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**DESIGN OF DISTRIBUTION NETWORK:  
ANALYSIS OF DROP-SHIPPING PROCESS  
IN A CASE COMPANY**

Master's Thesis in  
Science in Economics and Business Administration  
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## ABBREVIATIONS

- MM – Material Management
- PCM – Parts Coordination Management
- POS – Parts Order Supply
- WM – Warehouse Management
- DI – Distribution and Invoicing
- VAT – Value-Added Tax
- BC – Finance and Business Control
- QM – Quality Management
- PD – Product Development
- SAP – Systems, Applications & Products in Data Processing

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**ABSTRACT:**

Nowadays supply chain performance brings a major value for a business in order to sustain competitively in the market. However, distribution network design is presented as a significant factor in a supply chain design, because of its direct influence on supply chain performance. The distribution represents the actual flow of goods and services from production to the end customer and it is measured by quality, responsiveness, and availability of the goods. Therefore, this research is focused on the examination of distribution network design, particularly its role and importance. The study is limited to specific model: drop-shipping scenario. Case company is selected in order define drop-shipping design for, especially urgent and heavy deliveries. Drop-shipping process performance analysis is based on data collected by interviews in various departments. The approach aims to identify the current performance of the process, potential weaknesses and propose development suggestions for future continuous improvement.

Major results of the thesis present five key investigated areas where problematic issues have been grounded in a case company drop-shipping model: communication, resources, technical side, organisation and complexity of the process. Improvement recommendations are provided accordingly in order to optimise the process in the future.

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**KEYWORDS:** supply chain design, distribution network design, drop-shipping model, process performance analysis

# 1 INTRODUCTION

## 1.1 Research background and objectives

Nowadays customer satisfaction is a critical value for any company operating in any market. Satisfaction of customers mainly relies on how the supplied services and products met customers' expectations. Regarding the actual or physical supply of the goods, supply chain management finds the flow of the products and services. According to Waters & Rinsler (2014: 3-7) supply chain management is a concept of the organisation of logistics channels in order to maximize profit and increase competitiveness in the market by internal and external integration, partnership and close coordination. Integration and coordination of involved parties are maintained by successfully applied supply chain design that concludes all the supply chain members to a single whole in order to supply the goods and fulfil end customer needs. Moreover, a supply chain can be presented as a spine of the supply chain management that especially highlights its importance.

In order to enhance competitiveness in the market, companies' practices are targeted to organize a supply chain in the most efficient way. Thus, various supply chain transformations and modifications lead to the separate chapter in supply chain management – supply chain design. The design of the supply channels mainly depends on the company's strategy and particularly on the long-term targets. Thus, efficiency and responsiveness of the supply chain ultimately influence on the company's success in the market and overall profitability.

One of the first steps of creating reliable supply chain is development or modelling phase that establishes strategy planning and an actual design of the future supply chain. Development phase considers long-term decision-making process that can be viewed as a strategic weapon of the supply chain management. According to Estampe (2014: 9-11), supply chain modeling is a value creating process that is defined by three main

characteristics of the system's performance: efficacy, efficiency, and effectiveness. All these three criteria define the complex value of the supply chain that with a combination of the company's strategy design have a great impact on the supply chain performance. Nevertheless, matching of the performance defined at the modeling stage is presented by network design and further operations planning. By building a network companies are liable to define a scope of a supply chain and functions of each member in a supply chain. Identification of network members continuously follows to the network optimization modeling that is used for capacity allocation, demand planning, and regional facility configurations.

As it is stated earlier, supply chain contains all the processes from raw material till the available product for the end customer. Where network modeling is performed as distribution network design theory to ensure an effective distribution and on time delivery of services and goods. This concept illustrates the design of physical movement of the goods. Customers highly interpret quality, responsiveness, and availability of a product or services, thus, distribution can be defined as the most visible part for customers. Therefore, an efficiency of distribution network design has a major impact on supply chain performance.

By building a distribution network, business selects the most efficient and cost saving way to deliver the goods to a customer from their manufacturing points or suppliers. There are many varieties of distribution channels are known and applicable nowadays. The drop-shipping scenario that examined in this study is the network design that is based on manufacturer storage and direct shipping to the end customer. By this specific model companies are able to speed up a delivery process and optimize inventory and storage levels. However, this study analyses drop-shipping scenario as a model for, particularly urgent and heavy products. Moreover, case company is selected in order to examine a real drop-shipping network for oversized and urgent spare parts deliveries by qualitative



analysis. The analysis is based on interviews that are executed in each involved in the network.

The purpose of the thesis is to analyse current drop-shipping distribution network in a case company by defining weaknesses and also proposing improvement recommendations. Data is collected through the interviews of all involved departments: parts coordination management (PCM) and parts order supply (POS), material management (MM), distribution and invoicing (DI), external logistics company and also various process development experts who are working in the process and operations support department. In total 12 interviewees participated voluntarily in the research by bringing their valuable experiences in the process and thoughts about improvements.

