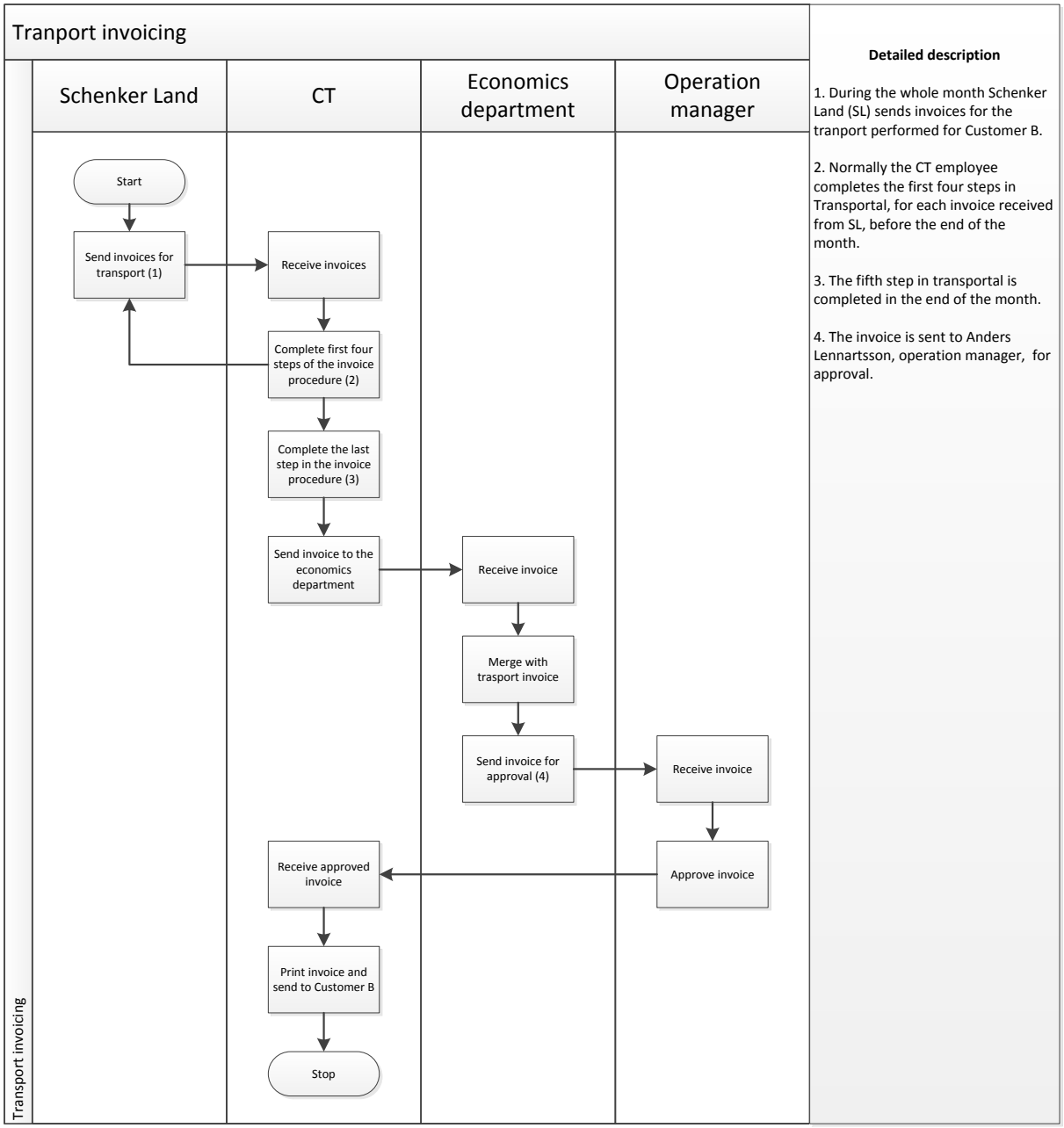


Figure 21. Invoicing process- transport invoice

Handling invoicing

In the end of each month the CT employee starts the invoicing process by collecting all reports and other information that is needed for the invoicing. These are merely collected from production and the Crystal report as well as the CT person responsible for Customer B. However, often there are problems with obtaining the data needed and thus the activity can range from taking couple of hours to almost a whole day. Thereafter, the documents are sorted and right data (e.g. number of shelves, number of picked orderliness) obtained from each report which is put in an invoice template. Since the employee has to make sure that the data filled in is correct and allocated under the right cost factors it can take considerable

time. Subsequently, the template is sent to the economics department where it is combined with the transport invoice template to create the final invoice which is sent to Anders Lennartsson, operation manager, for approval. Finally, when the invoice has been approved the CT employee prints it out and sends it to Customer B.

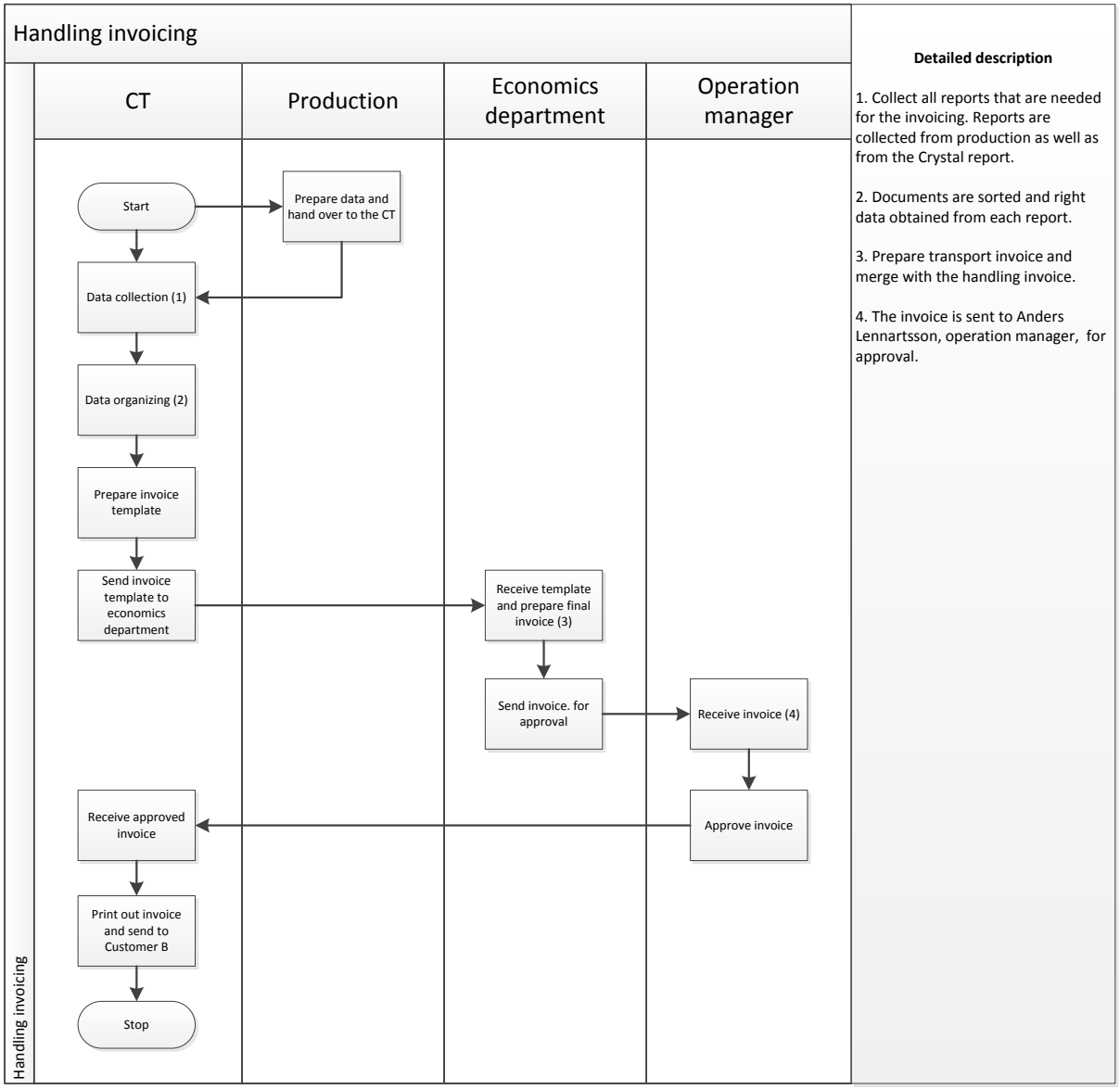


Figure 22. Invoicing process- handling invoice

4.3.2.5 Meeting

Once every other second week, a meeting is held at SLL where representatives from the CT, production and Customer B go through various matters of interest.

4.3.2.6 Support and problem solving

The support and problem solving for Customer B can in fact be considered manifold. This is especially since there are so many parties involved in this support function. In fact, CT provides support not only for Customer B but also internal departments (e.g. IT, economy)

and external stakeholders (KGH, UPS, Schenker Land etc.). The issues that arise from the various external parties are resolved in close cooperation with production as well as economic department and IT-support. However, normally most enquiries are first directed to the CT. Consequently, the high number of actors can often result in quite complex interactions between them where the CT acts as a coordinator of information and can therefore be quite time consuming.

Many of these problems need to be solved in close cooperation with production which means that the CT employee is spending quite a lot of time walking out to production, discussing these problems or questions and finding solutions and answers to them and could even be that this is one of the most time consuming parts of the CT work for Customer B according to the interviewee.

Customer support

There are many different questions and issues that are brought up by Customer B. For example, Customer B sends an email and requests that a specific shipment is sent earlier. The employee then needs to contact production to see if they are able to pick it and thereafter forwards the information to Customer B.

Another frequent transportation questions can be that cartons have been missing from the transport. Then, the CT first needs to check Schenker´s tracking system and see if they can find the POD for the delivery. This is because sometimes the store has received the shipment but can't find it. If this is not the case, the CT employee has to contact Schenker Land to get answers. When they have found the problem the next step is normally to get Customer B feedback on how to handle it. This can be e.g. if cartons have been sent to a wrong store. Thereafter, usually the CT employee needs to contact Schenker Land´s office and ask for the cartons to be sent to the correct address.

External support

Concerning KGH there have been a lot of problems recently caused by changes in the process with the bonded warehouse. From these changes there have come up problems with missing or wrong information being sent to KGH. However, these issues will be addressed and hopefully solved soon. Furthermore KGH often contacts the CT when they are missing some statistical documents from Customer B. Then the CT employee first needs to get this information from Customer B and then deliver these to KGH, working as a coordinator between these two. Finally KGH can have questions regarding SLL such as missing notifications on received goods or discrepancies between numbers of goods on invoices compared to what was stored in the system.

Furthermore since Schenker is responsible for the transport, the CT sometimes gets automatic emails from Schenker if there is a shipment that hasn't been delivered to the consignee. Then, the CT employee checks Schenker´s tracking system which usually shows

that the shipment will be delivered the day after. Finally, there can be problems from the transport company with finding the customers address or even that the stores don't want to receive the shipment. Then, the CT "needs to play" its role of information coordination, contacting Customer B to check what they want to do with the situation and come back with an answer.

The CT employee is also contacted by other companies that transport for SLL (e.g. UPS). There can be various issues or questions that the companies bring up and in some cases the employee needs to contact production to be able to answer back.

Internal support

The CT employee also supports and solves problems for other internal departments (e.g. production, IT- support). Production can for example have problems with an outbound order such as if there articles in the order that aren't in the system. This can be e.g. because Customer B has ordered wrong article number. Then, the CT employee needs to contact Customer B and get them to fill out a form with all necessary information that are then entered in to the system either by the CT or IT-support. Furthermore as this has most likely not been sent to SLL before, this will likely need to be zero-picked on this order.

Production also contacts the CT if a customer address is not correct. The CT employee then needs to contact Customer B to get the right address which is then forwarded to production.

Proactive support

Concerning examples of issues addressed, today there is quite a lot of time going in to working with problems with outbound orders. In fact, the CT employee checks every day if there are any problems with outbound orders, which can be a few times each week. These problems can e.g. be that there is a wrong address for the shipment in the system. Then the CT needs to contact Customer B, get the correct information and register it in to the system. Furthermore sometimes it can happen that there is a mismatch between the order and the means of transportation (smaller shipments that should be sent in a special way and bigger that should be sent in another way), that is, the order does not find the right means of transportation. In that case the CT employee contacts the IT support if she can't solve the problem. The IT department contacts them again when the problem has been solved. All system problems such as these are normally solved by IT-support but the CT often tries first to see if she can solve it.

4.3.2.7 Overview of processes

Figure 23 offers an overview of all processes which are performed for Customer B at the CT.

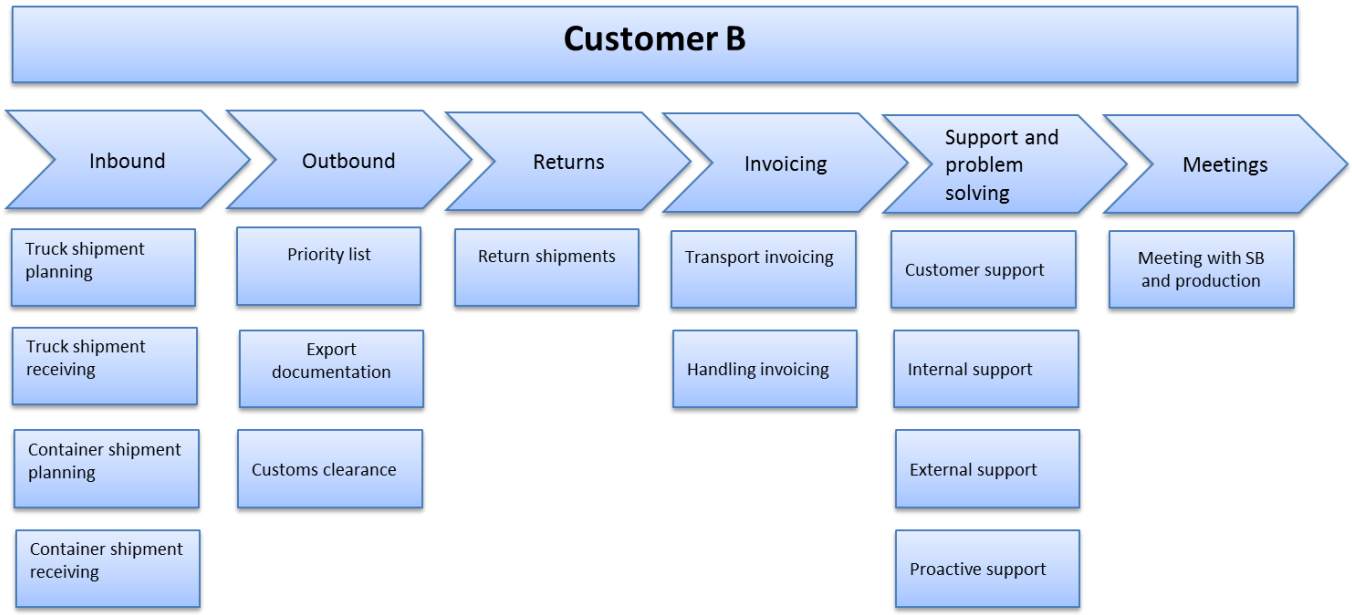


Figure 23. All processes identified for Customer B

4.3.2.8 Improvement suggestions by employees

Two improvement possibilities have been identified in the overall flow. Firstly, concerning invoicing the interviewee felt that it could be good to be able to do the invoicing without having to deal with the customer support. By this, it would be much more effective if it would be possible to concentrate on the invoicing, without distractions from the normal work. Today´s form of procedures produce a risk that mistakes are done on the invoicing since numerous things need to be performed alongside with it. Furthermore the interviewee felt that the coordination between production and CT could be executed in a more efficient way.

4.3.3 Customer C

Customer C is a company that handles plastic products such as plastic glows, disposable plastic covers for shoes and plastic bags for pharmacies and shops. They have been with SLL for around two years. Regarding the operations performed in SLL, Customer C is a rather small customer in relation number of staff (blue collar and white collar) working on the assignment, number of inbound and outbound orders, etc. Also the handling performed for this customer is very simple, since there is not so much pick and pack, repacking, relabeling, etc. needed. Instead, for Customer C the handling is merely moving full-pallets from one location to another.

4.3.3.1 Inbound

For the inbound procedure at the CT there are mainly two inputs depending on if it is a container or a truck that is coming in. The third possible input is when Customer C does not send a delivery notification prior to the shipment arriving at SLL.

Inbound container planning

Firstly, the CT receives a list from Customer C of all inbound orders which will be arriving at SLL in the future. Furthermore, the list states whether the order is a truck or container shipment and if it comes from non-EU country or an EU country. If the container comes from a non-EU country some article numbers have to be locked into the system by the CT employee. The main purpose for this procedure is to postpone the payment of the customs fees. This is especially since Customer C often buys far ahead in time and can therefore free up quite much of tied up capital by doing this. Peter Strömwall at Schenker logistics in Arendal (SLA) manages the customs documents for these shipments. The CT employee receives all customs documents from Peter at a similar time as the inbound list is received from Customer C. When the container is coming in, Schenker Air & Ocean notifies the CT that a container has arrived at the harbor. The CT employee then contacts production to see when they will be able to take it in and thereafter forwards the information to Schenker air & ocean.

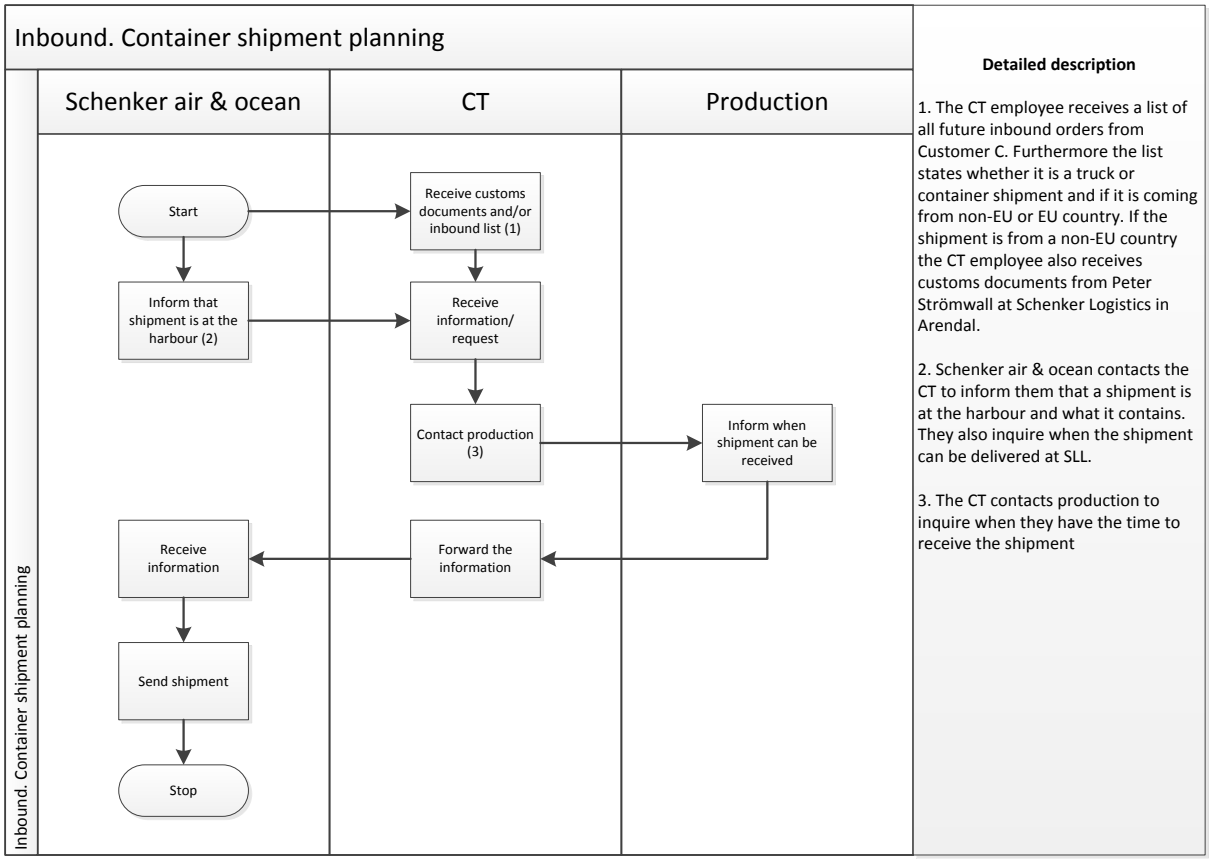


Figure 24. Container shipment planning

Inbound container receiving

When the container arrives at SLL and the chauffeur reports to the CT the employee checks the notification board and informs the chauffeur which gate to go to. Thereafter the chauffeur drives up to the assigned gate where the container is emptied and the articles entered into the system. If the shipment is from a non- EU country (e.g. China) the CT employee then locks parts of the articles in the system (guidelines from Customer C) and reports to Peter Strömwall to confirm that the quantity is right. Every article number is locked in the system separately and thus it can take substantial time for the CT employee.