## 1.2 Research questions

Generally, this thesis overviews the meaning of supply chain design and importance of the distribution network design in a nowadays competitive business environment. The research is limited to an examination of the drop-shipping model for heavy and urgent spare parts deliveries in a case company. Moreover, the analysis is focused on the study of operations as a whole and cooperation among departments, whereas legal or technical system based issues in the process are not investigated in detailed. Empirical part aims to present concrete improvement recommendations for further development projects in a case company. Therefore, based on the objectives, background, and limitations the following research questions are formulated:

RQ1: What are distribution network design and its role?

RQ2: How is drop shipping process organized in case company?

RQ3: What are the weaknesses in the drop shipping scenario in a case company?

- How can the gaps be fulfilled?
- How can the entire drop shipping process be improved in the future?

In order to continuously answer these questions, thesis contains firstly theoretical review and practical approach that based on investigation of a case company. Literature review is entitled to define the first question, whereas the all further questions are particularly described by empirical research.

### 1.3 Research approach

The approach refers to represent the drop-shipping process in a case company as a whole within particular observation of each involved department and interactions among them. Drop-shipping model has been already implemented in a company for many years while newly established Logistics Services unit in a company is working with this process for less than 5 years. Therefore, process has an existing performance with nominated professionals and training materials. However, drop-shipping deliveries are only applicable for a specific range of spare parts: heavy or hazardous goods, urgent shipments, or deliveries which aim to reduce costs of transportation. The amount of these defined deliveries is relatively small and in general estimated as approximately 30-40 deliveries per month. Accordingly, process does not have a stable routine performance and identified as a special service within Logistics Services unit in a case company. In the direction of extension of logistics services and enhancement of products and processes quality, a case company is heading to strengthen competitive skills and provide more services to the customer. Meeting customer expectations and building customer loyalty is a long-term target of any business nowadays, that is also currently highlighted in a case company strategy. Then continuous improvement is applied for many processes and operations in Logistics Services unit, where drop-shipping model is also considered to be developed for more smooth operations. The amount of the direct shipments from supplier to the customer is predicted to be increased in the nearest future, that outlines an importance of development process. Nevertheless, there have been many development projects ongoing on the drop-shipping deliveries for the past years, where this approach is dedicated to allocating current shape of the process and provide the most recent situation. Consequently, the research is assigned to investigate perception of the coordinators who are dealing with this process on daily basis and identify

the way of possible improvements, that is based on the people experiences and opinions. The approach is allocated to look insight the process through human resources in order to evaluate the efficiency of the daily operations.

Hence, case company approach has an exploratory nature that is based on qualitative semi-structured interviews. Furthermore, this study consists of both explanatory theoretical part and exploratory research that is presented as a combination of inductive and deductive approaches.

#### 1.4 Case company overview

Case company is well-known manufacturer and provider of lifecycle power solutions to energy and marine markets. There are three main divisions in the corporation: energy solutions, marine solutions, and services (parts delivery).

Since 2007 parts delivery 24/7 was handled by new unit called as Logistics Services. The central warehouse was opened in The Netherlands and in 2010 Logistics Services unit was operating within the following functional units:

- MM – material management
- PCM & POS– parts coordination management and parts order supply
- WM – warehouse management
- DI – distribution and invoicing

Also, other supportive units such as BC (Finance and Business Control), QM (Quality Management) and PD (Product Development) are playing a sufficient role in entire system.

Drop-shipping deliveries are mainly processed by PCM & POS, MM, DI and external logistics company. The main purpose for drop-shipping deliveries is to meet customers' expectation, provide high customer service by offering effective direct shipping from a

supplier to a customer without involvement of central warehouse. These are deliveries are only applicable in case of urgency, heavy and hazardous goods that cannot be stored at central warehouse and also in case of saving of transportation costs. Reduction of transportation costs might be offered if e.g. supplier and customer are located in the same country and lead time can be decreased by drop-shipping than proceeding through stock in the warehouse.

The study aims to capture specifically drop-shipping process in a case company as one of the special services that is provided to customers and that has a potential to be increased in a volume in the future. In order to increase efficiency level and optimize the process, this research is defined as a primary source of information. Interviews in the departments are formulated in order to look insight of each department and parts of the process separately. Individual way is selected for deeper understanding the process from the operational level. By recommendations and investigation of the weakest parts of the process, the further more structured projects can be expected in particular departments.

## 1.5 Research structure

In order to appropriately and consequently examine all research questions, this thesis includes the following five chapters:

- Chapter 1 primarily introduces the main idea of the thesis, provides background of the topics and also underlines research questions and purpose of the approach. This section is dedicated to providing overview of the theme and present in brief a case company, that will be examined further in the empirical part.
- Chapter 2 entirely considers theoretical background of the studies. It describes meaning of supply chain design while further distribution network design is highlighted as a key topic of investigation. This chapter provides an explanation of

drop-shipping design and investigates what can have an impact on process performance.

- Chapter 3 is dedicated to present empirical parts of the thesis by starting with examination of the drop-shipping process in a case company. It follows to a more detailed statement of the approach, particularly mentioning data collection and processing.
- Chapter 4 states for results and analysis of finding, where each interviewed department is analysed separately. This chapter also presents the coded themes that are defined during the approach. The analysis is accomplished by application these themes to the finding in each department and also reviewing of discussion about potential improvements.
- Chapter 5 concludes the main investigated points in the research by outlining the main qualities of the research and its current weaknesses. This sections also contain summary of improvement recommendations that is concluded by limitation statement and proposal for further research and studies.

## 2 LITERATURE REVIEW

The literature review states to define a role of supply chain design in a business planning process, particularly in a logistics design strategy. In order to sustain customer values and optimize business operations, supply chain design is defined as a base for future distribution network design. In this research, a drop-shipping design is selected as a key scenario of investigations. Therefore, a literature review is an explanatory foundation for an empirical part about a more detailed examination of a drop-shipping model in a case company.

This section begins with an examination of supply chain nature that further identified by the supply chain drivers as performance indicators. Accordingly, distribution is considered as a key process in a supply chain, while distributing network design is an effective tool for supply chain optimization. This is followed by an observation of the factors that have the most influence on distribution network design. Subsequently, this section concludes with a description and detailed explanation of drop-shipping modeling design in theory and in practice from a case company approach.

### 2.1 Supply chain design

The supply chain can be interpreted as a stream that contains information and material flows (Sadler 2007: 4-6). The stream follows directly to a customer and in order to guarantee customers expectations and obtain companies' values, this stream should comply with an appropriate design and structure. Thus, logistics design strategy is based on four key processes: logistics process design, logistics network design, logistics information design and logistics organisational design that have to be developed simultaneously in order to ensure an overall effective planning process (Rushton, Croucher & Baker 2014: 94-96). In this research supply chain design mainly contains process design, network

modeling and establishing of information flow, while the organisational design is outlined by implication.

Consequently, *process design* is presented by planning dynamic operations within supply chain members. As it is followed by (Rushton et al. 2014: 104-107) order fulfilment is an explicit example of one of the processes in a company. While an order is received it leads to availability monitoring, picking and packing, actual delivery, invoicing and further maintenance agreement. Operations are tightly connected, that requires complete mutual responsiveness. However, to proceed with operations, *network design* is focused on modeling of effective integration of all supply chain members. It is followed by a selection of the framework of a supply chain according to strategic fit and companies' long-term goals. According to Hou, Xiong, Wang & Liang (2014), supply chain relationships are based on long-term cooperation that encompasses importance of trust development. Thus, network building is presented by not only grouping involved supply chain members but also by *establishing trust-based communication channels* in order to optimize the entire supply chain. According to Sadler (2007:14-16), communication is the most necessary element that should be established before a supply chain will operate physically. Therefore, information is an essential part of designing both operations and networks.

In order to fulfil all steps of supply chain design, logistics performance should be measured and balanced appropriately that prevents any possibly occurred errors in a physical performance. Waters & Rinsler (2014: 264-268) distinguish "input and output measures" as one of the widely applicable measurement indicators of supply chain performance. By this principle, the influencing factors and its consequences can be estimated that provides more clearness in design processes. Thus, in order to start the design of a supply chain, its preliminary performance should be evaluated that strengthen an opportunity to create a dynamic supply chain.

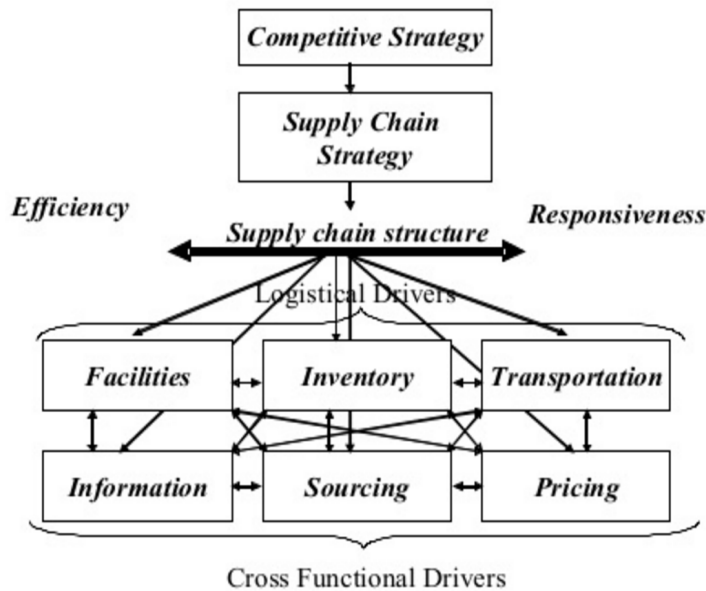
## 2.2 Performance drivers of a supply chain