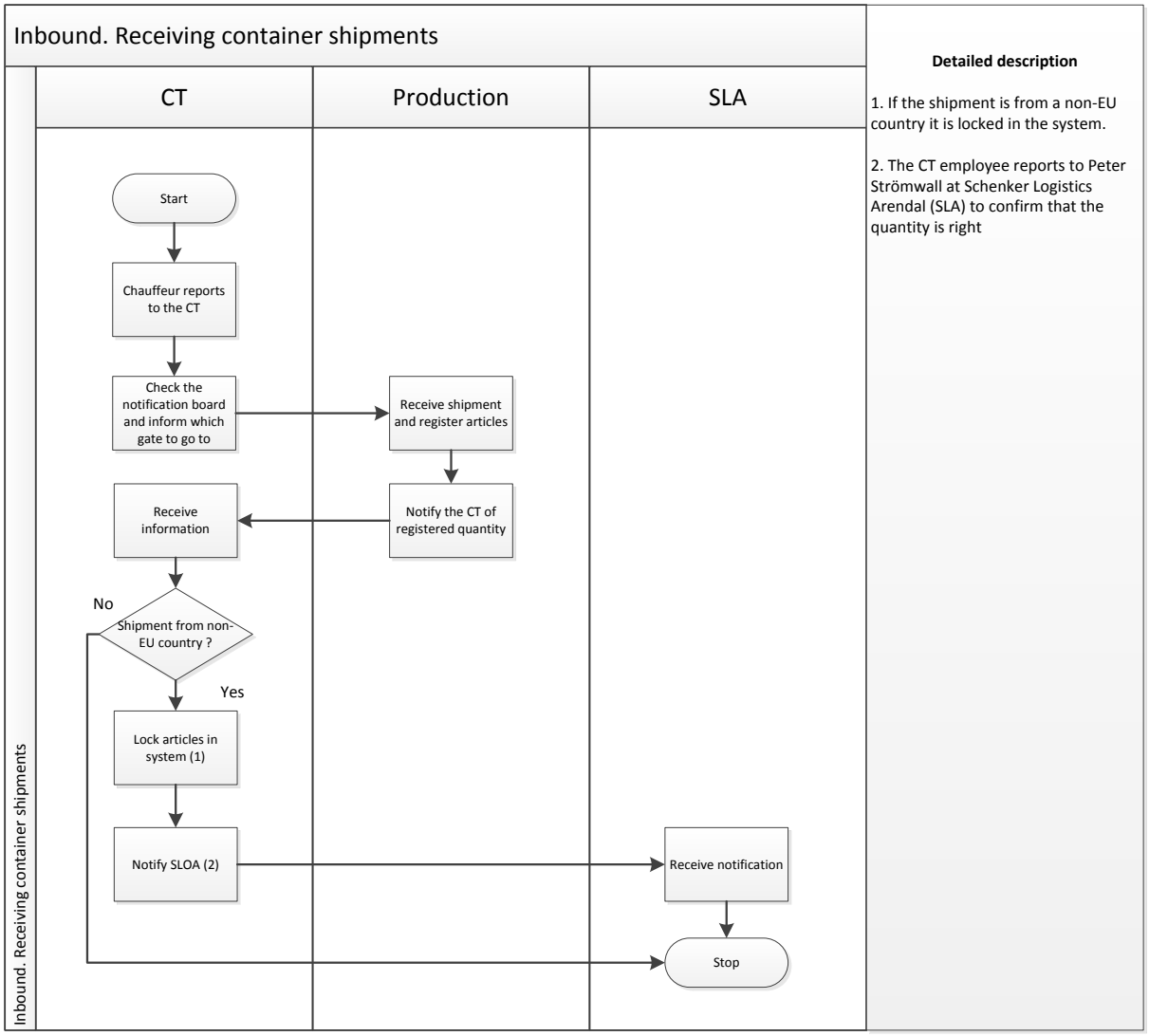


Figure 25. Container shipment receiving

Inbound truck planning

For a truck shipment coming in the input is that the CT gets a notification from the transport company via e-mail that a delivery is coming in. The notification usually states the shipment quantity and when it will arrive. If they say it will arrive after 15:00, the CT needs to inform them that it will not be possible since they close at 15.30. Thereafter, the CT employee writes the planned delivery on a notification board so everyone can see what´s coming in and lets production know so they can prepare and schedule their staffing need.

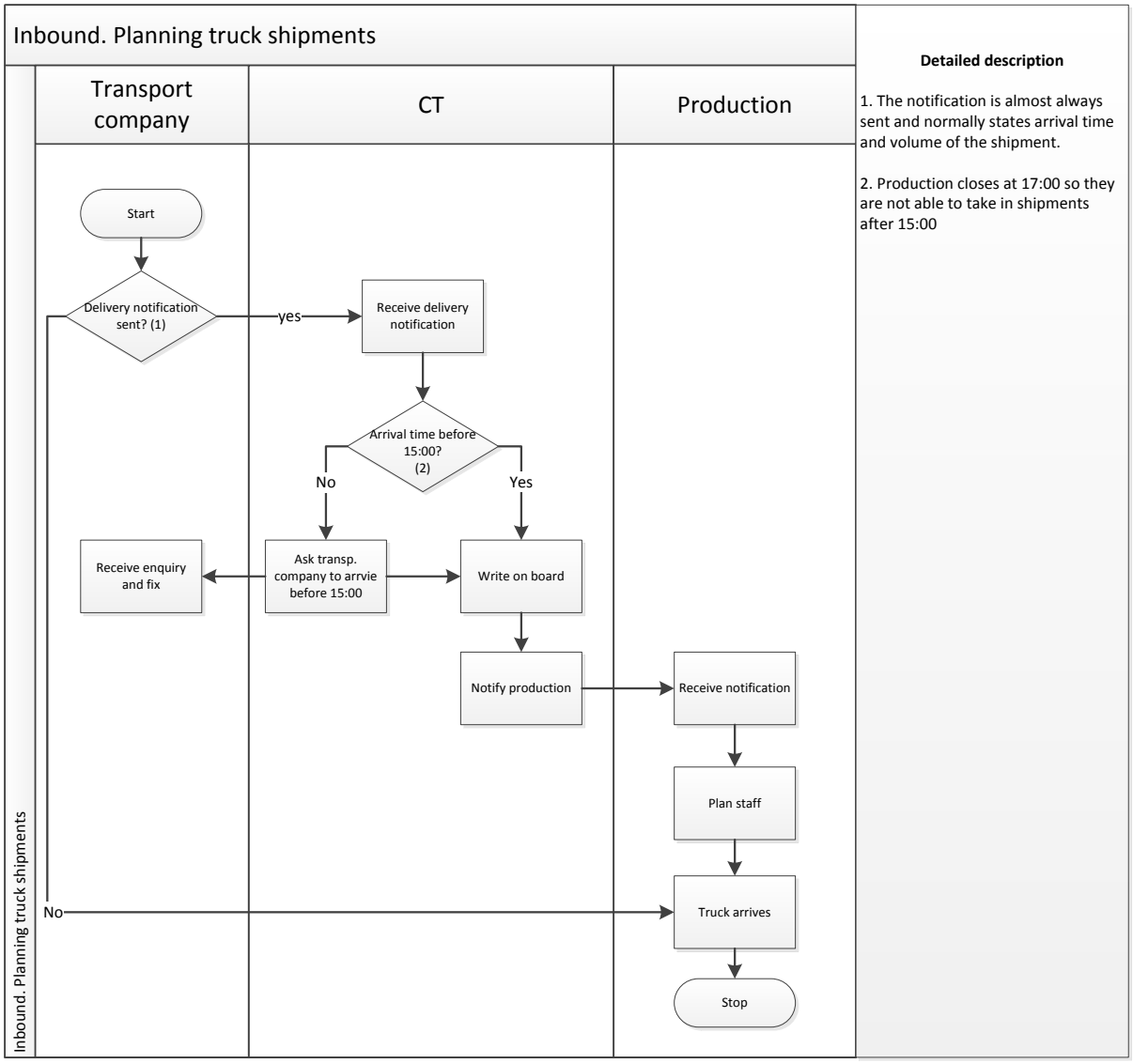


Figure 26. Truck shipment planning

Inbound truck receiving

When the truck arrives at SLL the first thing is to look at if a delivery notification has been sent. Normally these notifications are sent at least one day before. However it happens once a while that nothing is sent. Then it depends on the shipments size as well as if there is a lot to do for the production whether they are able to take it in. Once the truck arrives at SLL the chauffeur starts by going to the CT and gets a gate number. If they have not sent a notification, the CT contacts production to see if they are able to take it in. If not, the chauffeur is assigned a new appointment. If a notification has been sent in advance the CT contacts production to inquire which gate the chauffeur can go to. Thereafter the chauffeur drives up to the assigned gate and hands a waybill over to production which then count the number of packages to see if it matches the waybill and sign the document. Next, production looks at the order number of the shipments and matches it with an order number in the system, which is supposed to have been sent via EDI from Customer C. If there is no inbound

order in the system for the corresponding shipment, production needs to contact Customer C and ask them to put it in before they can enter the articles in to the system and place them away. However, problems related to inbound orders and delivery notifications seldom arise since Customer C has been a customer of SLL for quite some time and therefore these procedures are well routined.

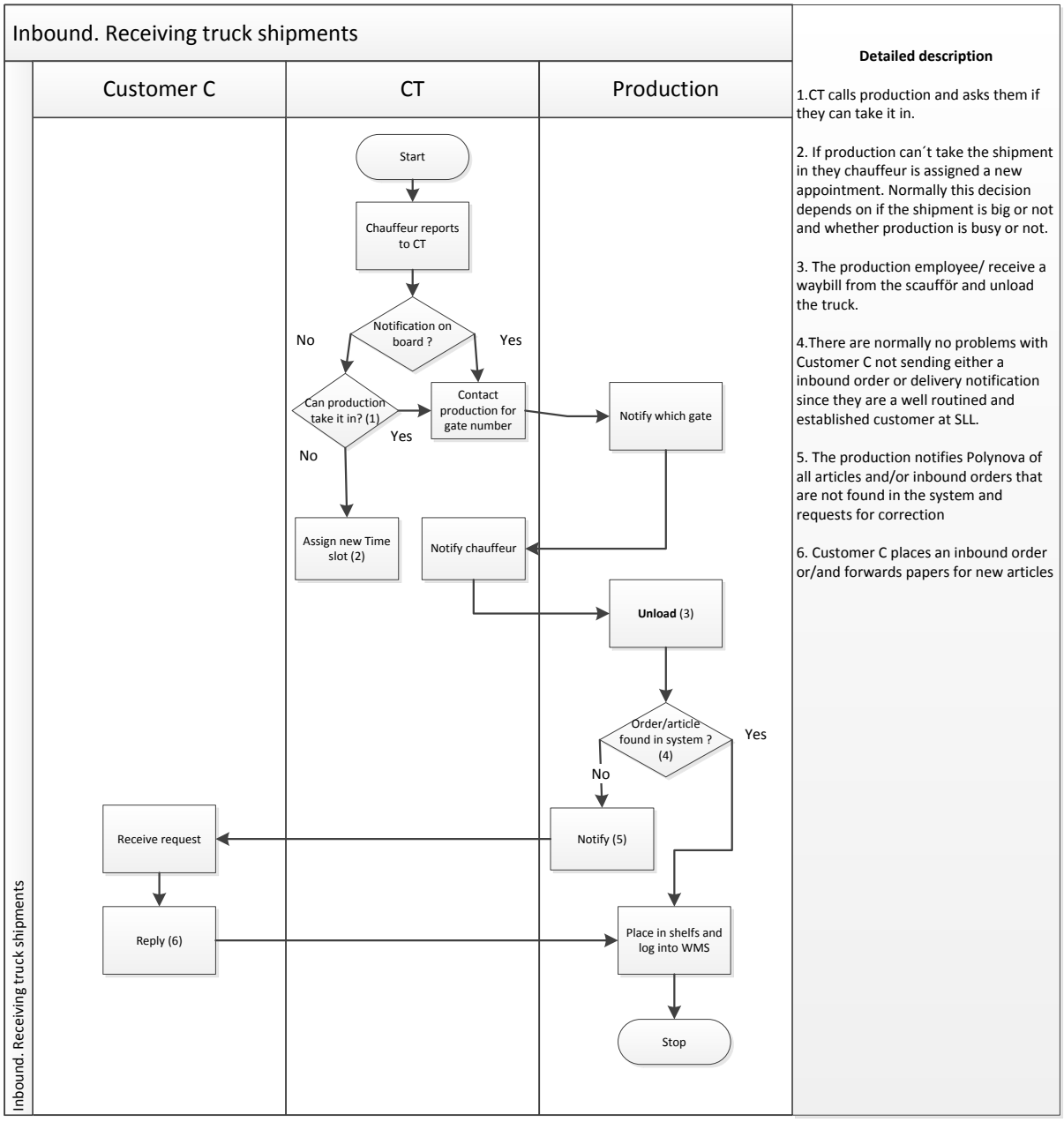


Figure 27. Truck shipment receiving

4.3.3.2 Outbound

For the outbound procedure there are mainly two processes depending on if the CT employee books the outbound transport or the articles need to be unlocked from the system.

Outbound standard transportation

Normally production books the transport for standard orders since the transport is owned by Customer C and they have a predefined transport party. However there are certain customers of Customer C that specially ask for DHL, Entex, DSV or other specific transport companies. The process is initiated when production hands the CT employee a picking list with all information regarding that specific shipment; the name of the transport company, quantity, weight, volume, Customer C´s customer account number and address. Thereafter the employee goes into the transporters webpage and books the transport on the Customer C´s customers account number so it goes to their account not SLL´s or Customer C´s. When the booking is finished an address label is received which is printed out and handed over to production.

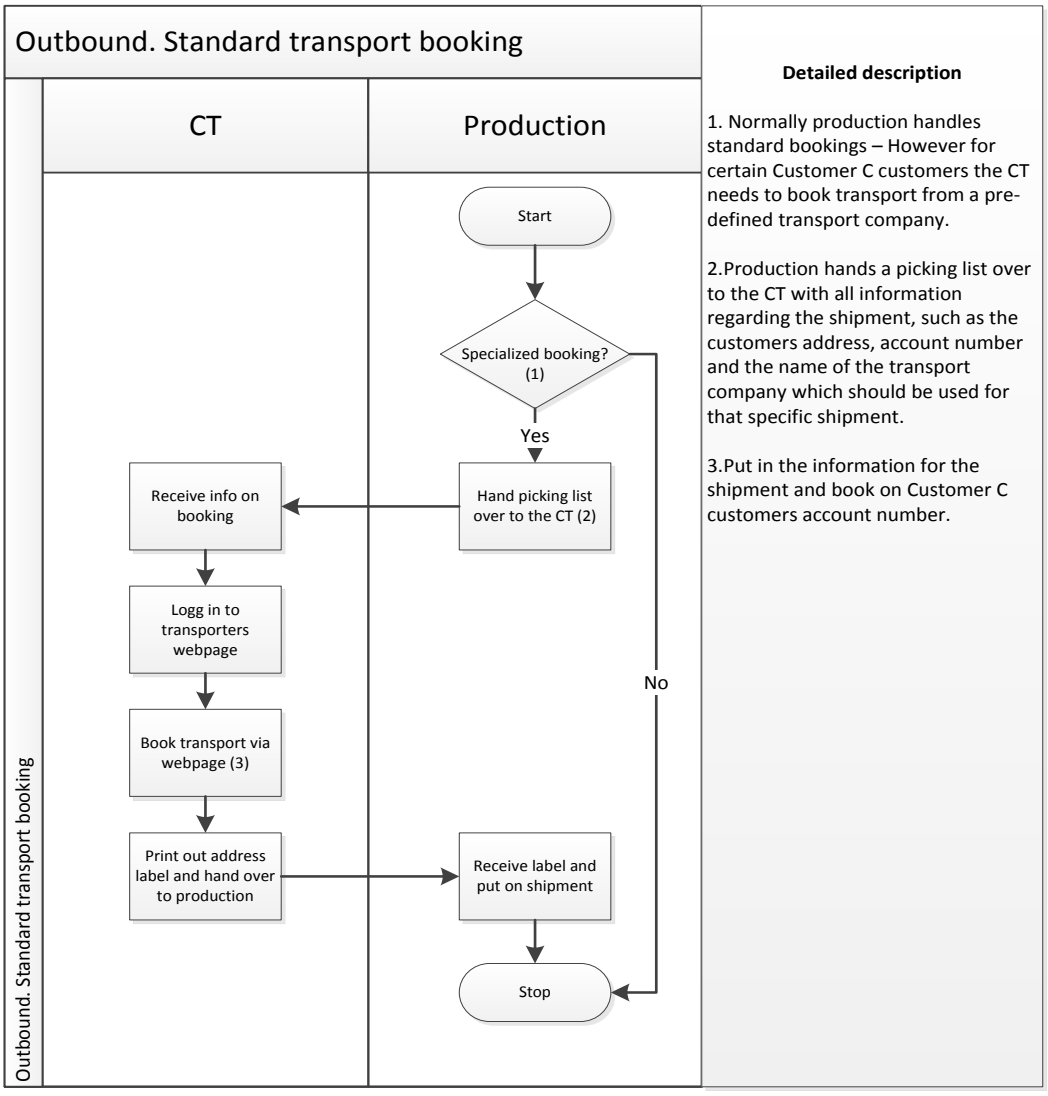


Figure 28. Standard transport booking

Outbound- unlock articles from system

Customer C informs both Peter Strömwall at SLA and the CT that articles need to be custom cleared. As stated above Peter manages all customs documentations and when he has custom cleared the articles he notifies the CT employee which is then able to unlock them from the system. The process can take significant time since each article number is unlocked separately from the system.

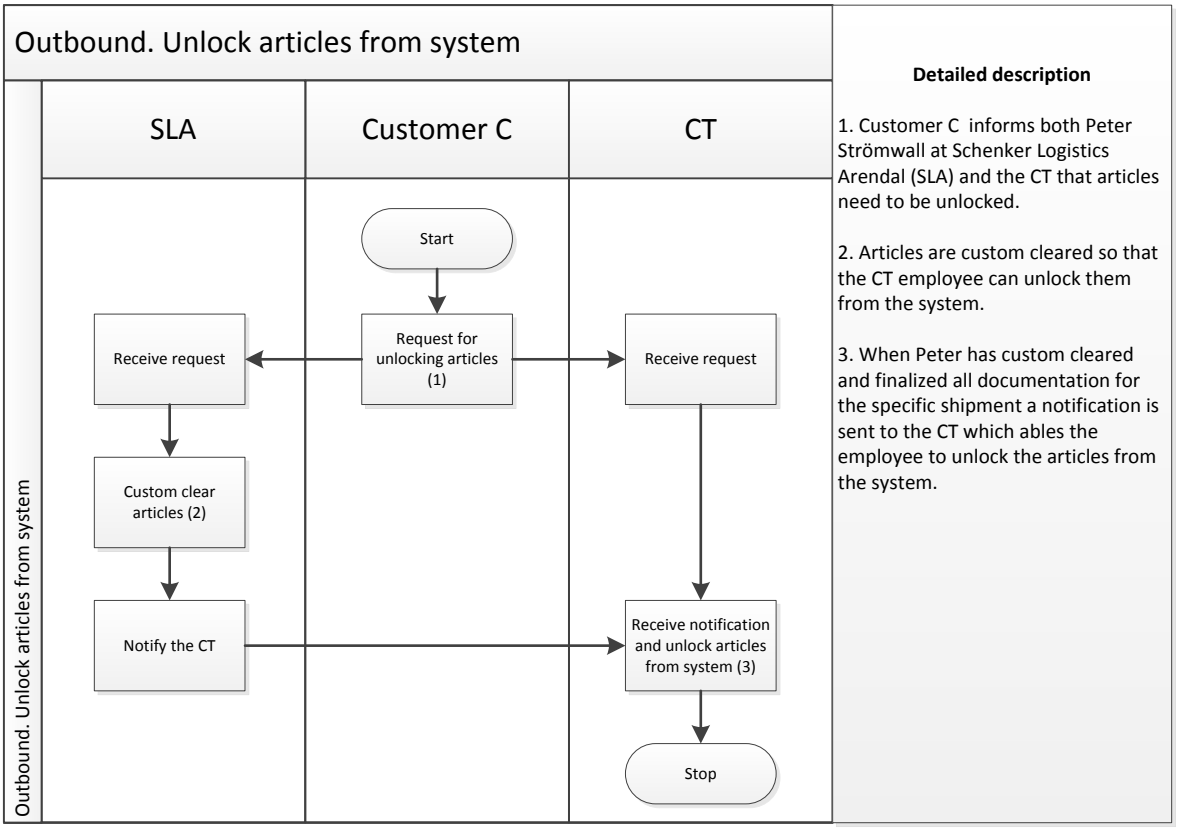


Figure 29. Outbound- unlock articles from system

4.3.3.3 Invoicing

At the end of each month the CT employee collects data and thereafter an invoice is created. Since Customer C is responsible for the transports, they are only invoiced for the handling at SLL.