In accordance to Chopra & Meindl (2013:50-55), to retain and develop a control over supply chain performance, cross-functional and logistics drivers should be examined. The following supply chain drivers by Chopra & Meindl (2013:50-55) are listed below:

- Facilities
- Inventory
- Transportation
- Information
- Sourcing
- Pricing

All above-mentioned drivers have a great impact on supply chain performance and can affect supply chain operations and network at any stage. To design a supply chain, these drivers should be defined in advance, in fact, drivers can be considered as the base of the design (Figure 1) (Chopra & Meindl 2013:56). Figure 1 presents a supply chain decision-making framework, where interactions of supply chain drivers can be resumed as a foundation of supply chain structure. Preliminary design and estimation of supply chain drivers seems as an opportunity to pre-evaluate a network, however, in practice, all supply chain drives should be adjusted repeatedly. Watson, Lewis, Cacioppo & Jayaraman (2013: 225-227) highlights that art of modeling can be interpreted as a science, whereas representation of real supply chain entity may vary from its model. However, the model performs a decision support in order to optimize supply chain and model should not be considered as a substitution of a real entity.





**Figure 1.** Supply Chain Decision-Making Framework (Chopra & Meindl 2013:56).

An efficiency of a supply chain can be defined by supply chain network performance that purely depends on costs and responsiveness (Danese, Romano & Formentini 2013). Responsiveness is built from flexibility and openness in communication and both internal and external integrations while efficiency is directly based on costs coordination. By Chopra & Meindl (2013:50-55), supply chain drivers are the key elements that contribute to supply chain performance on its responsiveness and efficiency levels. Therefore, to determine these drivers in more details and further apply it in particularly drop-shipping network design in this research, each driver is overviewed in the next sections.

### 2.2.1 Facilities as a driver

A facility as a driver describes company's physical locations, that can be divided to manufacturing and storage facilities. According to Chopra & Meindl (2013:56-59) facilities decisions have to be concerned with the three main elements: role, location and capacity. Both production and storage facilities should be followed by these three above-mentioned

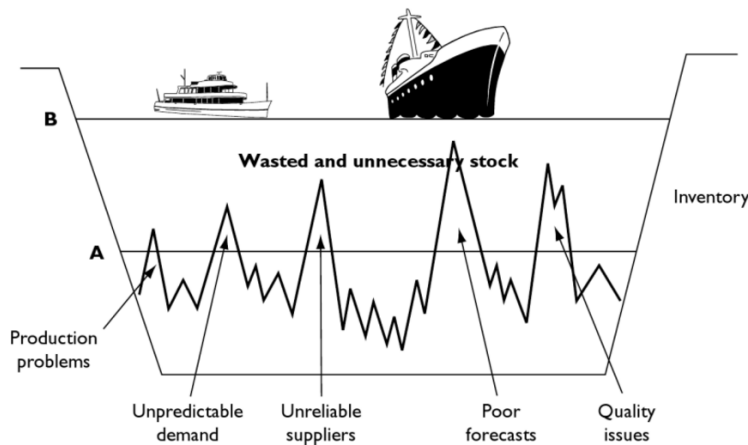
key points of a decision-making process. Firstly, the idea and role of facilities should be defined according to the supply chain strategy and company's goals. By evaluation of production facility, a company may consider if facilities are organized by manufacturing processes from raw materials to assembly or facilities are structured regarding specific functions. For storage facilities, a company may distinguish priorities of cross-docking facilities or purely storage facilities. According to Rushton et al. (2014: 125-127) warehouse and distribution center facilities are mainly applied in order to blend storage and transport in an appropriate way concerning customer needs. Nevertheless, storage facilities tend to be estimated by sophisticated mathematical analyses.

Location of a facility is determined by customer locations that enhance company's flexibility. This decision-making step includes consideration of labour, infrastructure, legal issues, and more macroeconomic factors. However, by defining a location of the facilities, its capacity should be calculated appropriately. Capacity decisions ultimately depend on customer zones' demand and supply in the market that concludes to the company's profit maximization. Moreover, capacity decisions and tactical planning solutions perform supply chain network design problems in nowadays competitive markets (Fattahi, Mahootchi, Govindan & Husseini 2015). Therefore, capacity optimization influences on financial performance that in fact can be viewed as the main and last decision-making step for facilities solutions.

### 2.2.2 Inventory as a driver

According to research by Goetschalckx, Vidal & Dogan (2002), inventory solutions complements integrated decision-making process concerning production and distribution after facilities allocation. Inventory planning is a separate area in supply chain management that concludes evaluation of raw material and stock. Rushton et al. (2014: 217-224) state that inventory and time are two interacting elements. Time is based on responsiveness to the demand and customers' satisfaction, however, inventory is a level of product

availability to meet the demand. Nevertheless, it does not conclude that more inventory can solve time issues for a company. Figure 2 by Rushton et al. (2014: 221) presents possible problematic issues that can be hidden by unnecessary stock and over planned inventory.



**Figure 2.** Hidden supply chain problems Rushton et al. (2014: 221).

Nowadays inventory planning is considered is an important tool in order to estimate supply chain performance of a company, whereas responsiveness and efficiency are the main influencing terms. By handling more inventory, responsive time increases, however, it directly has an impact on handling costs. While inventory handling costs are close related to facilities capacity. According to the Mason, Ribera, Farris & Kirk (2003), inventory visibility can be improved by proactive combination of applied warehouse and transportation management that follows to the optimization of the distribution in a supply chain.

### 2.2.3 Transportation as a driver

Transportation is dedicated to the actual movements of the goods that are presented mainly by inbound and outbound flows in a supply chain. Inbound deliveries include materials and parts that are purchased from a supplier and transferred for further assembly or storage to a facility. This inbound flow does not lead to the end customer and takes place only as an

internal movement of the goods. Outbound transportation contains deliveries that are supplied to the ends customer or retailer and transferred out of a facility. In both flows, transportation decisions concerns shipping type, incoterms, and various service levels. Shipping type presents a mode of transportation that is more appropriate within specific occasions, incoterms states the terms of insurances, costs, and liabilities. While service levels refer to the urgency and particular transportation necessity as e.g. delivery of dangerous or nuclear goods. Rodrigue, Comtois & Slack (2013: 95-112) outline that transportation modes and service levels are two correlated factors in transportation planning stage, where the common tool to maximize it is applying intermodal transportation. Accordingly, intermodal transport organisation is performed by combination of the transformational modes that depends on the distribution level, e.g. local distribution, international trades or etc.

Hesse & Rodrigue (2004) states that recently automation trends and modernization process have been prioritized in logistics and especially transportation. This development is supported by strengthening integration and communication among supply chain remembers. According to Sadler (2007:42-46), information use in transportation decisions has a major power and without well-developed information flows, transportation cannot be properly planned. As it was mentioned earlier, all the drivers are closely connected to each other, where, the unit of information and transportation proves the following statement.

#### 2.2.4 Information as a driver

To maintain dynamic supply chain, forecasting and organized information sharing should be implemented in logistics. Wu, Iyer, & Preckel (2016) analysed that overmuch amount of information does not provide transparency to the operations, otherwise accuracy in information follows to the most effective organisation of the processes. Nowadays information is enabled by innovations and technologies that simplify information flows within various departments and also with external parties in a supply chain. As an example,

enterprise resource planning systems that are presented mostly by software Systems, Applications & Products in Data Processing (SAP) unite all processes from material management to sale through warehouse management and final distribution. This kind of software is widely applicable and establish transparency in communication and in the processes and also increase the level of accuracy.

Accordingly, information has a wide scope and security issue is the following key element in order to accomplish well-structured information flow in a supply chain. Code of conducts as guidelines of social and ethical norms, cyber security and other types of security are significant aspects of evaluation. As supply chain includes both external and internal parties, information flow should be secured inside a company and also outside a company to maintain reputation and trustworthiness in a market. Additionally, by considering both internal and external environments, the information quality should be evaluated continuously in three main criteria: objectivity, utilization and consistency (Marinagi, Trivellas & Reklitis 2015).

#### 2.2.5 Sourcing as a driver

Sourcing states to processes that are required to purchase or acquire materials, services and products that can be performed by procurement and supplier selection in any supply chain. Supplier selection is defined as one of the key activities of strategic sourcing planning that empowers supply chain and organisation in general (Sollish & Semanik 2011: 101-104). Furthermore, supplier selection process can be defined as a separate term in a supply chain that an important role in order to maintain a competitive strategy.

Due to the globalization and huge impact of international markets, outsourcing has been raised as an efficient solution to supplement in-house activities. By outsourcing e.g. transportation services a company might accomplish more efficiency in internal organisation and while purchasing logistics services from the best providers in the market.

However, outsourcing decisions should be competitively estimated in order to prove its effectiveness and necessity of application in a supply chain. Lu, Meng & Goh (2014) admit that performance of outsourcing solutions can be reviewed through information sharing process within a supply chain and correspondence between internal and external members. Consequently, it proves constant relation between supply chain drivers, particularly information and sourcing.