To be able to prepare an invoice for the customer the CT employee needs to collect data from both production as well as the Crystal report. The report contains all information from the warehouse system, such as; how many shelves are used, the quantity of inbound orders and number of order lines. Other information needed such as; number of unloaded shipments and other activities performed for Customer C is received from production. All data is gathered into an excel sheet and costs added together. Thereafter the employee goes into the SAP and creates the invoice which is forwarded to Anders Lennartsson, operation

manager, for approval. When the invoice has been approved the CT employee prints it out and sends to Customer C.

As can be seen from the description this is a very simple invoice when compared to others and therefore takes quite short time.

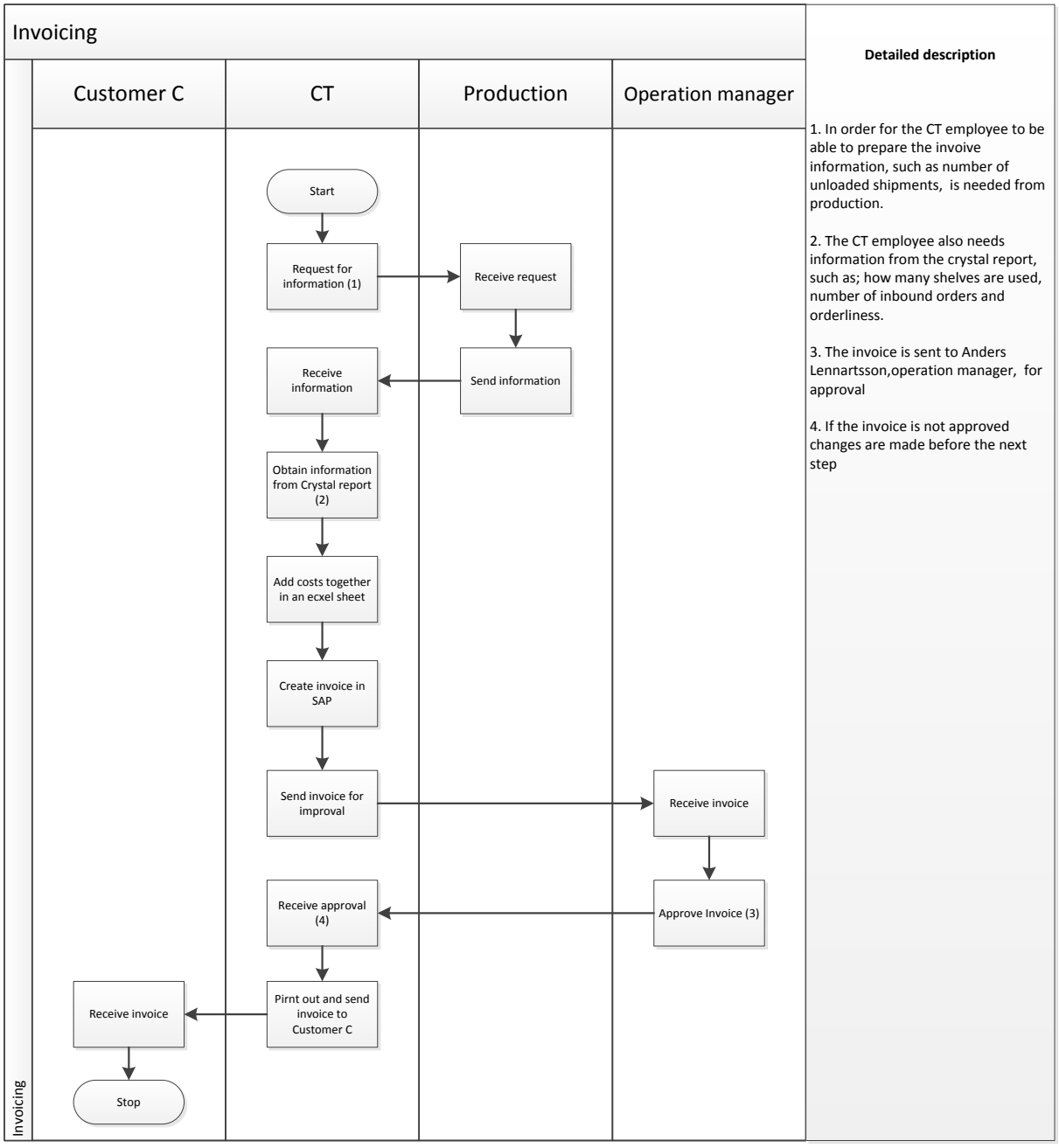


Figure 30. Invoicing process- handling invoice

4.3.3.4 Return shipments

If production has picked wrong articles, Customer C notifies the CT, which then books return transportation for the articles. When the CT has booked the transportation the address

labels are sent via email to the company where the shipment has to be picked up. All wrongly picked shipments are logged into an excel file and displayed on a screen in the warehouse entrance.

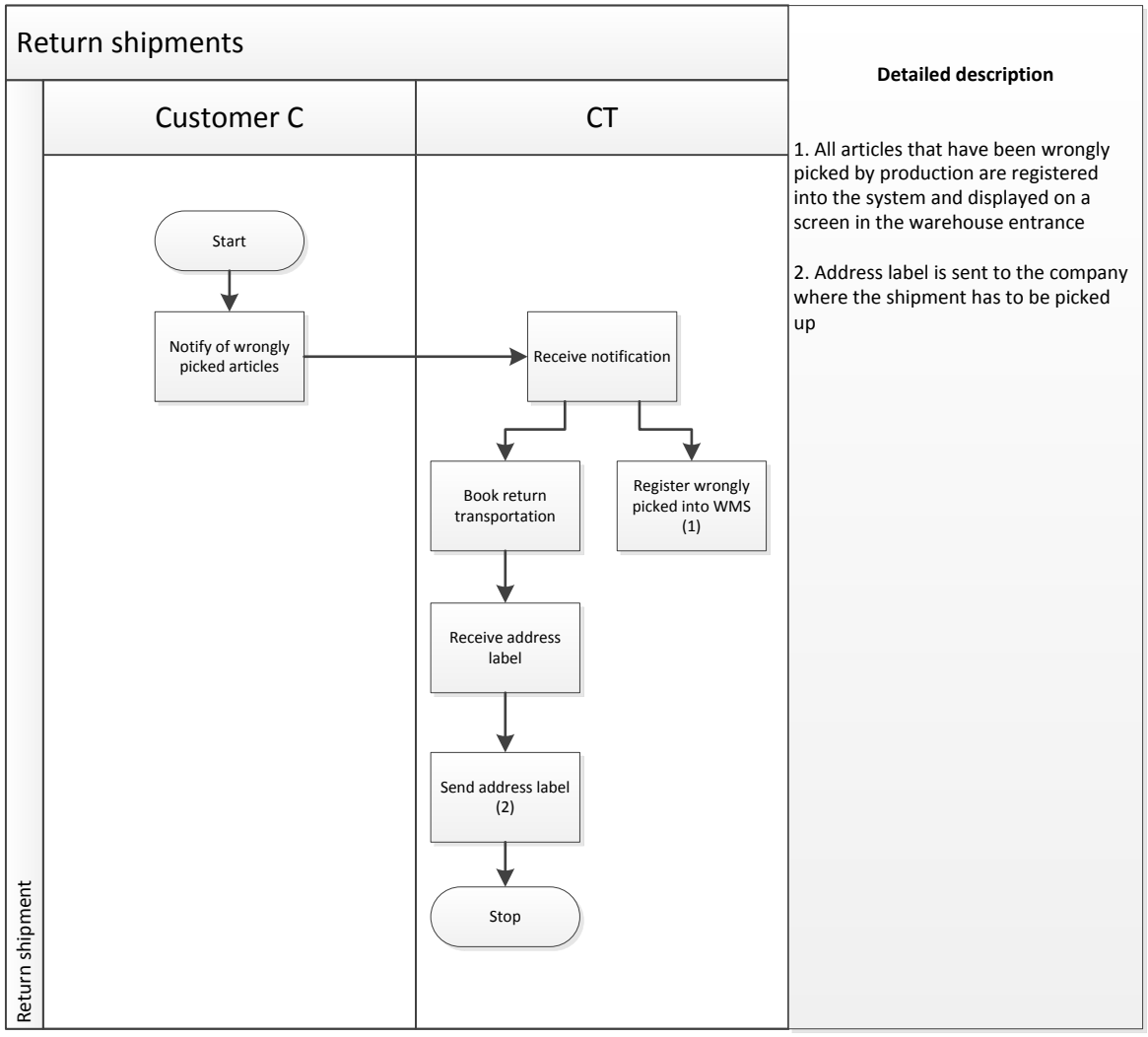


Figure 31. Return shipment process

4.3.3.5 Support and problem solving

The support and problem solving function for Customer C, is divided into; customer, internal and external support.

Customer support

When questions arise Customer C needs to contact the CT either by phone or email. This is although a fairly new procedure for the CT employee since it was mainly handled by production before. However, now the customer cannot contact production because the telephones have been removed from production and thus customer support is mostly handled by the CT employee. In some cases the employee has to run out to production in order to get answers to Customer C´s questions and thus the whole process, that is, from the

time that the question is brought up by Customer C and until the CT is able to answer the question, can take substantial time.

Customer C has recently changed computer systems and has had some problems related to information in the new system and thus they often contact the CT employee to ask them to check if quantity numbers in SLL´s WMS match the numbers in their system. Other questions that come from Customer C are for example to check if outbound orders have been received and registered or why an outbound order has not been received at the final destination.

Internal support

In some cases the CT employee needs to answer various questions from production, such as wrong address on shipment label. The employee often needs to contact Customer C or external transport companies to be able to answer these questions.

External support

The CT employee also answers diverse questions from external transport companies (e.g. DHL). In some cases the employee needs to contact production in order to answer the questions and thus it can take significant time.

4.3.3.6 Telephone meeting

Telephone meetings are held once a month with representatives from both Customer C and SLL to run through how everything has been going the foregoing month.

4.3.3.7 Overview of all processes

Figure 32 displays all processes which the CT performs for Customer C.

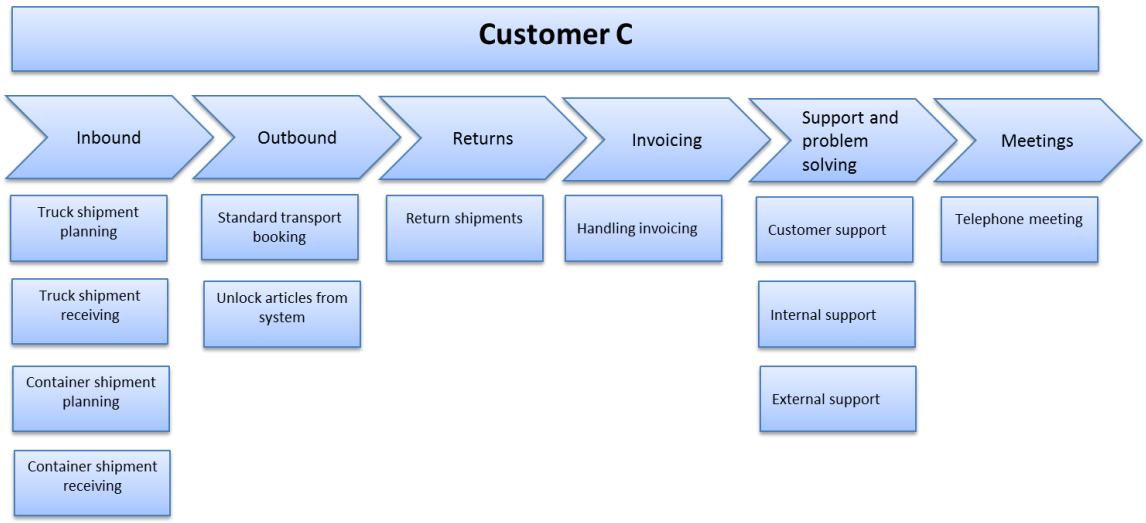


Figure 32. All processes identified for Customer C

4.3.3.8 Improvement suggestions by employees

From the CT employee perspective everything is very well routined for the customer. This can be traced back to the fact that Customer C has been at SLL for some time and has therefore established the routines required by SLL.

4.3.4 Customer D

Customer D is a retail company with over 1500 optical stores in 10 countries. All interior fittings for Customer D stores are kept at SLL´s warehouse. Since these fittings are not only for existing stores but also for store openings the flow of material and information needs to be as efficient and effective as possible so that shipments are delivered within the time needed. Customer D is a fairly new customer at SLL (2 years) and thus processes are continuously improving and becoming more structured and organized. Customer D is considered as the smallest of the four covered in this thesis in relation with blue collar staff and handling turnover.

4.3.4.1 Inbound

The input for the CT in the inbound process is that they receive a delivery notification, either by e-mail or phone, from the transport company (carrier, haulier). Thereafter, the CT employee writes the scheduled inbound on the notification board so everybody knows that it's coming in and lets production know when it is expected. This is mainly done so production can plan its staff and make sure to have staff available when shipments arrive. When the truck arrives at SLL the chauffeur goes to the CT and the CT employee tells the driver to go to the gate dedicated to Customer D. After that, the employee needs to run out to production and find the staff person dedicated for Customer D and let him know that there is a truck coming in. This can take quite some time since this person is working with a few different customers and can therefore be working in different locations in the house and can't be reached by email or phone. This seems to be very inefficient since the CT frequently needs to communicate with production concerning various issues such as inventory questions from Customer D. If nothing goes wrong after the driver meets the production staff, the CT will have nothing more to do with this specific inbound shipment.

However if there are any problems with the shipment, production will contact the CT and they need to solve it with Customer D. One problem can be that there is a new article in the shipment that is not in SLL´s system. Customer D then need to fill out a form, send it to the CT, CT contacts IT support that creates the new article in the system. Then production can start entering it in to the system. Another problem can be if there are some articles in the shipment that were not in the inbound order. Then Customer D need to place a new inbound order in the system in order for production to be able to enter these articles in to the system. Then there can be various other problems such as wrong articles sent, wrong article numbers as well as all kinds of missing master data, such as missing prices, weight, etc. When these problems arise the CT employees need to contact Customer D and ask them to solve this. For missing master data, Customer D needs to fill out a form with the correct information and send it to the CT. The CT employee then forwards it to IT support and they

enter it in the system. Today, Customer D are normally sending these forms before shipments arrive, which means that these problems occur rather seldom, making the whole flow much more efficient and smooth.

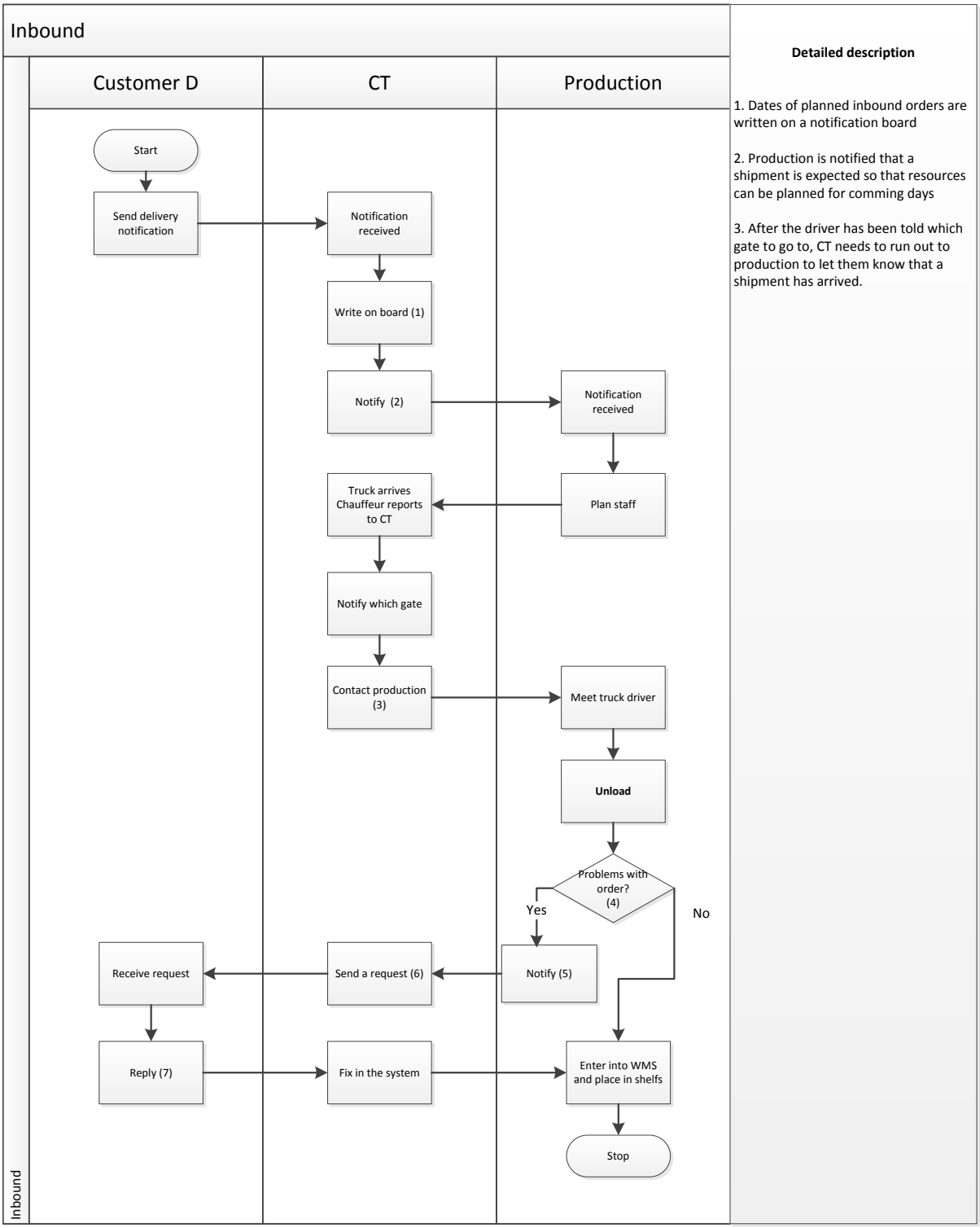


Figure 33. Inbound process

4.3.4.2 Outbound

There are three outbound order types that the CT employee handles for Customer D; roll-out, snagging and approx orders. Although the processes for the different order types are similar in some ways the individual steps are somewhat different and thus each order type will be described separately. As SLL is responsible for the transport, the CT is responsible for having an overview of all the orders in the system, looking at what is the status of each order and making sure that all rollouts are ready on the right date and that snagging orders are going out as soon as possible.

Roll- out orders

Roll-outs are orders for store openings; hence there is great pressure on the CT to make sure that the right interior fittings are delivered within the timeframe given by Customer D.

The CT employee starts the order flow each morning by going into the system and checking for new orders. Information on every new order is written on a piece of paper which is kept on the employee desk until the order has been delivered to the final destination. On the paper it is stated when the shipment has to be delivered, the store address, PO reference, what kind of order it is (approx, snagging or roll-out) and special instructions, such as if the truck needs to have tail lift etc. This is done so that the employee has total control over where they are in the process for every order. Each step of the outbound process is thereafter recorded on the document until it has been delivered.

When all new orders have been written down the CT employee puts the order dates and types of orders manually on a piece of paper and hands it off to production so they know when the goods need to be picked and in which order. This is due to the fact that although production can access the system and review the orders they are not able to check when shipments need to depart from SLL. Therefore the CT employee needs to inform production of departure dates for each shipment.

Production then picks the order and gives the CT list stating all information regarding the specific shipment e.g. total weight, number of pallets and packages. From that information the CT employee is able to count the loading meters. Subsequently the CT employee books transportation for the order.

If production has to zero pick articles in the specific shipment the CT is notified. The CT employee subsequently sends an email to Customer D informing them of the zero picks and requests that a new order is placed if the order needs to be complimented. When production has picked it the CT makes the transport booking.

As stated in the contract with Customer D the CT needs to contact several carriers to get transport prices before booking the outbound transportation. In the request sent to the carriers all information regarding the specific shipment is stated; the weight of the shipment, where and when it has to be delivered, the loading meters etc. When answers have been

received the carrier with the lowest price is chosen and notified. Thereafter the employee goes into WEB-TA and makes a false booking in order to create an address label. If the shipment is transported to Norway the CT employee needs to access the Crystal report and print out customs invoice for the shipment. Every document regarding the specific shipment is then scanned and sent to the carrier including the address label. Same documents are subsequently delivered to production. Afterwards the CT employee writes all scheduled outbound on the notification board. The CT employee is responsible for the shipment until it has left SLL and therefore it is monitored until the carrier arrives at production and the shipment has been loaded in the truck.