### 2.2.6 Pricing as a driver

Generally, by defining pricing strategies companies establish prices and charges for provided services and products. When a company develops a pricing strategy to their customer, it is sufficient to evaluate in advance pricing strategies of the manufacturers and suppliers (Zhang, Chiang & Liang 2014). Moreover, many types of research investigate an importance of tracking consumer's behaviour concerning different pricing ranges. As by customers' satisfaction level, needed correction can be accomplished to sustain competitive pricing range in the market. In a supply chain, pricing decisions are accordingly grounded in procurement, purchasing, production and distribution areas. Whereas, outsourcing activities as e.g. transportation services should be also considered as it might have a great influence on the final price of a service and product.

In the further study, pricing aspect is not considered continually, as most of the pricing strategies are stated confidentially in companies.

### 2.3 Distribution as supply chain linkage

The role of main above-examined drivers of a supply chain highlights an importance of pre-evaluation of any supply chain at the design stage. As known, a supply chain has a wide scope from starting point of the raw material and manufacturing till the end customer. However, this research is focused on one specific linkages of a supply chain – distribution that is considered at any following sections. The linkages in this study are grounded on

operational level, where the processes in a supply chain are divided into the groups accordingly. Nevertheless, linkage systems can vary upon the research, as Zelbst, Green Jr & Sower (2016) define power, benefits and risk reduction as the main enabling factors in supply chain performance. However, according to Waters & Rinsler (2014: 3-7), each supply chain contains three main parts: procurement, manufacturing and distribution. For more precise understanding, these terms are defined below:

- Procurement contains processes such as establishing negotiations, sourcing activities, purchasing and selection of vendors. This linkage can be defined as the first step in the entire acquiring process of products and services. For instance, co-markership is one of the nowadays applied practices in procurement decisions. Waters & Rinsler (2014: 4-5) state that co-markership is based on the simplifying long-term relations between supplier and buyer by changing competitive environment into a smoother and more trust-based atmosphere. In addition, procurement practices are researched to be the base of sustainable purchasing performance that is raised by integration of suppliers regarding company's values (Crespin-Mazet & Dontenwill 2012).
- Production concludes manufacturing processes from ordering raw material and compiling it into a final product according to the customer expectations. Due to the fluctuations in demand companies concern inventories and stock, however, flexibility should be highly valued in production. Flexibility can be gained by forecasting and high responsiveness, that can be maintained by an implementation of various innovations. Accordingly, by integration with other supply chain parts, production estimation can be performed more accurately and effectively. Therefore, optimization models as production-distribution planning process considers evaluation of production operations and distribution facilities simultaneously in order to maximize the performance level (Fahimnia, Farahani, Marian & Luong 2013).
- Distribution presents an actual movement of a product from manufacturers to a customer. The distribution channel is formed by intermediates who are involved in

the distribution process of the goods. Thus, as a supply chain was defined earlier has a wider scope and includes distribution channels, where distribution channels examine the physical movement of the goods. Hesse & Rodrigue (2004) states that the main processes of physical distribution are transportation, warehousing services, wholesale, trade, and retail. These activities are essentials in each supply chain and in order to match higher efficiency levels, responsiveness should be examined as a primary indicator. As it was mentioned before about importance of responsiveness, Waters & Rinsler (2014: 6-7) also underline quick response logistics as a current trend in international organisations. It is focused on an enhancement of customer service and costs reduction by immediate transmission of data to the supplier right after products have been consumed. This way of working relies sufficiently on information flows in the company where information technology is an empowering factor.

All above-examined linkages are mutually dependent and an importance of each process explains the complexity of a supply chain design. However, this study concerns the design of physical distribution in the next chapter by defining its performance, and one of the distribution network models: drop-shipping scenario.

#### 2.4 Design of distribution network

Any network design is dedicated to identifying the most cost-efficient and valuable way of organisation of supply chain members into a whole. Distribution network design starts with an evaluation of factors that have an influence on the everyday processes and then continues selection process of the most appropriate model. There are several models of distribution networks exist in a current market. According to Chopra & Meindl (2013: 85-96), key six designs can be defined and listed as below:

- Drop-shipping deliveries: shipping from manufacturers directly to the customer.
- Direct shipping with compilation centres by carriers.



- Distributor storage with carrier delivery: warehouse is maintained by distributor or retailer; delivery is held by carriers.
- Distributor storage with direct shipping to the customer by retailer or distributor.
- Distribution centres with possibility of customer pick up from warehouse: cross docs centres are widely used in this scheme as warehouse that provides separate pick up and also shipping service by carrier to the customers,
- Retail stores: customers are able to pick up a product from retailer storage by ordering online or buying in retail store.

This variety of designs is resulting from the substantial importance of customer service in nowadays businesses. To achieve competitive advantages, companies have to sustain dynamic distribution network by minimizing lead time and providing the most affordable way for customers to receive their products. However, as it is outlined in the research of Zamarripa, Aguirre, Mendez & Espuna (2012), uncertainty management is an essential toll for consideration in developing complex dynamic supply chain, where flexibility is concerned as the main feature.