Every email regarding the specific booking, such as the booking request, prices from the carrier etc., are saved so that the CT employee can refer to it later on if questions arise.

Concerning tracking the shipment after it leaves SLL it is the haulier that is responsible for letting the CT know if the shipment will not arrive on the right time. Then if Customer D has questions on whether the shipment has arrived at the store or not, the CT employee will go in to the system and get the POD (proof of delivery) that shows that it has been delivered or let them know when it will arrive.

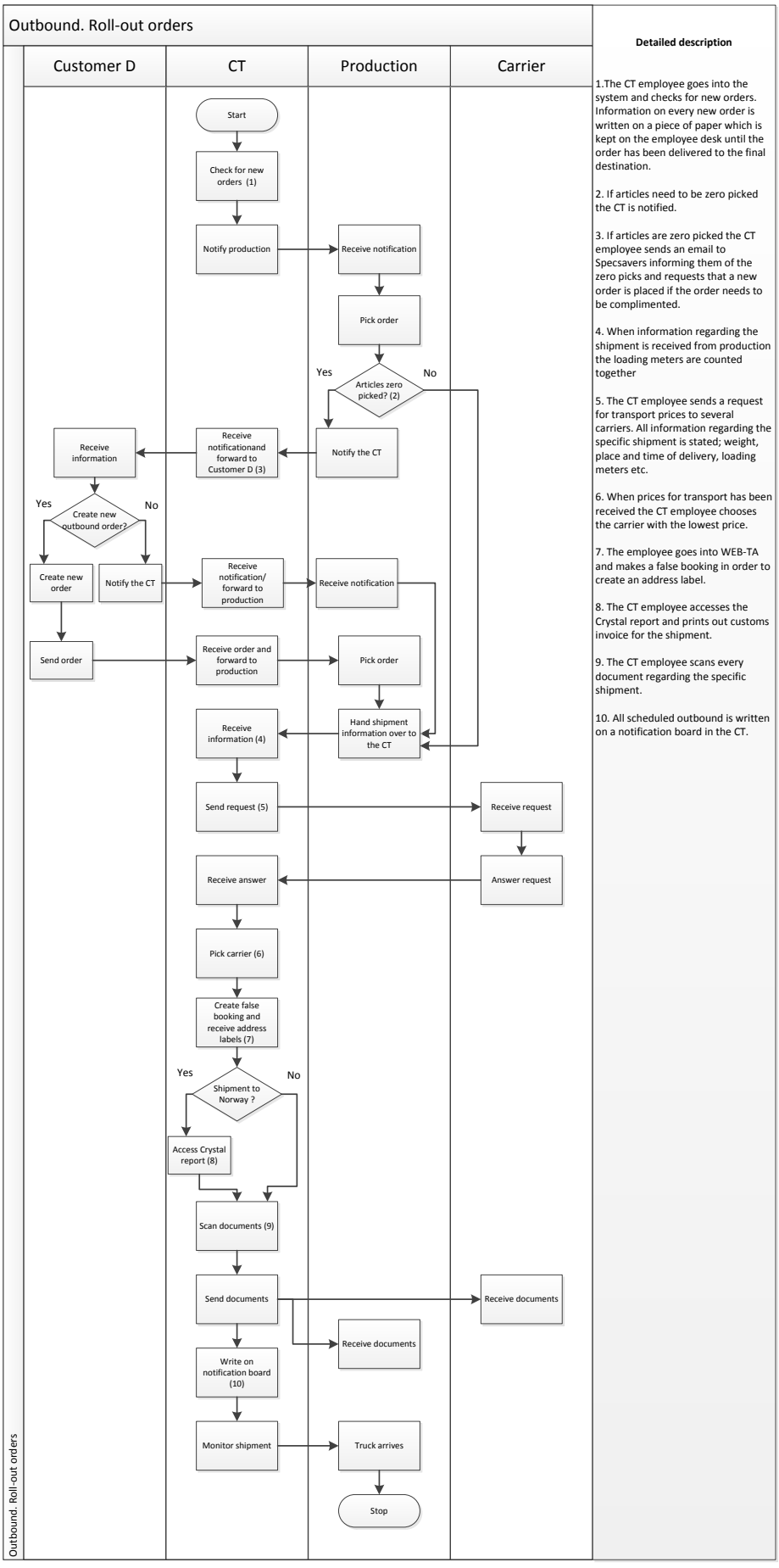


Figure 34. Outbound process- roll-out orders

Snagging orders

Snagging orders are express orders which are complimentary to the big roll outs. In many cases they need to be picked and sent out the same day as the request is sent to the CT. Although the contract states that the picking time for smaller orders is 1-2 days the CT employee tries to fulfill the request. However if production is not able to meet the request the CT notifies Customer D.

Activities performed previous to the transport booking are the same as for the roll-out orders, as can be seen in figure 34. The process is initiated when the CT employee goes into the system every morning to check for new orders which are then written down on a piece of paper. Thereafter the CT employee notifies production which orders need to be picked during that day. When production has picked the order and brought information regarding the shipment to the CT the loading meters are calculated and transportation booked.

As for the roll-out orders, the CT employee contacts several carriers before completing the transport booking. The main difference between snagging orders and roll-outs is however that the CT employee has to contact Customer D to give them few examples of transportation which they can choose from, concerning dates and prices offered from different carriers. When Customer D have answered the request the carrier chosen is contacted. Thereafter, the process is somewhat the same as for roll-out orders (figure 34); address labels are prepared, in the case of non-EU shipment the custom invoice is printed out, documents are sent to the carrier and brought to production and thereafter scheduled outbound is written on the notification board.

Although time vice, roll-out and snagging orders are the same there is additional pressure on the CT employee to make sure that the snagging order goes out within a specific timeframe. Therefore the order needs to be monitored at a higher degree throughout the process until it has been loaded onto the truck and left SLL. Concerning tracking the shipments after they have left SLL it is the same procedure as for the rollouts.

Approx orders

Approx order is a standard economic order for the Customer D stores which is delivered in 6-7 days. These orders are complementary shipments to stores that have already opened and need parts such as a new reception desk, new chair, etc. These shipments are not rush shipments and have a good flexibility on arrival date and it is not an issue e.g. if they arrive in 10 days. Since the articles ordered are not needed urgently at the stores the CT employee does not have to monitor the process to the same extent as for roll outs and snagging orders.

Although, the CT employee writes all new approx orders on a piece of paper as for the other order types the process is most often initiated when production has picked the specific shipment and notifies the CT by handing over information regarding the shipment. As for the

other two order types, production notifies the CT when articles need to be zero picked. The CT employee then notifies Customer D and requests for a new inbound order if the order needs to be complimented.

When information has been received from production the loading meters are counted together and transportation booked with Schenker Land via WEB-TA. When the transport has been booked the address labels are printed out and handed over to production. If the shipment is transported to Norway the CT employee needs to access the Crystal report, print out customs invoice, scan it in and send to Schenker Land. Since SLL manages the transport for Customer D the approx orders are tracked in order to verify that the shipments are delivered at the final destination.

Although the CT employee has limited activities to perform in relation to this order type she has to synchronize all three order types and ensure that there is a certain balance between them.

Recently however, the CT has had to allocate more time in support, answering questions regarding the approx orders, such as questions concerning the delivery time, transport prices etc. This has changed the process to a large extent and made it more time consuming for the CT employee, which does not correspond to the agreements made.

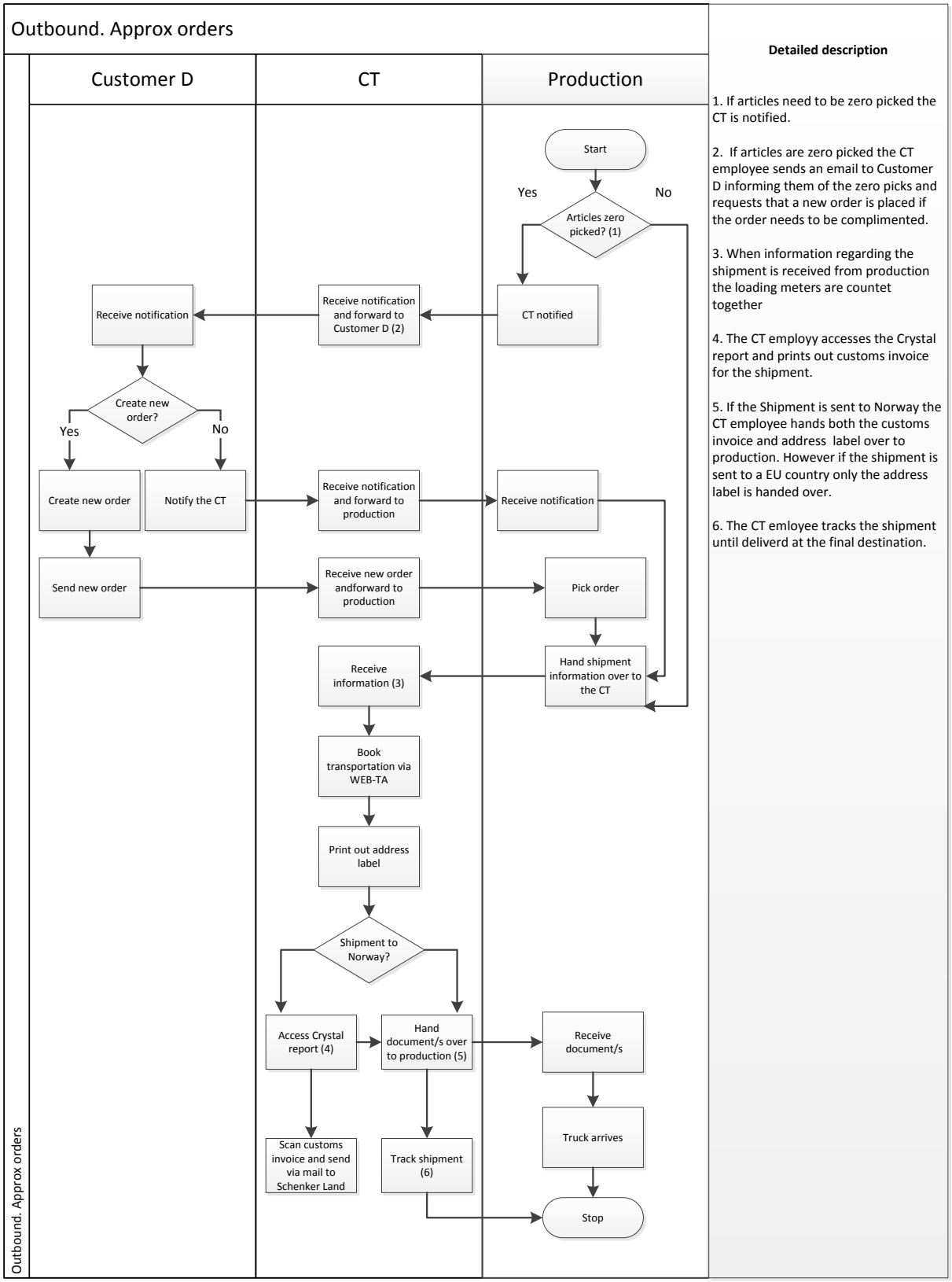


Figure 35. Outbound process- approx orders

4.3.4.3 Invoicing

From the beginning of the first day of the month, CT has three days to finish the invoicing for all customers. This is split in two parts, handling invoicing and transport invoicing. Furthermore, as well as doing the actual invoice, CT also needs to fill in two different excel templates that include several more detailed explanations concerning the invoice, one that is sent to the economic department in Sweden and the other one to the headquarters in England.

Handling invoicing

On the first day of the month, CT starts collecting all data needed to do the handling part of the invoicing as well as putting down all extra activities that were performed for Customer D in the corresponding month. Firstly, information concerning e.g. volumes in shelves and picked pieces is taken from the Crystal report. Furthermore, the CT employee goes out in to production, asking the staff about additional information concerning the handling such as number of pallets and containers that were handled during the month. Then, information regarding time spent on performing extra activities is received from the CT person responsible for Customer D. When information available at that time has been gathered the CT employee starts filling in these numbers in to the different excel sheets. However, as some information cannot be obtained immediately this is not done in one sequence, and can often not be finished during day one. Instead, since most of the CT staff that does the invoicing have number of customers to invoice, they can start with the next customer while waiting for information on the others. When the final invoice has been generated the operation manager, Anders Lennartsson, is able to access it in SAP and approve it. Thereafter, the CT employee can print it out and send to Customer D.

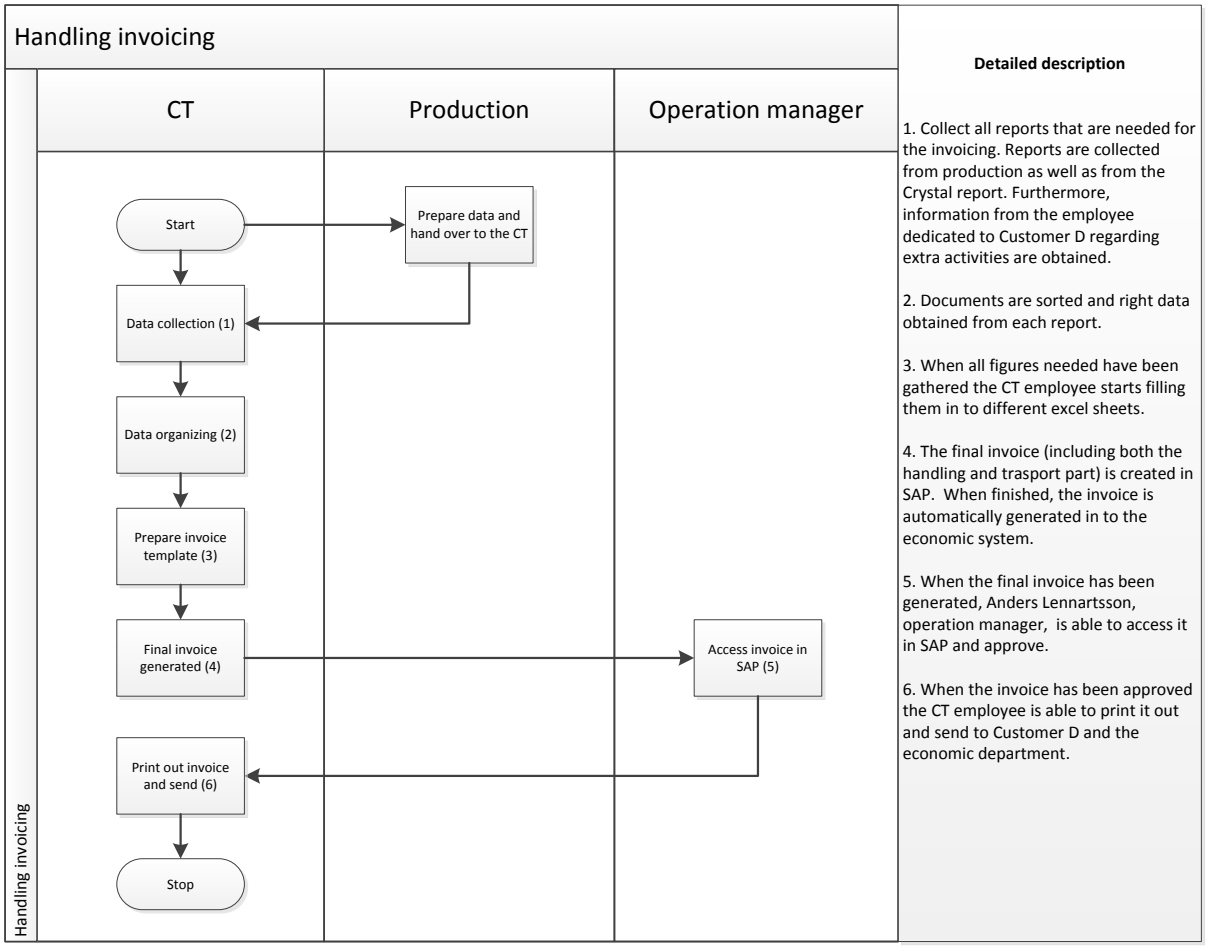


Figure 36. Invoicing process- handling invoice

Transport invoicing

During the whole month the CT employee receives invoices from the transport companies (Schenker Land, Transportören, TNT etc.) through SAP. When these invoices have been received, the CT employee approves them and prints them out. On any given time interval during the month, the CT employee completes the first four steps in Transportal for the invoices received from Schenker Land. It is only the fifth and last step that needs to be performed when all invoices have been registered in the end of the month. This procedure can take considerable time as the employee needs to review all figures in Transportal for every invoice. However, if the figures are incorrect the employee needs to solve it and thus the time spent on each transport invoice can increase significantly depending on how many figures need to be corrected. As for the invoices received from other transport companies than Schenker Land, the employee needs to calculate the freight manually in Excel which takes considerable time. This is since Schenker land is the only forwarder that can be used in Transportal. However, Schenker is working on upgrading the system so that in the forthcoming future they will be able to register invoices from more transport companies into the Transportal.

When all invoices have been registered in to the excel sheets and Transportal, including the handling invoice, the final invoice is created by the CT employee in the SAP. When finished, the invoice is automatically generated in to the economic system. Thereafter, the operation manager, Anders Lennartsson, is able to access the invoice in SAP and approve it. When approved, the CT employee prints it out and sends to Customer D and the economic department.

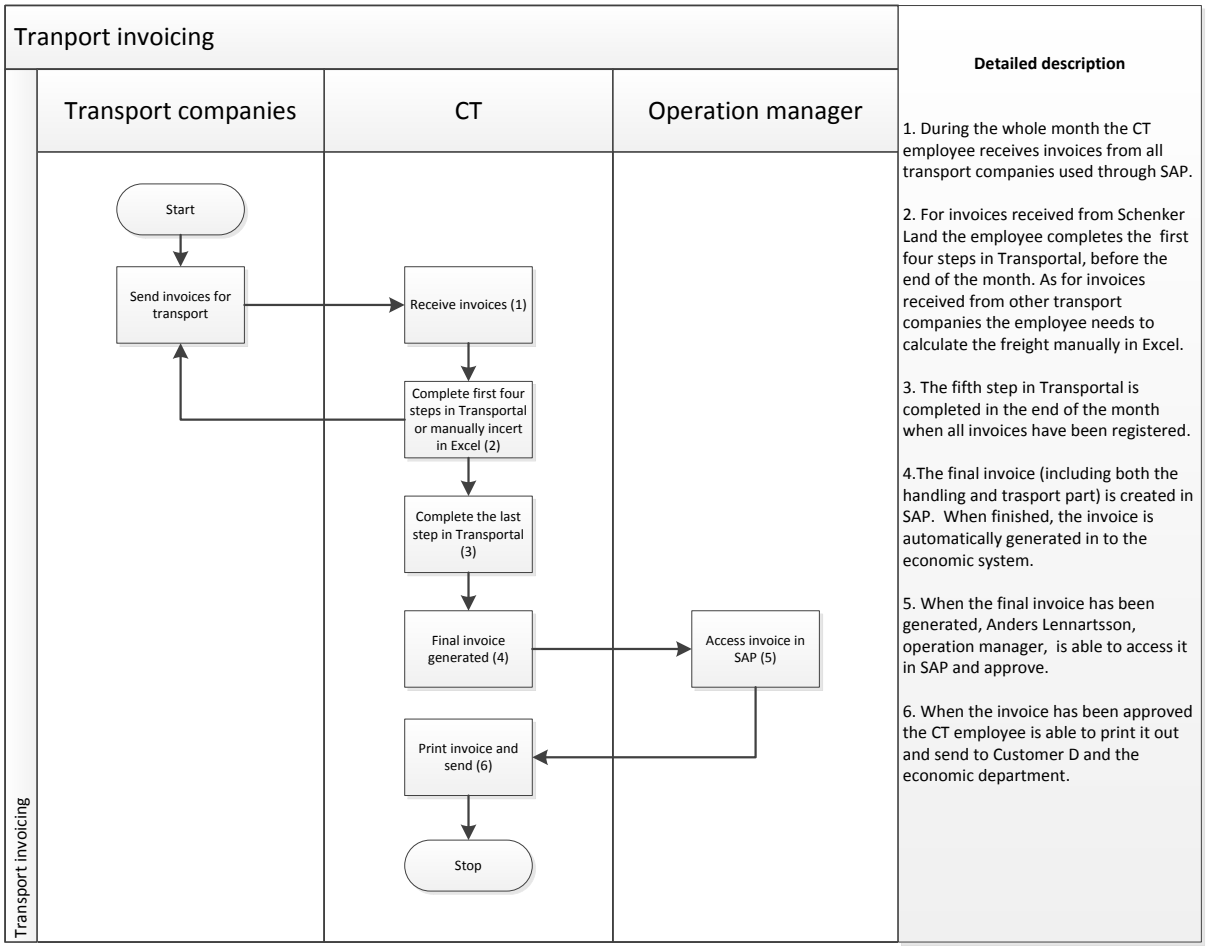


Figure 37. Invoicing process- transport invoice

4.3.4.4 Telephone meeting

Every week SLL (the CT and production) has a meeting with Customer D. There they get information on scheduled inbound for forthcoming 2-3 weeks such as volumes, number of trailers, containers, etc. Furthermore they get information on when rollouts are expected in the future, which gives the SLL an opportunity to prepare. Additionally, unsolved problems from last meeting as well as recent problems are brought up and discussed and ways found to prevent them in the future. Having these weekly meetings makes the flow very organized and is a key factor in enabling good and transparent communication and deep understanding of the situation from both sides. This has proven to be very successful solving various frequently arising issues, making the flow smoother and less troublesome.

4.3.4.5 Support and problem solving

The CT provides support not only for Customer D but also for e.g. Schenker Land, production and the IT department and thus the support and problem solving function is multifarious. Since there are many parties involved the flow of information has to be effectively coordinated and thus the function can take substantial time for the CT employee.

Customer support

For this process the input is normally that Customer D will contact the CT regarding various issues. Then it is up to the CT employee to solve these issues, which can be done in very different ways depending on what the issue is.

One frequent question can be that Customer D want to know why there are discrepancies between the stock balance in their client portal versus the WMS. Then normally the CT employee needs to go to production and get them to do inventorying on it. Then, if it is some system corrections that are needed, the CT needs to get IT support to fix that. Also Customer D can call and ask if it is sure that a certain article was sent with a certain shipment. Then the CT point to the dispatch reports that are sent automatically from the system every time an outbound order is closed. In some instances SLL receives a shipment from Customer D which should be delivered somewhere else. The CT employee then needs to contact Customer D and give them all the information which is stated on the waybill. When Customer D has replied the CT employee books the transport for that specific shipment. Furthermore, the customer notifies the CT when new stores need to be entered in to the system, if data on stores needs to be changed or new accounts on the client portal are needed. Then CT has to forward this information to IT support that upgrades the information in the system.

These are just examples of different questions and information that the CT receives from the customer, where the CT´s role is mainly to coordinate information between Customer D and production or IT support, solving various problems occurring and ensuring a smooth flow.

Internal support

In relation to internal support, an example of this can be that since production is not able to see when shipments need to depart from SLL, the CT employee needs to keep them updated on each shipment. There are also various matters that the CT employee needs to solve for the IT department. For example when prices are missing from the system the IT department contacts the CT and ask them to solve it.

External support

The CT also provides support for Schenker Land. There are various matters and questions that can arise which the CT employee needs to be able to solve and answer. This is often done in collaboration with production and can take substantial time for the employee.

Proactive support

The CT employee also performs proactive support. For example when master data is missing from an outbound order the employee needs to scan the order/orders (can be more than one order in a shipment) and send it to Customer D and ask them to send the right info.

4.3.4.6 Return shipments

Returns are very seldom occurring for Customer D. However when it happens, it can be either that the stores have ordered too much or SLL has performed a wrong picking. Then the input for a return is when a Customer D store calls the CT and asks them to book a return, which they do. However, if there was a wrong picking, the CT first needs to walk out to production and ask them to do an inventorying on articles in place. Furthermore, the CT employee looks through the dispatch reports to make sure that a wrong article has been sent. If a wrong picking is identified, the CT employee books the transport. Finally the CT needs to log the wrong picking in to the system, so they can show Customer D the percentage of wrong pickings they have done. Then when the return has been booked, Customer D puts in an inbound return order, the driver arrives at SLL and the shipment is entered in to the system and placed in the shelves.

Concerning the costs of the return transports, it depends on who is responsible for the return that should pay for it. However, it has been made clear at SLL that wrong picking are not acceptable for Customer D since there cannot be any missing articles in a store opening which has resulted in very few wrong pickings. Consequently, SLL has been able to fulfill what the contract states (99,8% picking accuracy) leaving Customer D responsible for the cost of these transports.

4.3.4.7 Overview of processes

Figure 38 offers an overview of all processes which are performed for Customer D at the CT.

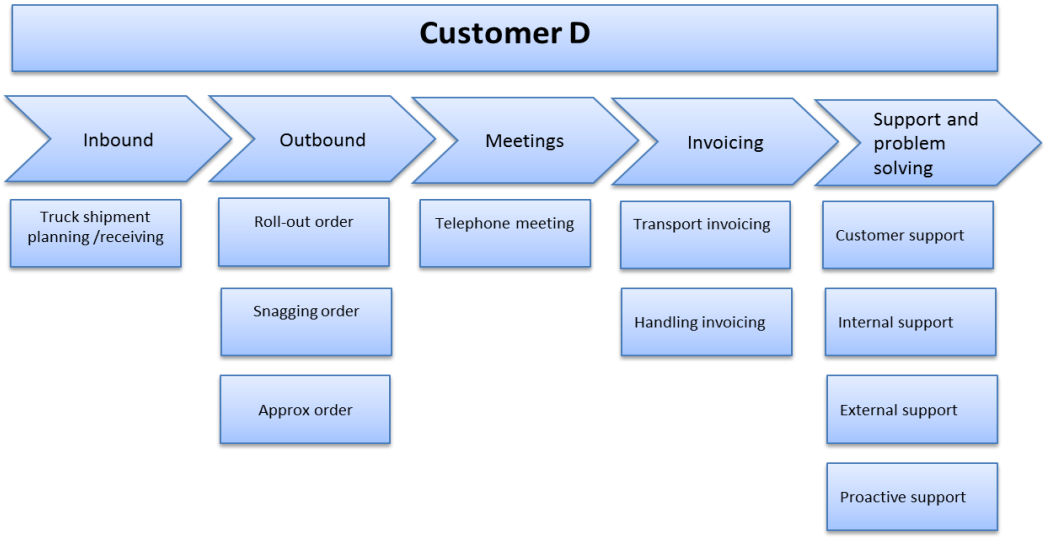


Figure 38. All processes identified for Customer D

4.3.4.8 Improvement suggestions by employees

In this chapter improvement possibilities that have been identified by the CT employee are illuminated.

Inbound

Today there are almost no problems with the inbound orders at SLL. Before Customer D didn't send notifications and inbound orders in time but the CT has successfully assisted them in to making it a routine. This has resulted in inbound orders entered in to the system at least one week before and delivery notifications sent before the shipment arrives. This was mainly possible by being very strict on the conditions SLL put on Customer D. So when Customer D realized that e.g. all trucks without a notification would be sent off and if orders were not entered in to the system they would be charged extra, Customer D were quick to define procedures and make arrangements in order to make this in to a routine.

The weekly meetings that were set up were an important part of this transformation enabling a clearer communication between Customer D and SLL and were a great way for SLL to clarify for Customer D, why these conditions were so important for them.

Outbound

Generally, the activities performed in the outbound process are well defined, structured and organized. However one improvement possibility was identified in relation to the departure dates in the WMS. As described above, the CT employee needs to inform production of all departures for each shipment. This procedure could however be eliminated by implementing a feature into the WMS so that production could identify when shipments need to be ready for departure. This could be done by inserting the driving routes for different customers in to the system enabling production to see how long it takes to transport to that customer. Then the desired arrival date would be presented as well as making it possible for production to see when they need to have finished picking the shipment. A simpler way would be if the system could take these different factors in to account and display to production exactly when the shipment needs to have been picked, in order for it to arrive at the correct date. This would reduce the time needed from CT to schedule and monitor outgoing shipments.

General improvement possibilities

First of all, one improvement that has already been made is the communication with Customer D. Before there were many different people at Customer D, located in different places responsible for SLL which resulted in coordination problems. Today there is one coordinator at Customer D, responsible for SLL, solving problems and making sure that all conditions are fulfilled which ensures structured and defined procedures, removing various former frequent issues.

Concerning internal improvements, better and more efficient ways of communication between production and the CT is needed. Today, the CT employee always needs to walk out to production and find the staff member that is dedicated for Customer D. Since that staff member is not only dedicated to Customer D he can be anywhere in the house. This can be very time consuming and especially unsuitable in stressful situations. This should be very easy to fix, by having one person dedicated for Customer D and implementing some way of communication between the CT and this person. This could be email, phone, walky-talky, etc. By implementing this, the time spent on this type of work performed by the CT would be reduced substantially and ensure a more efficient way of communication between the CT and production.

Finally there could be some discrepancies between the agreements with the customer compared to the work performed at the CT today. One possible reason could be that when the contracts were signed the major part of the flow was the simple approx orders that require low amount of time for the CT and have a different time driver then rollouts and snagging orders. Additionally, concerning the approx orders it needs to be defined how much CT is supposed to do for these so it is clear that all additional work required by Customer D will be charged extra.

As for the invoicing process there could be some improvements. Since invoicing today is performed on top of the normal work that the CT staff has, it means that they will have much interruptions while doing these invoices and will have to stop numerous of times to work with something else that is time sensitive and urgent. This results in fairly higher overall time spent on the actual invoicing since some time goes in to getting back in to where they were and what they were doing, since they are not able to fully “sink” in to it from beginning to finish.

Furthermore in general for all new customers, CT staff should be more involved in the start-up with new clients to ensure that routines are defined in a better way.

Other than this, the Customer D flow has improved heavily and is pretty well structured especially with the contact person at Customer D assigned to SLL making the flow smoother and more transparent.

4.3.5 Administrative processes in the CT

The table presented in this chapter offers a summary of all administrative processes that have been identified for each of the four customers covered above.

Table 2. All administrative processes for the four customers

Customer B	Customer A	Customer C	Customer D
Inbound	Inbound	Inbound	Inbound
Truck shipment planning	Truck shipment planning	Truck shipment planning	Truck shipment planning
Truck shipment receiving	Truck shipment receiving	Truck shipment receiving	Truck shipment receiving
Container shipment planning		Container shipment planning	
Container shipment receiving		Container shipment receiving	
Outbound	Outbound	Outbound	Outbound
Priority list	Transport confirmation	Standard transport booking	Approx orders(standard booking)
Export documentation	Express transport booking	Customs clearance - unlocking articles	Roll- out orders(specialized booking)
Customs clearance	Rush transport booking		Snagging orders(express booking)
	Export documentation		
Support and problem solving	Support and problem solving	Support and problem solving	Support and problem solving
Internal support	Internal support	Internal support	Internal support
External support	External support	External support	External support
Customer support	Customer support	Customer support	Customer support
Proactive support	Proactive support		Proactive support
Other processes	Other processes	Other processes	Other processes
Return shipments	Return shipments	Return shipments	
Invoicing		Invoicing	Invoicing
- Handling invoicing		- Handling invoicing	- Handling invoicing
- Transport invoicing			- Transport invoicing
Meeting	Telephone meeting	Telephone meeting	Telephone meeting

4.4 Time-study

The time study was divided in two main parts; fixed and variable time study. Then there are two main areas that define the final time; Time per process and frequency of the process per time period where the frequency is taken as the average over number of months. However, as the frequency for each customer is not used for the algorithm it is only displayed for the processes where it was believed necessary to demonstrate the time consumption.

The fixed time study was performed on two main categories of activities and processes. Firstly, activities that are not performed in a standardized and repetitive way and can vary substantially in duration and content and therefore cannot be defined as a process, with a predefined input or output. As discussed earlier, these activities were instead placed under the same definition as support and problem solving. As support and problem solving is unlike other processes defined it was needed to present it in a different way than the others in the time study. In order to estimate the time spent on this function, the percentage per day was measured for each customer, i.e. time spent on this function per day. Secondly, processes that cannot be linked to any variable factor such as incoming orders or outgoing shipments. These processes are; invoicing and phone meetings.

The variable time study was performed on the two main parts of the goods flow; Inbound and outbound as well as return shipments. The variable factors for inbound are merely whether inbound orders have been put in system and whether notifications have been sent prior to shipment arrival. Also whether it is a container or a truck affects the time. For the outbound flow the variable factors there are mainly the percentage of each transport

booking type, since each takes different amount of time in the CT. Additionally, number of non-EU inbound and outbound shipments can have effect on the total time spent on each client, as discussed in more detail in the description below. Finally number of returns is the sole factor that affects the time consumption of return shipments.

Concerning data collection, the data for the time it takes to perform each process/activity a single time was gathered by three main ways. The majority was gathered by measuring the times duration through direct observation of the processes. However, for non-frequent processes and activities that was not possible to observe directly the data was collected through either detailed discussion with staff or by having staff measuring it by themselves by filling in to excel templates made by the researchers. This is discussed in more detail for each process.

4.4.1 Customer A

As Customer A is a large and rather problematic customer most CT processes where executed and measured during direct observation. However, for non-frequent processes the time was estimated through interviewing of staff. Finally for the support function the percentage spent on this per day was estimated by two ways. First by direct observation for one day and secondly by having employee logging it in to an excel sheet for one day.

Inbound process duration

The time required for the inbound process can differ a lot between whether if there are any problems with the shipment or not. In order to define this – all routines that are directly connected to a shipment coming in, and are performed regularly, such as asking Customer A for inbound order numbers that are not displayed on the shipment were included as a part of the inbound process. However, activities where the input comes from the customer, transport company, etc. and is not happening repetitively or on a predefined time interval, are defined as a part of the support role as discussed below.

For the inbound process the time it took to perform each process was measured by direct observation. As described earlier the inbound process is divided in two processes, inbound planning and inbound receiving.

Inbound planning is only performed when notification is received. The time this takes was measured **6 minutes on average**.

For the inbound receiving there are three different variances depending on the time it takes to perform the process:

1. No problems
    a. If there are no problems with the inbound shipment – It will take **on average 3 minutes** to perform this process.

2. No inbound order in the system for the shipment
    a. If there is no inbound order in the system when the shipment arrives, it will require some extra time for the CT employee. In general this added time can vary quite a lot between 5-25 minutes. The time consumed per procedure depends on both how many orders are answered per procedure as well as amount of order information when shipment arrives. This means that if the orders per response are several, the CT needs to spend more time on looking in to the system to see if these inbound orders have been registered. Also if there is no order information on an inbound shipment, generally more time will be spent by the CT, in inspecting the goods received, discussing with Customer A and production in order to find out what it is that has been received and realizing whether there is an inbound order for it in the system. Considering these aspects the time has been estimated from two perspectives. First, **per order** it was estimated that **on average** it takes CT staff **around 5 minutes** to perform this part of the inbound process. Looking at it **per occasion** it can be said that on **average it takes around 18 minutes**.

3. No delivery notification
    a. When a delivery notification is not received prior to the shipment arrival, the CT employee logs it in to an excel sheet and informs Customer A. Also this can affect the time it takes to understand what goods have arrived and from where they are coming – This takes normally **around 6 minutes per occasion**. However as when no delivery notification is received the inbound planning process is non-existent. As this takes on average the same time, 6 minutes per occasion, it has been suggested that this part of the process does not in fact have any influence on the time consumption in the CT.

Inbound process frequency

The frequency of the inbound process is in fact threefold as described above. Firstly, the frequency of the regular process is directly correlated to the number of inbound shipments per time period. This information was collected from the WMS system over a three month period. **On average there are around 565 inbound orders per month.**

Then, number of inbound orders not in the system where given from an excel sheet that the CT and production log in. Looking at July, August and September the corresponding amount of inbound orders missing at arrival were 256, 202, and 224 which makes an **average of around 227 orders missing per month.** However, as these activities can be performed for many inbound orders at the same time the frequency of this needs to be measured as well. The corresponding number of days this was performed was 14, 13 and 16 for July, August and September which gives an average of **around 15 times per month.**

Outbound process duration

As SLL is not responsible for the transport for Customer A they do not have anything to do with the transport after it leaves the warehouse. Furthermore, it is not their responsibility if trucks that are booked automatically through Centiro arrive at SLL on the right time. Also largest part of transport bookings is performed through the automatic booking system, Centiro. However, there are three types of manual bookings that need to be performed in the CT; Booking confirmations that are performed manually via email, express bookings that are booked via UPS express web-portal and rush bookings that are done mainly through direct phone calls.

Then for non-EU shipments, the CT employee needs to request export documents from Customer A before shipments can leave.

Concerning booking confirmations, the results from direct observation showed that these bookings take very short time; **normally 1-2 minutes**. This is because the only thing the CT employee needs to do with this is to forward the email from production to either Itella or Dachser. Then if a waybill is sent back (Itella) the process takes **additional 1-2 minutes**. On average it is possible to say that booking confirmations take around **3 minutes.**

In regards to express order bookings, they are marked specially when entered by Customer A in to the WMS system and need to be booked by the CT employee. The booking is performed via UPS express web-portal and was measured by direct observation to take **around 5 minutes on average.** Additionally, for standard shipments going to China, Iceland and Croatia, these need to be booked at UPS express, which needs to be performed at the CT as well and takes the same time as express order bookings.

Concerning rush bookings, since this process is very non-frequent, it was not performed a single time during the observation in the CT. Consequently, the time per rush booking in the CT was estimated through discussion with the CT employee. There, it came clear that this time can vary heavily between occasions depending on several factors such as whether Customer A wants to be a part of the decision on which transport company is used and how long time it takes for production to pick the shipment. However in **average** it can be said that this takes around **1 hour in total.**

As for the export documentations process, all measurements were taken by direct observation. There it was seen that the time spent can have variations depending on where the shipments are going. Then it depends on how many orders are per shipment, how much time is spent on each. For shipments going to Laxevågen Norway and SAS Norway that go on predefined time slots every week, the export documentation is done for these shipments on the same day as it is sent, i.e. once a week for all outbound orders in this shipment. The time this takes is around 15 minutes on average for SAS and 25 minutes on average for Laxevågen. The reason for these differences is mainly caused by the fact that Laxevågen requires more search in the system then SAS.

Then for other shipments to Norway, this can be done at any time of the week, at departure date of a Norwegian shipment, and was measured to take around 25 minutes on average per shipment. There, the time spent, depends on number of orders per shipment as well as how many destinations the shipment has in Norway, since it might be going to a few different places. This causes extra time for the CT since they need to separate the destinations while scanning and printing the export documents.

Finally for other non-EU shipments, such as Iceland and China the export documentation is performed as soon as production has finished picking each shipment. From direct observation it was measured that it takes normally around 10 minutes on average. Again this depends on the outbound orders per shipment, which are normally fewer for other non-EU countries than Norway.

This makes it a little bit hard to define the time spent on this process since it is performed on several outbound orders at the same time and is not performed in the same way for all destinations. After discussion with the CT employee and by considering all the factors mentioned here, the time spent per shipment for export documentation was estimated to be around **20 minutes on average.**

Support and problem solving

The support function is very time consuming for Customer A since there are many problems especially concerning the inbound orders that need to be addressed several times per day. This can be related to the fact that Customer A is a fairly new customer, and routines have yet to be structured in an efficient way, but also because of organizational issues at Customer A.

In order to gain as good understanding as possible of the time consumed on this function per day, two types of measurements were performed; by direct observation as well as having the employee measure the time herself. Then the results were compared and discussed with the employee where it was seen that both measurements gave very similar results which concluded that in general the CT employee dedicated to Customer A spends 50-65% of the day working with support and problem solving. This means that from 4-5 and a half hours are dedicated for this function which can be approximated up to **around 5 hours per day on average.**

Phone meeting

Phone meetings are held two times a month and are normally around **30 minutes** long.

Overview of all processes

Table 3. Time duration for each process- Customer A

Process	Duration
Inbound	
Truck planning	6 min/truck
Truck receiving standard	3min/truck
Truck receiving/no inbound order	18min/occasion
Outbound	
Standard bookings	3 min/booking
Express booking	5 min/booking
Rush booking	1 hour/booking
Export documentation	20 min/shipm.
Phone meeting	60 min/month
Support	5 hours/day

4.4.2 Customer B

Customer B is a rather large customer with quite repetitive administrative processes which made it possible to directly observe large part of the activities performed. During the observation, time was measured for each process/ activity which was performed during that time. However, for the processes that were not executed, the data was obtained by interviewing the CT employee.

Inbound process duration

As described in chapter 4.3.2.1 the inbound process is divided into container and truck shipments. Furthermore, these processes are split into planning and receiving phase.

Data was gathered through interviewing the CT employee dedicated to Customer B since the processes were not performed during the observation. According to the employee, the truck planning phase takes on **average 14 minutes** per occasion when the transport booking is performed by the CT. However, if Customer B performs the booking themselves the process takes only **6 minutes** for the CT employee. As for the receiving phase of the truck inbound process, it takes on **average 3 minutes** to perform the activities.

The time spent by the CT employee on activities connected to planning for container shipments takes on **average 10 minutes** in total whereas the total time spent on activities related to receiving the container is on **average 3 minutes**.

Outbound process duration

The outbound process is in fact manifold as described in chapter 4.3.2.2 and thus the time spent on the process can vary substantially. In the outbound process there are three procedures that have been identified; priority list, customs and export documentation.