This study examines the first design with direct shipping from a supplier and manufacturers to the end customer. This model is mostly used by online platforms or retailers where customer orders goods online and receives it directly from the manufacturer. As it is defined by Rabinovich, Rungtusanatham & Laseter (2008), drop-shipping supply chains are presented in over third of all amount of online retailers, because this model ensures the higher availability of the product for the customer without additional inventory costs. However, as it was defined in the introduction, in this study drop-shipping scenario is investigated for urgent, heavy goods and also for transportation costs reduction. A case company operated with cross docking center for usual deliveries that is used for consolidations, any specific control as inspections, dangerous and nuclear goods check. Nevertheless, in order to provide better customer service, drop-shipping is offered to the

customer with a possibility to minimize transportation costs and lead time that is more examined in further sections.

#### 2.4.1 Factors influencing distribution network

In order to gain the more precise overview of why there are various designs can be applied, the main factors that influence on distribution performance should be defined. Therefore, based on Chopra & Meindl (2013:81-85) approach, influence on the network might be resulted from two main areas: customer needs and values, and financial estimators as costs. Generally, these two dimensions have a priority at any part of a business and in an everyday decision-making process.

Financial performance of distribution network is measured as it was mentioned by costs, thus, all earlier discussed seven supply chain drivers can be presented as the main factors that have an impact on distribution financial planning. The facility, inventory, transportation, information, sourcing, and pricing are indicators that can be estimated separately for inbound and outbound flows or generally for an entire distribution network. Ambrosino & Scutella (2005) underline that there is a significant interrelation between cost estimation and quality of customer level, thus e.g. optimization of inventory directly follows to the product availability and variety that leads to an efficiency of customer service. Therefore, response and lead time, products availability and variety, order and process visibility, and returnability can be named as key indicators for customer satisfaction.

Waters & Rinsler (2014: 7-9) highlight four main qualities of the distribution network that is stated as four R's concept: reliability, responsiveness, resilience, and relationships. These qualities describe dynamic distribution network that is designed accordingly with a consideration of all above described influencing factors. Croom (2007: 358-363) states that information sharing follows to stronger connectivity and willingness. In fact, connectivity

in a distribution network is defined by relationships within a channel and responsiveness level. However, willingness describes resilience of a network and reliability of the processes. Furthermore, these qualities define desired performance of a distribution network, where high customer level is maintained and costs are optimized.

In this study, investigation of distribution design in a case company is followed to define the weaknesses of the process according to the above-identified key qualities. Hence, performance analysis is structured in order to overview current performance concerning the factors that have an impact on the distribution network design in general. However, due to the already implemented process in a case company, the financial performance of the process is not taken into consideration, and the main focus is dedicated to the information, the organisation of the process, its complexity, human power education and partly to the system based processes. The key aim is to standardize the process in order to increase the volume of the drop-shipping deliveries and strengthen operations to prove high customer values.

## 2.5 Drop-shipping option of distribution network

This section focuses on drop-shipping network design that is explained and described in more detailed. It accordingly begins with a definition of drop-shipping network design as a general process and continues on the specification to urgent and heavy deliveries.

### 2.5.1 Characteristics of drop-shipping model

In general, direct shipping to the end customer from a supplier or a manufacturer can be viewed as the easiest way to proceed, however, by decreasing inventories costs and facilities costs, other ultimate factors are appearing. According to Gan, Sethi & Zhou (2010) drop-shipping scenarios can be distinguished by inventory risk and demand uncertainty, where supplier and customer are equally related on each other. Where inventory analysis directly depends on availability of information about lead-time and

demand that shows coherence between demand and inventory through information (Ayanso, Diaby & Nair 2006). Therefore, information flow, order visibility and response time can be named as the on of the most comprehensive aspects of drop-shipping models. Cheong, Goh & Song (2015) research information flow in the direct shipping and the term “*information discrepancy*” is defined by lack of integration between supplier and customer. Consequently, the information is reviewed as a primary working source that is used to prevent error and over o underestimations of demand and inventory.

Certainly, characteristics of a drop-shipping model as any other model varies and depends on the nature of a service of product, the purpose of the model and overall strategy of a company. However, according to Chopra & Meindl (2013:85-88), there are two main types of factors that can describe a performance of the process: costs and service factors. These factors were also defined earlier as key indicators of financial performance and customer service level.

Accordingly, the costs factors might be identified as low, due to the aggregation and not utilization of facilities and stock. Direct shipping ensures transfer of the goods right from the manufacturer stock or supplier warehouse that explains of no need of cross docking centres in the middle of a distribution network. Therefore, in drop-shipping scenario documentation and export & import procedures are handled by supplier and transportation department or company. As Seyoum (2009: 197-201) mentions that accuracy in documentation is a crucial factor in the successful shipment, due to the complex systems of international trade, especially in some countries.