Concerning the outbound processes, the data on time per process was mainly obtained by observing the CT employee and measuring each activity within the process.

The priority list process is performed each day and thus the time is fixed at **7 minutes per day**. The process although varies quite a lot since it is correlated to the number of updates which have to be done on the list.

As for the export documentation procedure, the time can vary substantially depending on if the CT employee performs the transport booking or not. During the observation, the time spent on export documentation and transport booking for Greenland and Iceland was **15 minutes per occasion** whereas the time spent on shipments going to Norway was on **average 7 minutes per day**. The difference between these two are mainly because the CT employee books the transport for Greenland and Iceland while shipments going to Norway are transported with UPS which comes every day and thus does not need to be booked by the CT employee. Furthermore, since all export documents for Norway shipments going within one day are handled together it takes significantly shorter time for the CT employee to perform the procedure. However, the time which is spent on the procedure is correlated to the number of documentation handled within one day and thus the time can fluctuate somewhat.

The third procedure, customs clearance for shipment going from the bonded warehouse to countries within EU, is done once per day for all shipments when production has finished picking. On average the procedure was measured to take **10 minutes/day**.

Return shipments process duration

The process was observed in order to identify how long time it takes. The time which the process took was measured on **average 13 minutes** in total.

Invoicing

As stated in the process description in chapter 4.3.2.4 there are separate CT employees that do the handling and transport invoice. In order to gain an idea on how long time the processes took, the employees were interviewed and each step in the process investigated thoroughly.

Process duration

According to the employee performing the transport invoicing it takes **on average 90 minutes per month**. However, the time can vary substantially since the time spent is correlated to the number of invoices which are received from the transport company. The time can increase even more if other transport companies than Schenker Land have been used during the month, since the employee needs to calculate the freight manually for those. As for the handling invoicing, the process can also vary from taking few hours to taking up several hours. This depends on if there are any problems with obtaining the data

needed etc. However, it is estimated that the process takes on **average 5 hours per occasion**.

Support and problem solving

Since the employee was observed during few days a good overview of the total time spent on support was obtained. From the observation, fixed time per day spent on support was estimated.

Process duration

During the days that the employee was observed, she spent on average around three hours or 40 % of the day on the support functions for Customer B. Since the time varies substantially from day to day the duration of the function is **fixed as 3 hours per each day**.

Overview of all processes

Table 4. Time duration for each process- Customer B

Process	**Duration**
Inbound	
Transport booking	14 min/ shipm.
Truck planning	6 min/shipm.
Truck receiving	3 min/ shipm.
Container planning	10 min/shipm.
Container receiving	3 min/shipm.
Outbound	
Priority list	7 min/day
Export documentation (Iceland & Greenland)	15 min/shipm.
Export documentation (Norway)	7 min/day
Customs clearance	10 min/day
Returns	13 min
Invoicing	
Transport invoicing	90 min/month
Handling invoicing	300 min/month
Support and problem solving	180 min/day

4.4.3 Customer C

Customer C is a rather small and simple customer in relation with services needed to perform at SLL. Furthermore, Customer C has been SLL´s customer for quite some time and therefore the flow has become rather routined and standardized. Because of these characteristics most of the CT processes are not being performed each day and there are normally no major issues in this flow. This made it harder to perform measurements from observations. Instead majority of the time estimations were decided from a discussion with the CT employee responsible for Customer C.

Inbound process duration

For the inbound process in the CT it is split in two factors depending on whether it is a truck or a container that is coming in. Furthermore, the inbound truck process is divided in to planning and receiving. However as there are normally no problems with the inbound process such as missing inbound orders in the system or missing delivery notifications the time this process takes is around the same.

The Inbound process for containers is split in two different processes. Firstly the planning of the container was measured by observation to take **3 minutes on average**.

Secondly, when the container is received the CT employee needs to lock some articles from non-EU containers in the system. This time can vary a lot depending on the number of article numbers per container since each article number is locked independently. Therefore a container with only one article number takes very little time, while a mixed container can take much longer time. From a discussion with the CT employee it was estimated that the time this takes is **around 30 minutes on average per container.** Then for containers coming from an EU country the work performed by the CT is mainly standard receiving activities that have been measured by observation to take **3 minutes on average.**

Concerning inbound trucks the process is split in planning and receiving phase as before and was measured by observation. There, planning takes **on average 4 minutes** while receiving can vary a bit more depending on if all information on the inbound shipment has been received prior the shipment. However as for containers, it was measured to take **3 minutes on average**.

Outbound process duration

The main functions related to outbound shipments in the CT are standard bookings and unlocking outgoing articles from system.

Standard bookings were estimated from discussion with the employee and were defined to take **10 minutes on average per booking.**

For outgoing articles that are locked in the system, these need to be unlocked before they can be sent from the warehouse. The time this takes was estimated from a discussion with the CT staff member to be **around 30 minutes on average.** Again this can differ a lot between occasions which depends on how many article numbers need to be unlocked each time.

Return shipments process duration

Time spent on returns was estimated from a discussion with the staff member and defined **as 20 minutes on average.**

Support and problem solving

Since there are not so many problems for this customer this process in not very time consuming for the CT employee. However, as discussed in the description, organizational changes in Customer C´s part of SLL have led to an increase in enquiries at the CT. In general, **1 hour** is spent on this function **per day**.

Invoicing

Concerning invoicing this is believed to be the most standardized invoice that is performed in the CT, meaning that there is quite low amount of information needed to collect and Customer C does not require as detailed explanations on the invoices as other customers. Furthermore, as SLL is not responsible for the transport, they only charge for the handling. From a measurement by the CT person this was believed to take around **1 hour and 30 minutes each month.**

Telephone meeting

Finally, SLL has telephone meetings with the Customer C **once each month** which normally takes around **45 minutes each time.**

Overview of all processes

Table 5. Time duration for each process- Customer C

Process	**Duration**
Inbound	
Container planning	3 min/shipm.
Container receiving	30min/occasion
Truck planning	4 min/shipm.
Truck receiving	3 min/shipm.
Outbound	
Standard bookings	7 min/day
Unlocking articles	30 min/occasion
Returns	20 min/shipm.
Invoicing	90 min/month
Support	60 min/day
Telephone meeting	45 min/month

4.4.4 Customer D

The CT employee dedicated to Customer D was observed in order to measure the time spent on each process/activity. However, as some of the processes for this particular customer are not very frequent and fluctuating between periods they were not performed during the observation, and thus the data was obtained by interviewing the employee and by having her fill in a time template.

Inbound process duration

The inbound order process for Customer D is not performed that often since the total numbers of orders per year aren't that many. During the observation the process was not performed and in order to obtain data on how long time the process takes the CT employee dedicated to Customer D was interviewed. According to the employee the whole inbound process takes on average around **40 minutes per occasion**. Of that time around two thirds or 25 minutes goes into planning before the shipment is received whereas the remainder goes into activities connected to receiving the shipment.

Outbound process duration

Concerning the outbound process, time study data was obtained by observing the employee and measuring the duration of each activity within the process. Numerous measurements were made on both Approx and Roll-out orders which provided a good indication on how long time each process took. However, no snagging orders were done during observation and thus the employee was asked to estimate how long time the process takes. Several time measurements were made on the approx order process and **on average** it took **17 minutes**. However, that time can fluctuate substantially depending on if the shipment is going to Norway or a country within EU. Roll-out order process took substantially longer time, or **on average 44 minutes**. However, the time which the process took fluctuated in correlation to the number of orders within the shipment. This is mainly since the CT employee needs to go through each order and make sure that all specifications from Customer D are met. According to the interviewee the duration of the snagging order process is similar as for roll-out orders and thus is assumed to take **on average 44 minutes per occasion**. As for the approx order, the time which is spent on roll-out and snagging orders can vary substantially depending on if the shipment goes to Norway or EU-countries.

Outbound process frequency

Looking at the outbound process frequency for the periods; August, September, October, it could be seen that the average frequency of the three types of outbound bookings was as following: snagging orders around 10 (24%), roll-out orders around 9 (22%) and around 22 (54%) approx. orders.

Invoicing

Since the invoice process is only performed once per month and the employee is under a great pressure during that time the observers weren't able to monitor and measure the process. Thus the duration of both the handling and transport invoicing was obtained by interviewing the employee performing the process. Each step of both processes where thoroughly discussed and from that approximate time duration was determined.

Process duration

According to the CT employee the **average** time spent on doing both the transport and handling invoicing is **6 hours per month**. However, duration of the processes can vary substantially. The handling invoice process can vary due to various problems such as the time that it takes to obtain the data needed. Whereas, the time that the transport invoicing process takes can fluctuate since it is correlated to the number of transport invoices received from transport companies. Furthermore, the time can vary if there are any problems with the invoices (e.g. prices missing). As described above, the processes have a fixed value per month.

Support and problem solving

The support function was estimated by measuring it as fixed time during each day. In order to obtain the duration per day the CT employee was asked to study the time that was spent during each day within one week. From that the average time spent on support was calculated.

Process duration

According to the CT employee the average time spent on support/day is 120 min.

Overview of all processes

Table 6. Time duration for each process- Customer D

Process	**Duration**
Inbound	40 min /shipm.
Outbound	
Approx orders	17 min/shipm.
Roll-out orders	44 min/shipm.
Snagging orders	44 min/shipm.
Invoicing	360 min/occasion
Support	120 min /day

4.5 Pricing of CT services

This chapter offers an overview on how the four customers are priced for the administrative activities performed at the CT. Furthermore, improvements possibilities which were identified by the interviewee will be illuminated.

4.5.1 Current pricing approach

Today, the four customers covered have either variable or fixed prices for the administrative work performed. The distinction is normally based on the size of the customer, where larger customers are charged on a fixed price, while smaller customer's prices are variable. This is since larger customers normally have a whole CT person dedicated only for them which makes it easier to price. The variable prices are correlated to the amount of handling

performed in the warehouse. This is based on time drivers such as number of pallets, order lines, orders and other factors that drive cost by causing increased handling and administration in the warehouse. Thus during peak seasons the income is higher whereas during low seasons it is lower. As for the fixed pricing the customer pays a specific management/administration fee where a specific amount of a CT function is included. Thus the amount is fixed throughout the year.

For both pricing methods, SD gives a rough estimate on the average percentage manning need in the CT. This estimation is based on few different factors. First they try to find similar customer's and look at what administration they require. Then for each specific customer SD estimates their specific need based on e.g. turnover. Then as described above, once the man hour need has been estimated it is either put as a fixed fee per time period or added to the transaction costs and thus the customer pays specific amount for administration per order, order line, pallet, etc. Of the four customers, Customer D is the only customer that has fixed fees for the CT function while the others have variable pricing.

4.5.2 Problem discussion

The problems that have been identified with the variable prices is that the manning need estimated in the beginning is solely based on the factors above, which is not believed to give a correct reflection on how the real demand for administration will be. Furthermore, it is not specified in the contract how many man hours are estimated to be needed per month to perform administration work in the CT nor what administrative services are included to be performed by the CT. This can be seen as a major problem since the customer does not exactly know how many hours are dedicated for him per day or what services are included and thus always expects 100% service. Finally, it is not assumed that the manning need will be any different between the first couple of months versus the future. This is another problem since the CT manning need is normally quite higher in the first few months of a project when processes are getting routined and both parties are getting used to working with each other.

4.5.3 Improvement suggestions by employees

One of the improvement possibilities that were identified is that more time should be spent by the SD team on interviewing the Customer before the pricing is done. The customer should for example be questioned on which kinds of inquires he will have and what types of services will be expected from the CT. Furthermore, the contract should specify how many man hours are dedicated for the customer per day and which services are included in the base price. Another aspect that should be considered, is that the Business Development (BDM) should more often go down to the CT to see what extra activities, that are considered value adding, have been performed for the customers. Finally, as discussed above is not assumed that the manning need should be higher during the first months of a project which is not the case and thus a learning curve should be covered in the manning need, meaning that the need should be considered higher for the first few months.

5 Analysis

In this part of the thesis, the knowledge from the process maps and particularly the time study is used to analyze the time perspective of this research. Firstly, the most time consuming processes for each of the four customers are identified. Furthermore, it is applied to analyze key time drivers for all administrative processes of the four customers. From there, the time factors are generalized in order for it to be applied in future quoting scenario. Finally by applying these generalized time factors, an algorithm is created that enables calculation of administrative need for future clients.

5.1 Most time consuming processes

In this chapter the main time consuming processes of each of the four customers are summarized and evaluated providing an understanding on common problems or conditions in different situations that increase the CT time consumption.

5.1.1 Customer A

The most time consuming process which has been identified for Customer A is support and problem solving. This is believed to be partly since Customer A is a fairly new customer and thus there are many problems which affect the overall efficiency in the material and information flow. Furthermore, as this customer is quite large, there are many parties involved in communication with SLL and often number of parties from different departments can be asking the same or similar questions. This demonstrates lack of synchronization and coordination at the customer. Together these factors have led to a quite high amount of questions and enquiries regarding various issues directed to the CT which can be seen from the measurements performed, where it was shown that the CT employee spends around 50-65% of the day in support and problem solving for Customer A. This is specially the case in relation to the inbound process since there can be some problems with the incoming order. As is described in chapter 4.3.1.1 if an inbound order is not received prior to the shipment arriving at the warehouse the CT employee needs to spend substantial time to be able to solve it. Furthermore this can affect other processes such as outbound orders, since articles going out might not have been registered in to the system. Consequently this has increased time consumption for the inbound process as well, since the CT and production have defined a routine as a part of the inbound process, in order to address these issues efficiently. From data obtained from the CT employee it could be seen that during the time period July to September on average there were 227 orders missing per month. At the same time the average inbound orders were 565 orders per month. Therefore, it can be seen that in 40% occasions Customer A did not place an order prior to the shipment arriving.

5.1.2 Customer B

The support and problem solving function is the most time consuming process for Customer B. As described in chapter 4.3.2.6 there are many parties involved in the function and thus the CT employee normally spends around 40% of the day solving diverse issues and coordinating information between different actors. One main reason for this is that as

mentioned before, Customer B has a bonded warehouse at SLL that is administrated by KGH. This requires quite much extra support time in coordinating all kinds of information between several stakeholders.

5.1.3 Customer C

As all processes for this client are very stable and standardized it is quite hard to identify any main time consuming process. However, within both the inbound and outbound process the CT employee spends substantial time if articles need to be locked or unlocked from customs and thus this procedure within both processes is considered to be the most time consuming activity. When looking at the overall flow it can be seen that it is quite effective and efficient which can to some extent be related to the relationship maturity between the customer and SLL. It could be said that SLL should strive towards achieving this goal for all customer within as short time interval as possible. Although, now as responsibility for the CT towards support enquiries has been increased by removing communication tools from production, this may become a more time consuming process for the CT. This is since traditionally, production has dealt with these issues. However again, this flow is normally not very problematic and the customer does not have many enquiries in general.

5.1.4 Customer D

As can be seen in chapter 4.4.2 the outbound process is a very time consuming routine. This is especially since the CT employee needs to manually book every outbound shipment and each booking requires substantial calculations and information. Furthermore the employee often needs to run out in to production to exchange certain information or solve problems. This can take substantial time in total. Thus this process is by far the most time consuming for this customer and has been estimated to take around 44 minutes per booking for rollouts and snagging orders. As these described in chapter 4.4.4 (outbound process frequency) these two types have become around 50% on average of the total outbound order flow which according to the Customer D CT staff is a substantial increase. This accounts for on average 20 snagging and rollout orders per month which delivers in around 40 minutes per day only spent on booking these.

5.2 Possible time drivers

In order to identify what drives time for different processes, the main identified factors that cause increased time consumption were discussed and consensus was reached on which factor was the most important time driver for each process of all customers.

5.2.1 Customer A

Inbound

For the Customer A inbound process the main time driver is **number of inbound orders.** Looking at different time factors in the process it can be seen that the time consumed is mainly related to the number of inbound orders per occasion. This is merely caused by the

fact that Customer A is not entering all orders arriving at SLL in to the system which causes additional time consumed, both in the CT and production, in working through these orders and having them fixed by Customer A. Instead for the more general part of the process, such as receiving a shipment, number of shipments drives the time as most activities are performed per shipment.

Additionally, it needs to be considered that certain characteristics of Customer A cause higher time consumption for the inbound process. These are factors such as complexity of the customer, size, etc. that cause inefficiencies in the inbound flow and therefore result in increased time for the CT making sure that everything works as it should be.

Outbound

Looking at the outbound processes defined for Customer A, transport bookings and export documentation, there are in fact several possible time drivers that should be discussed.

For export documentation, as the amount of outbound orders is higher, the more time is spent on the process each time. However as this procedure is carried out per shipment, it is the number of non-EU shipments that steers the time per month.

Then concerning transport bookings; the type of booking has large effect on the time consumed per booking, since a rush booking takes a lot longer time in total than other bookings. Then, in relation with frequency, the time driver is number of shipments. This is since the time is in most cases similar between shipments booked (i.e. not dependent on e.g. number of order lines or pallets).

It can therefore be said that the main time driver for the outbound process as a whole is the **number of outbound shipments.** Since transport bookings as well as export documentations are performed per shipment it was found that as the number of shipments increases so does the time consumed by the CT. However, it needs to be kept in mind that the CT employee only books a minor part of the total shipments for Customer A.

Support and problem solving

Finally, first looking at the support function in general it is indirectly related to both the inbound and outbound processes since this provides backup for any inefficiencies that may occur in these two main processes and ensures that these are executed in a smooth and efficient way thereby minimizing problems. For Customer A, this function is a big part since there are quite large inefficiencies in the flow, especially concerning the inbound process. Therefore, it is believed that the **number of inbound orders** is the factor that affects this function the most since it will likely increase the number of problems occurring, assuming that routines at the customer stay the same. However, increases in the number of outbound orders could also affect this function, since number of enquiries is normally directly related to the number of orders.

Also, an important factor here is that Customer A has not been able to set routines in relation to sending delivery notifications, entering inbound orders in to system, etc. which affects the time consumed in this function quite much. It can therefore be assumed that as this becomes improved, the support time will be lowered.

5.2.2 Customer B

Inbound

The number of transport bookings performed by the CT employee is one of three time drivers that have been identified in the inbound process for Customer B. As can be seen in chapter 4.4.2 (inbound process duration) the employee spends 14 minutes on average on the truck planning procedure if she needs to book the transport whereas the procedure takes 6 minutes on average if Customer B performs the booking. However, since Customer B manages the transport most of the inbound transport bookings are performed by them and therefore it is assumed that the time driver has not have that much effect on the total time spent on the process each month.

The second time driver identified is type of shipment. Since the planning phase for container shipments takes nearly twice the time that the same procedure does for truck shipments the higher the proportion of container versus truck shipments the more time the CT employee spends on the process per month.

Total number of inbound shipments is third time drivers which have been identified within the process. As the number of shipments received increases the more time the CT employee spends on the process each month. Of all three time drivers this is the one that has the most effect on the total time spent on the process.

Outbound

The number of updates in the priority list is considered to be one of the time drivers within the outbound process. During the observation it could be seen that the time spent on updating the list could range from taking 4 minutes up to 10 minutes depending on how many updates were made. However, since the list is only updated once per day it does not affect the total time spent on the process each month that much.

The second time driver which has been identified in the process is number and type of export documentations. Since the customers in Greenland and Iceland are non-frequent, the export documentation procedure is performed each occasion. Instead, for the more frequent shipments going to Norway the procedure is done in the end of each day. Additionally, the CT employee needs to book the transport for shipments going to Iceland and Greenland which affects the time spent on the process significantly. However, since the customers in Greenland and Iceland are non-frequent it is not likely that the orders would increase substantially and therefore it could be disregarded as a factor that influences the

time spent on the process. As described in chapter 4.4.2 (outbound process duration) the time which is spent on the export documentations for Norway can fluctuate somewhat since it is correlated to the number of documents handled within one day. However, since all export documents for Norway shipments are handled together and thus the procedure is only done once per day it does not affect the total time spent on the outbound process a great deal.

As for the inbound process **the number of outbound shipments** is considered to be the time driver that influences the time spent on the process the most. The reason behind this is that the number of shipments can affect number of updates performed on the priority list as well as the number of export documents and customs clearance occasions performed by the CT employee.

Return shipments

Number of return orders is the time driver which has been identified in the process. However, since Customer B normally does the booking by themselves it does not affect the total time which the CT employee spends on the customer. Instead, increase of the percentage of return bookings performed by the CT employee would increase the time consumed in the CT.

Invoicing

Concerning the invoicing process there are number of time drivers that have been identified.

In the transport invoicing process the number of transport invoices received from transport companies is one of the time drivers that affects the time duration. During the observation it could be seen that going through one transport invoice in Transportal took on average 2 minutes. Thus the number of outbound shipment also affects the time spent on the process. However, the time duration can be significantly longer if there are any problems with the data in Transportal. Furthermore, as described in chapter 4.4.2 (invoice process duration) the time can increase substantially when freight is manually calculated for other transport companies than Schenker Land.

Concerning the handling invoice the process can take significantly longer time if there are problems with obtaining the right data. However, since the process was not observed it is hard to identify how much this time driver can affect the time spent on the procedure and thus will be disregarded as a factor that can influence the duration.

Support and problem solving

Concerning the support and problem solving function there have been three time drivers identified. Type of problems and inquiries is one of these factors. This is since some problems and questions can be handled in a relatively short time period whereas others can take considerable time. However, it can be hard to exactly determine how the function is

affected by this since the nature of these problems and inquiries can be very diverse in both content and duration. Therefore, this time driver will be disregarded.

As for Customer A the main time drivers identified for this function is the **number of both inbound and outbound orders.** This is mainly because as the number of these orders increases so does the number of problems and inquiries from Customer B as well as questions from internal and external stakeholders.

5.2.3 Customer C

Inbound

The inbound process for Customer C is twofold. Firstly, concerning containers, there are mainly two time drivers that need to be considered. Looking at non-EU containers, each article number is locked in to the system independently and therefore the amount of article numbers per container will affect the time that is consumed per occasion. However concerning the frequency of this process, as the activities are merely the same between containers and the process is executed per container it is **the number of container shipments** that has the most effects on how many times this process is executed per month and therefore the time consumed per time period.

For inbound truck shipments, the main time driver is **number of shipments.** This is because of the fact that all CT activities within the process are performed per shipment and not per inbound order. However if there are any problems with the shipment, the time it takes to fix this is likely to be per inbound order, since these problems are often connected to a specific inbound order. For Customer C these matters are normally solved by production as well as being low frequent and are therefore not considered here.

Finally it should also be mentioned that as containers take considerably more time than trucks in general, the type of shipment will affect the time duration as well.

Outbound

For the outbound process there are mainly two parts that need to be considered when discussing time drivers. Firstly for transport bookings, number of shipments is the control factor in how much time is spent on this per time period. However, as discussed before, the percentage of transport shipments booked manually by the CT is a very important factor. For Customer C, this percentage is very low which results in small amount of time spent on this process in the CT.

Then for outgoing articles that are locked in the system, these need to be unlocked, and the time spent on this depends on how many article numbers need to be unlocked per occasions. This activity is mainly driven by the number of non-EU inbound containers, i.e. as

the **number of inbound non-EU containers** increases, so does the time spent on this per time period.

Return shipments

As this process cannot be connected to either inbound or outbound it is merely controlled by the **number of return orders** per time period. This is since all activities performed are directly connected to each return order.

Support and problem solving

Since the frequency and time duration of this function is correlated to **the number of inbound and outbound orders** (as described for both Customer A and Customer B) it is considered to be the main time driver. As described in chapter 4.3.3.5 the time which is spent on this function has increased considerably as a consequence of removal of communication tools in production, which means that the CT employee needs to answer all customer enquiries.

Invoicing

Handling invoicing is rather simple for Customer C and normally not very time consuming. The main factor that effects the time consumption for this process can be if there are problems with either acquiring or understanding the information needed to do the invoice. However, this is normally not a big issue for Customer C as the information needed is pretty standardized. Therefore this process is rather standardized and stable in time consumption.

5.2.4 Customer D

Inbound

The time driver which has been recognized in the process is **number of inbound shipments.** This is because an increase in shipments results in increased time spent on the process as discussed above.

Outbound

Type of order is one of four time drivers which have been identified within the outbound process. As can be seen in chapter 4.4.4 (outbound process duration) the time which is spent on roll-out and snagging orders is more than twice the time which it takes to do an approx order. Therefore, the higher the percentage of roll-out and snagging orders in relation to approx orders the more time the CT employee spends on the outbound process.

As is described in the time results chapter the numbers of orders within one shipment can also affect the time which the process takes. However, it is hard to estimate how many shipments have over one order and thus the time driver will be disregarded.

The third time driver which has been identified is the shipment destination, that is, whether it is dispatched to Norway or countries within EU. During observation it could be seen that the procedures performed for Norway shipments took a round 12 minutes to perform additional to the standard time spent.

Total number of outbound shipments is the last time driver which has been identified in the process. As the number of shipments increases so does the time which the CT employee spends on the process. This is especially important since all transport bookings for Customer D are performed manually by the CT employee which is unlike other customers. By this it is clear, that from all four time drivers identified number of shipments affects the total time spent on the process each month the greatest.

Invoicing

There are few time drivers which have been identified within the invoicing process. When looking at the handling invoice procedure the main factor that influences the time duration is whether there are any problems with obtaining the data needed. However, as described in chapter 4.3.4.3 the CT employee creates invoices for more than just this customer and thus is able to work on invoices for other customers if the data needed to prepare the invoice for Customer D is not obtained immediately. Therefore, it is assumed that the factor does not affect the time duration of the process that much.

The way that invoices are registered is considered to be one of the time drivers affecting the duration of the transport invoicing procedure. As described in chapter 4.3.4.3 the invoices from other transport companies than Schenker Land are manually calculated which takes substantially longer time than for those that are created in Transportal. Furthermore, the number of invoices received from the transport companies is correlated to process duration and thus the more invoices which the CT employee needs to go through the longer time the process takes.

Type and number of problems is the last time driver which has been identified in the process. These problems are for example that reference numbers are missing or that figures in Transportal are incorrect. However it is hard to clearly identify how these problems can affect the process duration.

Support and problem solving

As for the other customers the main time drivers which have been identified within the support function is **number of in- and outbound orders.**

5.3 The algorithm

From the processes identified, the time measurements performed and the time drivers assessed, an algorithm was created that enables calculation of the CT manning need for future customers. In order to be able to create this algorithm it was necessary to generalize

the processes identified for the four customers. Figure 39 demonstrates processes which are assumed to display the general need for a future client, based on the description of the four customers covered in this thesis. As Customer D is a very unique customer, most time measurements for the customer are not used in the algorithm, but instead used for discussion on e.g. improvement possibilities.

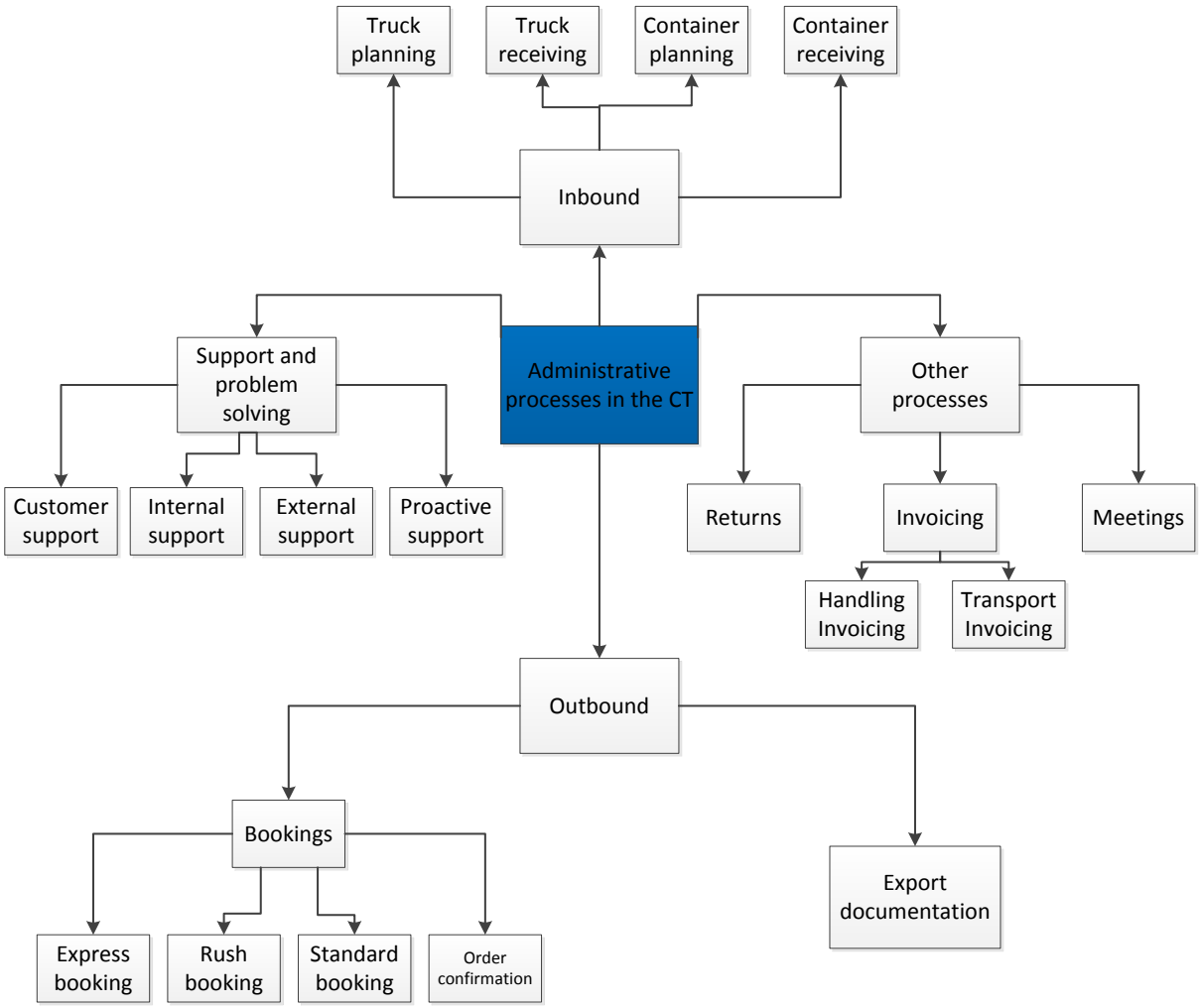


Figure 39. General administrative processes in the CT

The algorithm is based on two main inputs. The first concerns the volumes expected for the possible client. This consists of different time driving volume parameters such as number of inbound/outbound orders or shipments as well as division of different types of activities such as percentage of manual standard bookings performed by the CT. As this can differ substantially between clients, volumes will need to be filled in by the SD staff, per quoting (figure 40). However in order to be able to make a general algorithm that can be applied for quoting possible clients, it is needed to generalize the main time drivers for each process used in the algorithm. This is done by consolidating the results from the time driver analysis performed on each customer in to a general framework which is applicable to all possible customers.

5.3.1 Volumes sheet

This sub-chapter demonstrates how the volume sheet was designed and discusses the main input parameters. This mainly involves generalizing the time drivers identified above. No real numbers were used as these are confidential

Inbound		Quantity/year	Unit	Estimated	Given
Shipments		0	shipm.		
Containers		0	shipm.		
Trucks		0	shipm.		
% Shipments booked by CT		0	%		
Outbound			**Unit**	**Estimated**	**Given**
Shipments		0	shipm.		
Quantity confirmations		0	pickups		
% Automatic bookings		0	%		
% Standard bookings		0	%		
% Express bookings		0	%		
% Rush bookings		0	%		
% Non-EU shipments		0	%		
Returns			**Unit**	**Estimated**	**Given**
Shipments		0	shipm.		
% Booked by customer		0%	%		
% Booked by CT		0%	%		
Support			**Unit**	**Estimated**	**Given**
Size of customer					
Large					
Inb. Orders Outb.orders	500≥ 10.000≥	0	0/1		
Medium					
Inb. Orders Outb.orders	100< 500 1000< 10.000	0	0/1		
Small					
Inb. Orders Outb.orders	≤100 500≥	0	0/1		
Invoicing			Unit	Estimated	Given
Handling invoicing		0	0/1		
Transport invoicing		0	0/1		

Figure 40. Volumes slide in the algorithm based on the general time drivers analyzed (real figures not displayed)

Inbound

The main time driver identified for the inbound process is number of shipments. This is since the majority of the work performed by the CT is per shipment. Thus the higher number of inbound shipments (containers and trucks) the more time is spent on the process each month. However, as the time per container and truck varies, this needs to be displayed as well. Finally, it can be that the customer would require the CT to perform the booking of an inbound shipment which will need to be defined as well.

Outbound

As for the inbound process, the time driver identified for the outbound process is number of shipments. This is since most activities concerning both transport bookings and export documentations are performed per shipment. However, as there can be differences in types of bookings, this needs to be specified as well.

Return shipments

The time driver which has been identified for the return process is number of return shipments booked by the CT employee.

Support and problem solving

Time spent on support and problem solving is estimated to be partly correlated to number of in- and outbound orders of each customer, thus the time driver for the function is number of orders. However, since it can be quite hard to identify how much time is spent per order the factor will be divided into three groups; small, mid-size and large customer, who have fixed time, as discussed in more detail in the calculation sheet part below.

5.3.2 The calculation sheet

The other input in to the algorithm involves the time it takes to perform each process. In order for this to be possible, the times measured for the four customers discussed in this thesis; need to be generalized as well.

Variable times				
Inbound	Time/activity (min)	Time driver	Frequency /year	**Total (time/year)**
Containers				
Planning	0	No.shipments	0	0
Receiving	0	No.shipments	0	0
Trucks				
Planning	0	No. Shipments	0	0
Receiving	0	No.shipments	0	0
Booking	0	% of shipments	0	0
Total inbound				**0**
Outbound				
Bookings				
Automatic	0	-	0	0
Manual				
Transp. confirm.	0	No.pickups	0	0
Standard bookings	0	No.shipm.	0	0
Express bookings	0	No.shipm.	0	0
Rush bookings	0	No.shipm.	0	0
Toll documentation				
Export docs	0	No.shipm.	0	0
Total outbound				**0**
Returns				
Bookings				
Standard	0	No.shipm.	0	**0**
Total returns				**0**
Support/day				
Support				
Small	0	Fixed	0	0
Medium	0	Fixed	0	0
Large	0	Fixed	0	0
Total support				**0**
Fixed times				
Invoicing				
Handling invoicing	0	Fixed	0	0
Transport invoicing	0	Fixed	0	0
Total invoicing				**0**
Meetings				
Meetings	0	Fixed	0	**0**
Total meetings				**0**

Figure 41. Calculations slide in the algorithm (real figures not displayed)

Inbound

Looking at the inbound process there are four main parts that need to be defined. For containers the planning time was defined 4 minutes as an average of the times measured for Customer C and Customer B. This time excludes the activities performed for Customer B that are related to the bonded warehouse as this is a specialized activity that should not be a part of the generalized algorithm. The receiving part for both trucks and containers was then defined 3 minutes, excluding the specialized locking in the system activity performed for Customer C. Finally, the planning part of inbound trucks is normally stable around 6 minutes. Moreover, if the CT needs to book the inbound transport, this was defined to take around 8 minutes as for Customer B.

Outbound

The outbound process is divided in to transport bookings and export documentations. The transport bookings are then further divided in to following booking types; automatic booking through Centiro, manual quantity confirmation and standard, express and rush bookings.

Firstly, a significant part of transport bookings is performed through Centiro, automatically when the shipment has been picked. This does not require any time for the CT employee unless there are any problems with it. Quantity confirmations are performed via email and normally take around 3 minutes per occasion. Standard bookings and express bookings are normally performed in the same way via shippers-web-portal. The time consumed per bookings can differ quite much. This can be caused by different speed of the CT staff, different information needed in each web-portal, etc. However, looking at measurements for all customers, it was defined that the procedure takes around 7 minutes on average. Finally, for rush bookings performed via phone or email, these are very time sensitive and take quite long time. This is since the CT employee has to monitor the shipment from the point which the customer makes an enquiry until it has been delivered. It is estimated that the CT spends around 1 hour on average performing the booking.

Another aspect that needs to be considered is whether SLL is responsible for the transport or not. This will contribute to an increased CT time since there is basically a new dimension added to the booking if the CT is responsible for the transportation, monitoring the shipment before the truck arrives and after it leaves SLL. This is especially for time sensitive shipments such as rush and express shipments, and can in fact increase the time spent on these both as a part of the booking as well as a providing support by tracking and tracing.

Then, for the export documentations it can be rather hard to define the time spent per shipment since this process is not executed in the same way for all customers. This is since this process is executed /day for Customer B whilst it is executed per shipment for Customer A. However since the time driver has been defined as number of shipments, it was needed to define the time per shipment as well. This was done by taking an average of the numbers

for Customer A and Customer B and assuming that the time for Customer B would be a bit lower per shipment. This gave an average of 15 minutes per shipment.

Return shipments

Concerning booking return shipments, this was measured for Customer B and Customer C to take 13 and 20 minutes which gives an average of 16, 5 minutes/booking.

Support and problem solving

As support and problem solving is unlike other processes defined it was needed to present it in a different way than the others in the algorithm and is therefore displayed as average time per day, for each customer. When looking at the time spent for each customer, it could be seen that the time was in some way correlated to the size of the customer, i.e. how large the flow of inbound and outbound orders was. As the quantity of orders increased, the more time was spent on the function. This varied from 5, 5 hours (Customer A) down to just around an hour (Customer C). By using the time measurements for the four customers it was possible to categorize the function in to three predefined types in the algorithm. There it was defined that small customers are Customer C, medium size is Customer B and large is Customer A. From this it was possible to define the interval that each of the customers lie in (table 7).

Table 7. Definition of customer size in regards to quantity of in- and outbound orders

Boundaries / Customer Size	Inbound orders	Outbound orders
Small	≤100	≤ 1000
Mid- size	100< 500	1000< 10.000
Large	500≥	10.000≥

The time which the CT spends on the support function for small customers is estimated to be 1 hour per day whereas the time spent on mid-size customers is 3 hours. As for large customers it is estimated that the CT spends 5 hours per day on support and problem solving. Now someone might wonder what happens to the customers that e.g. are small sized in relation to inbound but medium sized in relation to outbound. This will have to be one of the things that need to be assessed during each quoting since it is not possible to define these separately. Furthermore the boundaries defined are only put in order to give a rough approximation on the size of a new customer and should therefore be re-considered for each client, i.e. the boundaries are merely to provide some kind of basis to build the estimation on.

This is especially since there are many other factors that need to be considered when estimating the support and problem solving need which are hard to include in the general algorithm.

First of all, the support function is very dependent on the customer. If the customer is not very organized there can be numerous people calling from different departments, entities or even countries inside the company asking for the same thing. However, this can likely be connected to the size of the customer, i.e. the larger customer the more people will be calling. Also, the customers experience with logistics will have great effect on whether the customer understands or is capable right away to organize so everything is performed correctly on their side. With less experience they might be likelier to have various questions related to status of shipments, inventories, function of client portals, etc. Additionally, the amount of handling performed for the customer will affect the support function as well, since the more the goods are handled, the higher the probability is for faults.

Another big factor that can affect time in this function, is whether some kind of a bonded warehouse function will be in place for the client or not. As can be seen for Customer B, there are quite many administrative activities connected to the bonded warehouse function such as doing stock counts and comparing these to the stock count from the customs party (KGH) and getting confirmations from the toll office that goods can be released, etc.

Additionally, it was seen from the observations that the hard part with analyzing the time duration of this function is that it is quite flexible. This means that for enquiries that are not extremely time sensitive, the CT staff only does it if they have time for it. So if they have a lot of other processes that are maybe more important they will wait with the maybe not as important support, or have someone else do it. This makes it very hard to estimate the time spent on this function, since it can be vary circumstantial. Furthermore this demonstrates that the support function needs to be defined in a more precise way.

Invoicing

Invoicing is divided in two main parts; Handling and transport invoicing. In order to make a generalized estimation on the time this takes, the average was taken for all customers involved.

For transport invoicing this is performed for Customer B and Customer D, since SLL is responsible for the transport for these two companies. There the transport invoicing takes around 1,5 hours for Customer B. However as transport invoicing is not performed separately for Customer D, it was not possible to split the time spent on each part. Instead the whole time was defined as around 6 hours. From this it was assumed that the transport invoicing part takes around 1,5 hours per occasion for a general customer. However it is important to keep in mind the characteristics that affect the time spent on this. Firstly, for the customers those have Schenker Land as a transport company, this makes it possible to make the invoice calculations in the Transportal which reduces the time spent on each

transport invoice. For other transport companies, this needs to be performed manually in Excel which can be quite time consuming. Furthermore, as the number of invoices increases, the more time will be spent on this function.

For handling invoicing the time spent on it can differ quite much. From 5 hours for Customer B to 1,5 hours for Customer C. As stated above the time estimated for the invoicing part for Customer D was in total 6 hours, which makes around 4-4, 5 hours for the handling invoicing. By estimation it was believed that this part of the function should take on average 4 hours as it is executed today. As for transport invoicing there are number of factors that will affect this. First, it can differ a lot the information requested from the customer. For example Customer D requires quite large amount of information on their invoices as well as the CT employee needs to make two extra excel sheets with more detailed information on different parts of the invoice. Meanwhile, Customer C requires quite simple and standardized information. This is partly since the handling of Customer C is simpler then the handling for Customer D. Another factor that affects the time spent on this process is the accessibility of data. This is related to the reports that the CT gets out of the system. These often do not display exactly the right data that the CT needs which makes it tricky at times to work through and calculate. Moreover, there can sometimes be problems with getting some data from e.g. production which means that they may need to wait with some steps of the invoice until it is ready.

Meetings

In regards to customer meetings, they are normally held once or twice per month and were given the fixed number of one hour per month based on time estimations for all customers.

5.3.3 Front page

The front page of the algorithm, displays the end result, i.e. the CT man need per year for the future client along with the results for all processes separately. There it can be seen that the changeover add-on or “slack time”, i.e. the time wasted, was estimated to be around 20% per CT employee. This is taken from an assumption made by SLL´s SD team but backed up by existing theory (chapter 2.2) and from researcher’s observations.

Overall CT man need/year	
Inbound hours/year	0,0
Outbound hours/year	0,0
Returns hours/year	0,0
Support and problem solving hours/year	0,0
Invoicing hours/year	0,0
Meetings hours/year	0,0
Total need hours/year	**0,0**
Changeover add-on	0%
Total need hours/day	**0,0**
Total need CT Functions	**0,00**

Figure 42. The front page of the Algorithm - Overall calculated man need for a new client customer (real figures not displayed)

5.3.4 Limitations of the algorithm

There will always be some limitations to a generalized algorithm as this. This is especially for an organizational entity as the CT, where services can be unique and specific for each customer and it needs to be kept in mind that there can be additional processes executed that are not general, and therefore need to be charged extra for or added to agreements afterwards. An example is the priority list that is a process executed for Customer B only, and is therefore not a part of the generalized algorithm. Other examples are locking/unlocking articles in system (Customer C), bonded warehouse (Customer B), inbound orders not entered in to the system (Customer A) and specialized bookings (Customer D).

These are just examples of specialized activities that a new client might need. How to address this will be viewed in more detail in the discussion.

6 Discussion and recommendations

This chapter seeks to bring up the main problems and inefficiencies recognized by the CT and other SLL employees as well as researchers during the thesis work. This involves both internal as well as external problems. Furthermore improvement possibilities and solutions to these problems are discussed and recommended.

6.1 Pricing of the CT

The first problem with the pricing of the CT today is related to the sales process, i.e. quoting where the man need is estimated:

- Man need not accurately estimated for the customer

Recommended solutions:

- Interview customers more thoroughly in relation to the CT services needed
- Increase understanding of general CT processes
- Include learning curve in to the specified man need

As described in chapter 4.5.2 there are a few problems related to the way that customers are priced for the administrative work performed in the CT. One general problem is that the CT manning need in the quoting process is based on the rough estimations which are built mainly on SD´s perception of the customer needs as well as SLOG´s similar customer´s needs. This tends to give an inaccurate estimation. This can be improved to some extent by interviewing the customer thoroughly before the final need is determined. This is believed to improve the pricing estimation substantially since quotation would be built on various factors obtained from the customer, such as specialized services required, number of shipments, type of questions from the customer etc. Furthermore, if all time driving volume information could be obtained, the SD team could calculate the manning need by inserting these volumes into the algorithm constructed by the researcher which is assumed to give a better reflection on how the customer should be priced.

Also the SD team needs to increase the understanding of the processes that are performed in general for a customer in the CT. Obviously this is something being worked on right now, and should be one of the main contributions from this thesis. Moreover, this should be done by having the CT employees more involved in both the sales process as well as the implementation phase, getting their perspective on e.g. what should be included and what not. This is especially important since customers have different backgrounds and different logistic knowledge, meaning that they will not always understand what administrative services they will need.

Finally in order to cover the total manning need it is necessary to take in to consideration the so-called learning curve. This means that for the first few months the manning need in the CT is generally quite higher than on average in the long term. This is related to both parties getting to know each other, getting used to each other user interfaces, communication ways,

etc. Also this is related to the fact that the customer might need to get used to following SLL requirements such as notifying incoming shipments. Furthermore if the customer does not have much experience with working with 3PL providers, they might have a lot of different clarification questions in the beginning of the project. This was seen with e.g. Customer A where the manning need has already been reduced since the project started. As discussed in chapter 4.5.2, a learning curve is not included in the estimated CT manning need. In order to solve this it was assumed from a discussion with SD and the Account manager that the learning curve can be estimated in the same way as it is done for production. That is that the average manning need will be reached after six months of working with the customer. During these six months the manning need is believed to decline linearly from 200% (in the 1st month) need to 100% (in the 6th month).

Next problem relates to the services provided in the CT:

- Services provided not specified in contracts
- Amount of staff in the CT not specified in contracts
- Services included not specified for the CT

Recommended solutions:

- Specify clearly what services are included – for the customer and CT
- Specify clearly the amount of staff estimated to perform these services
- Monitor and charge for value added services (VAS) or add to agreements

As it is today, it is not stated in the contract how many man hours are dedicated in the CT for the customer per day or which services are included in the pricing. As a result of the increased knowledge of the administration needed this could make it possible to state much clearer in the agreements with the customer, what administration is included and what the expected CT manning need will be. For example the support function should be defined in a much better way for each customer, i.e. define what support activities are included in the agreement or at least which are not. This is especially important for companies that are not used to working with a 3PL company and will therefore constantly be calling to check up on various things. This could be done by e.g. having a sheet in the quoting document to a new customer that states exactly what is included in the specified CT function.

By specifying this in the contract it is not only believed that the customer would have a better understanding what service level to expect but SLL would also know exactly which services are value adding and could be charged extra for. Additionally, it is important that the information would be shared with the CT which would enable them to monitor which VAS (Value adding services) are being performed and charge extra for these. This could be done by putting in to the SAP system exactly what CT administration is included. Furthermore, they should be given a list of possible VAS in order to simplify the decision for the CT. However it is important that BDM monitor this as well, by continuous

communication with the CT. This would ensure that SLL would be able to charge for all activities performed in the CT. Moreover, it would make it easier for SLL to approach the customer afterwards to renegotiate the man hour need, by comparing services stated in the contract to what is being performed. This is very important since it is common that the administrative need perceived in the sales process tends to vary quite much from the actual need. Additionally, if specific VAS would be performed repeatedly, BDM should contact the customer to enquire if the customer would be willing to include it in the base price.

The last problem is associated with time drivers:

- Time drivers not in correlation with time consumption in the CT

Recommended solution:

- Include correct time drivers in variable pricelists

Lastly, it seems that the time drivers that are included in the variable prices for customers are mostly related to what causes increased time in production, not the CT. This will result in incorrect estimation and pricing of the time spent by the CT. Therefore an understanding on what drives time in CT (which is provided in this thesis) is essential to ensure accurate pricing of this function. These time drivers should then be included in the variable pricelists for future customers and would enable a more accurate and correct estimation on the CT time consumption.

6.2 Getting customers routined

An important aspect identified concerns the customer following the requirements SLL puts on its customers. These are mainly concerning formalities that should be performed in predefined time, e.g. before a delivery arrives at SLL, in order to assure efficient flow of material and information and efficient and effective use of staff. Routines that have been identified during this thesis mainly concern activities that need to be performed before an inbound order is received:

- Sending delivery notifications pre-delivery
- Entering inbound orders in to system pre-delivery
- Registering new article numbers into system pre-delivery

This is since there can often be problems with for example customers not being organized enough and therefore failing to follow the guidelines SLL sets them. Also their experience in logistics can be very different. There, some new customers might have experience in working with 3PL´s and understand what is required by them. However, some might have e.g. been running their own warehouse and do not understand fully why these things are needed or simply have a hard time structuring it. This can cause severe inefficiencies and costs which affect both parties negatively. During this thesis, these problems have mainly been identified

for two customers, Customer D and Customer A, which are actually on different stages of maturity, and will be used as examples in order to demonstrate, what problems can occur, what affects they can have and how they can be handled and avoided or reduced.

Looking at delivery notifications, this is maybe not as related to the CT work as others, but still very important for SLL and especially production. This is because production needs to be able to plan their capacity based on inbound and outbound orders per time period. Consequently, if many deliveries are coming in without being notified, it will make it impossible for production to plan their staff and reduce possibilities for efficient capacity planning. Additionally, this can increase time consumed in the CT, since it can sometimes take quite the time to figure out what is being delivered, from where, etc. The next two points are related to system information that needs to be in place when a delivery arrives at SLL. This is of great importance since articles cannot be entered in to the system unless they have been registered in the correct way, have an inbound order for the delivered articles, etc. Consequently this will cause various inefficiencies in the total flow e.g. by delaying outbound orders.

As can be seen these problems can have various negative effects on SLL as well as its customer. In order to find solutions to this, data from interviews with the CT staff, especially Customer D and Customer A, along with ideas from the researchers, recommended solutions have been identified that are believed to enable more efficient flow of material and information and make it likelier that customers understand and follow the defined guidelines:

- Low flexibility from beginning
- Demonstrate the gains in following set procedures
- Improved communication and coordination with customer
    a. Check-up meetings
    b. One responsible party
- CT involved from the beginning of projects

Fixing these issues identified above can in some way be related to how you raise your' child. If you are not strict on certain standard issues from the very beginning, it is likely that they will never be the way you want them to be.

In relation with a 3PL company, this concerns being very strict from the beginning and not allowing much flexibility in relation to these conditions. If this is not done from the beginning, the customer will think that he can get away with it again. This is because the customer might not see the value for implementing these routines, as it could be perceived as an added unnecessary work. A way to hinder this would be to either charge the customer additionally every time there are any problems or simply sending shipments back and ask for them to return when everything is settled. This was discussed by the staff responsible for

Customer D in relation with the inbound flow. The fact is that not so long ago there were major problems with the inbound flow, where deliveries were not notified, inbound orders not always entered in the system, etc. which caused several problems as discussed. When a new staff member took over the Customer D flow, one of the first things was to change this. The first thing done was to not allow shipments in to the warehouse that had not been notified. This forced Customer D to respond quickly and implement necessary routines in order to ensure that this was performed. However, it needs to be kept in mind that as easy as this sounds, it can be very hard to execute and can cause short term conflicts. It should however as demonstrated by Customer D result in a lot smoother and reliable flow in the long term.

Consequently, it is very important that this is done from the beginning and that all parties involved need to be made clear why these requirements are necessary by demonstrating the value gained by implementing these routines. This requires adequate explanation on the affects that these things can have on both parties. For example delays can be expected in the overall material flow if all information is not registered at the correct time. Furthermore, by charging extra for the time SLL needs to spend on fixing these issues the customer is made responsible for the extra costs associated with it. This will in most cases encourage the customer to improve.

Another important factor is the communication between the CT and the customer. This concerns ensuring a simple and efficient communication by reducing the number of parties involved by having one contact person from the customer that is responsible for interaction and communication with SLL as well as ensuring that everything runs smoothly. This should reduce misunderstandings in relation to sending delivery notifications, etc. but as well reduce the support needed by reducing number of parties contacting the CT. Then, short but frequent check-up meetings should be held between the CT staff and customer´s contact person to ensure that everything is going according to plan and to address problems occurring, e.g. lack of delivery notifications, etc. This should enable a better long term relationship and make sure that both party´s perspectives on different issues are shared and understood.

Additionally, in some way, the CT should be more involved in the beginning of projects. This was seen to be quite important since it would enable the CT staff to specify what they expected from the customer and what the customer expects from the CT. This would increase understanding between the companies and enhance the business relationship.

Finally there can be other factors that affect the time it takes to have a new client set these standard routines there are many factors that will affect it. This will depend on whether he really sees the need in doing this, what it will cost him and if he has the resources to implement this as well as how complex and organized the company is.

6.3 Staff cross-training

Another improvement needed in the CT concerns increasing the cross-training of the staff, to ensure that they have each other´s back during absence. As it is today, with many new staff members this is not as it could be but they have however started working towards this. There are in fact several reasons for increasing the cross training of the staff in the CT. First and most obvious reason relates to staff absence due to e.g. sickness or holidays. Secondly, as part of the CT staff creates invoices for customers each month, the others should to be able to cover while the invoices are being created. Finally, since there can be fluctuations in administration needs between customers in different time periods, a cross-trained CT would be able to assist each other when there are peaks for different customers. By this, the employees would be utilized a lot more efficiently and the need for additional staff might even in some cases be removed.

6.4 Communication between CT and production

As the CT and production need to work very closely together on solving issues the communication and interaction between these two should be made as efficient as possible. It has been identified that for couple of the customers at SLL, the CT spends quite a lot of time running back and forth in the production in order to discuss with the production staff because there are no communication tools in place between these two. Of course there are many cases where there is a need for the CT employees to go to production to understand the problem, etc. and vice versa but it should also be made possible to interact in a more efficient way for simpler enquiries. This could be solved by implementing an internal phone or an email that the CT and production could communicate with. However, these would need to be internal since SLL does not want their customers to bypass the CT and start calling production (thereby interrupting them in picking shipments, etc.) for issues needed to solve.

Finally, in order to improve the communication and understanding between production and the CT, as well as other departments involved with the customer directly, internal meetings should be held with representatives from different departments discussing the main issues with different customers and coming up with solutions to improve the overall flow.

6.5 Improvements in the invoicing process

Today, invoicing seems to be one of the processes where there are the most improvements possibilities in place. Firstly, the invoicing is performed on the top of the regular work, meaning that the staff doing this is continuously interrupted. This increases the time spent on this process since it takes some time to get in to the invoice again when switching between tasks. Also the risk that mistakes will be made is higher than if the staff would be able to focus completely in the invoicing. In order to improve this, the CT staff that makes the invoices should be allowed to close themselves off in a separate room with no disturbance where they could dedicate themselves solely to the invoicing work without being interrupted from other work tasks. This would reduce the time spent on invoicing each

time. This however requires more cross-trained work team so that the rest of the team would be able to take care of the CT functions for all customers in the meantime.

Another problem with invoicing today is that the structure of the data is not in any way designed to the needs of the person creating the invoice. Instead reports that are collected from the system provide information that need to be modified or re-calculated in a certain way to get the correct information that is used in the invoice. Furthermore, only small parts of the data published in these reports are even needed to create the invoice. Also data needs to be collected from several places and is not always available at the time it is needed. This makes it quite complicated and non-standardized to create the invoice which makes it hard to replace the person normally creating it. Consequently, this makes the CT very dependent on the staff creating the invoices each month and demonstrates how fragile this procedure is. Therefore this process needs to be simplified heavily. Firstly, the data collected from the system should be displayed in the exactly same way as it should appear on the invoice, making it easier for anyone to create the invoice. Also the data collected from other places such as production should be made more accessible and it should be made possible to collect as much of the information as possible from standardized reports from the system. These improvements should have positive effect on the quality of the invoices as well as decreasing the time it takes to create the invoice. Moreover, the process itself on how exactly the invoice is created for different customers should be documented and standardized better thus making it more understandable for new employees, thereby reducing the dependency on invoicing staff.

Finally there are quite big differences in the information requested from different customers in the invoices. While Customer C requires a basic and simple invoice, Customer D actually requests two different excel sheets in addition to the actual invoice which include more detailed information regarding the invoice. This causes quite long time spent on doing the invoice for Customer D. In the investigators perspective this could be seen as a value-added service that should be charged extra for.

6.6 Improvements in the return process

Lastly, one improvement identified for incorrectly picked returns is that quite often it is handled directly by the customer without the CT being notified. This makes it very hard for the CT to investigate what problems are causing the wrong picking and therefore hinders SLL from identifying reoccurring problems that can be fixed and therefore improved continuously. Instead, it could be possible to create a simple sheet with couple of parameters that the customers fill in every time a wrong picking is identified. This would enable SLL to monitor the problems occurring and make improvements on those reoccurring.

7 Conclusions

This chapter looks at the main purpose and aim of this thesis and summarizes how the research objectives were addressed and solved. Furthermore it discusses the validity of the algorithm that was created from the data gathered. Finally it provides suggestions for future studies on the subject.

7.1 Concluding remarks

As stated in the purpose, this thesis aims to increase the knowledge on administrative processes in SLL, focusing on the administration performed in the Control Towers (CT). By this, SLL is able to estimate it in more detail when quoting possible clients and the precision of pricing the CT function can be increased heavily. This was made possible by fulfilling the research objectives proposed in the introduction.

Firstly, this thesis provides a detailed explanation of all administrative processes performed for the customers covered by creating process maps and detailed descriptions. This enables an increased understanding of the administrative activities performed for different customers in SLL. This is especially since the four customers were strategically selected in cooperation with SLL supervisors as they are all rather different in relation to the administration required, thereby ensuring that various administrative activities are covered.

Secondly, a time study was performed by measuring the time duration of each process as well as identifying various different time drivers for these processes. These were then generalized in order to be applicable to future clients. This makes it possible to understand what drives time in the CT for the basic processes generalized for future clients which is an absolute prerequisite in order to be able to calculate the future CT manning need.

By consolidating this knowledge in to a general framework it was then possible to create an algorithm that is intended to calculate the generalized manning need for a future client. However, as there are normally various specialized administrative services needed to perform for most clients; this algorithm solely provides a basis on which the pricing can be built on. Instead the descriptions and maps offer examples of activities that are considered specialized. These will then need to be added to the pricing either in the sales process from discussions with the client or in the project phase. This will depend on for example the customer's knowledge on the administrative need, i.e. whether they are able to specify additional administrative requirements before the project start-up. Then, in order to validate the algorithm, it was tested on some of the customers discussed in this thesis. This gave reasonable results that were in context with the real manning need which increases the validity of the algorithm.

Finally the discussion part addresses the improvement possibilities that were identified in the thesis work especially concerning the pricing of customer. There, several improvements were presented. Firstly, in relation to pricing of customers, SLL needs to work more with understanding the administrative need right away in the sales process, i.e. during quoting.

This should be done by interviewing the customer in more detail. Furthermore, the knowledge on the administrative services that are generally provided for customers should be increased which is believed to be provided to some extent by this thesis. Additionally, the CT should be consulted on this aspect as well, gaining their perspective on the administrative need for different customers. Another very important improvement to the pricing of the CT function is that it needs to be stated much clearer in the agreements what administrative processes and activities are included and consequently what the expected CT man need will be. This will make it easier to re-negotiate the agreements and to charge extra for activities not included in the agreements. Finally, in order to charge more accurately for the CT time, correct time drivers need to be included in the variable pricing, which is not considered to be done today.

Moreover, some general improvement possibilities have been identified and discussed that should ensure more smooth and efficient flow of material and information between all stakeholders involved in the 3PL-client relationships. This is related to improving external as well as internal communication, e.g. between customers and the CT as well as between production and the CT. Furthermore, it is suggested that SLL increases the emphasis on making sure that the customer follows the requirements (e.g. sending delivery notifications) set from the beginning of the project as this will improve the overall flow of goods and safe time for all parties involved. Finally some process improvements were suggested that should have positive affect on both the quality of the work performed as well as the time consumed for the corresponding process.

7.2 Future studies

As this thesis defines and discusses the administrative processes executed for four different customers in one of SLOG´s warehouses this provides a good base on what general administrative processes are performed for customers. From this the algorithm created is a good starting point for calculating the CT manning need. However, as it is limited to these four customers, it would be interesting to perform the same study for the rest of SLOG´s customers. This would enable a much more detailed and comprehensive knowledge of administrative processes executed for various number of customers which would ensure a lot more accurate pricing for future customers.

Also an interesting aspect would be to get SLL customer´s feedback on how they perceive the administrative service received from SLL. This could be related to investigating their satisfaction of the CT function; whether they are satisfied with the service they get, if they believe they are paying in accordance for what they are receiving and what they believe could be improved.

Finally it would be interesting to investigate how other 3PL companies price their administrative services and compare this to how it is done at SLL and from there how it could be done for the general 3PL provider.

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Appendix A

Interviewees

Employee I	Supervisor of control towers
Employee II	Contact person for Customer E
Employee III	Contact person for Customer A
Employee IV	Contact person for Customer B
Employee V	Contact person for Customer D
Employee VI	Contact person for Customer C
Employee VII	Stock manager
Employee VIII	Transport manager
Employee IX	Operational Exellence
Employee X	Account manager
Employee XI	Solutions designer

Appendix B

Questionnaire for employees at the control towers

General employee information

Name of employee
What customer do you work with?
Are you working with many different customers?
What is your role and tasks in the processes?

Process/procedure information

a. How would you describe the procedures you work with in general?
b. Are the procedures standardized?
c. What are the boundaries of the process?
d. What is the input?
e. What is the output?
f. What are all the activities (all possible scenarios) that can happen in between?
g. What are the component parts of the processes; people involved, departments, equipment, information systems?
h. Do the processes overlap? Is it often that you need to start on one procedure before the next ends?
i. Are there any problems associated with the processes?
j. Could the process be improved? How?

Time information

a. Do you feel it is possible to estimate how much time you spend on each process/each time/ month?
b. How long time (on average) does it take to perform each task in the process (percentage of each activity)? What takes the longest time? Why? Does it differ a lot?
c. What are the key factors that drive time for different processes?