Moreover, high information investment and poor visibility of the processes are the key aspects that are caused by direct contact without intermediate member who can be reviewed as a buffer. Thus, drop-shipping model is also identified as “just in time” process, where order fulfilment and physical shipping are grounded as the essentials, and its quality and transparency are highlighted in order to succeed in the process (Yao, Kurata &

Mukhopadhyay 2008). In fact, due to the various location of suppliers and customers, response time might be affected that also leads to difficulties with return shipments. As it is known, warehouses and cross docking centres simplify communication, however in some cases cannot provide high levels of product availability and variety. Therefore, direct shipping is used to expand company's services by providing more flexibility to a customer.

In order to achieve more precise insight of the drop-shipping model, the next section presents performance characteristics of this scenario in a case company. It mostly defines the main influencing factors, while an operational level is described further in the methodology chapter.

#### 2.5.2 Specification of drop-shipping model for heavy and urgent deliveries

In this study drop-shipping scenario is applicable to only three specific category of the goods:

- Heavy spare parts, which transportation costs will be sufficiently higher if it is arranged through stock in a central warehouse. Thus, in order to minimize transportation costs of the parts, it is applicable to ship directly from a supplier to the customer, e.g. if customer and supplier are located in the same country or continent.
- Urgent deliveries that are prioritized to be shipped within 1-3 days.
- Liquid or hazardous goods that cannot be stored in the central warehouse.

Generally, case company proceeds with cross docking center that is assigned as the main European warehouse. However, a drop-shipping scenario is not prioritized and applicable only in specific situations with an approval of managers in parts order coordination department. Therefore, below table 1 presents the main performance characteristics of the drop-shipping model for this specific range of spare parts.

**Table 1.** Performance characteristics of the drop-shipping scenario for heavy and urgent goods.

<b>Factors</b>	<b>Performance</b>
Inventory and facilities	Due to the stock at supplier's premises, inventory costs are low. Facility costs are also relatively low, because of the aggregation.
Transportation	<ul style="list-style-type: none"> <li>• In the case of using drop-shipping scenario for transportation costs reduction, transportation costs are definitely lower, because of the shortening the destinations and lead time.</li> <li>• In the case of heavy shipments, transportation costs stay high, due to the tariffs for oversized and overweighed deliveries.</li> <li>• Transportation possibility can be also estimated conditionally impossible, as supplier and transportation company are liable for proving import and export license, that might be very comprehensive in some countries, e.g, Brazil, Argentina, Turkey or Russia.</li> </ul>
Information	Information flow is considered as ultimately comprehensive and requires significant investments and developments. As far as the drop-shipping model works only in special occasions and also urgency, each case requires a lot of communication among departments and external parties.
Lead time	Gravely shortened

Product variety and availability	It is easy to order required material or spare parts, however, it depends on the contract with suppliers as e.g. some parts or materials are only can be purchased in the specific amount that is fixed in the system. For orders of a not normative amount of materials, usage of stock in the central warehouse would more appropriate solution.
Returnability	Reverse logistics or return shipments are almost not possible, due to the direct shipping from the supplier that is also stated in the contract and order acknowledgment.

To conclude, drop-shipping network in a case company is considered as rarely used service that is applicable only for several specific occasions. However, in the next chapter, the drop-shipping scenario in a case company is investigated in more details by examination of roles and tasks of all involved departments in the process.

### 3 RESEARCH METHODOLOGY

The main purpose of the research is to answer on research questions that follow to an identification of the actual performance of the investigated process in a case company. The methodology chapter aims to describe in details the selected process with the most focus on operations of each department and its role in the process. The data is collected from internal company's sources and also from participants' responds on Part 1 "Background & Interviewee's knowledge about the process" of the interviews (Appendix). Afterwards, data collection and interviewing process are presented to enable deeper insight into the subject of investigation and actual research procedures. This chapter is concluded by declaring data processing stage where research quality is performed by validity and reliability of information.

#### 3.1 Empirical examination of drop-shipping scenario

Generally, all drop-shipping deliveries are shipped by following the same operations within involved departments, however, customer's and supplier's specifications might follow to certain activities. All direct shipments from a supplier to a customer can be divided into four main types:

- external supplier to an external customer: both supplier and customer are external that require more attention on document exchange. By collecting the good from supplier stock a case company ensures that supplier's documents will be replaced with new correct documents. Document swap is explained in more details in the section of external logistics company as one of the main outsourced services.
- external supplier to an internal customer: internal customer can be presented by case company branch as factory or premises. Thus, the delivery is shipped to its own location, where document exchange is not needed as a case company is purchasing spare parts for its own purpose.

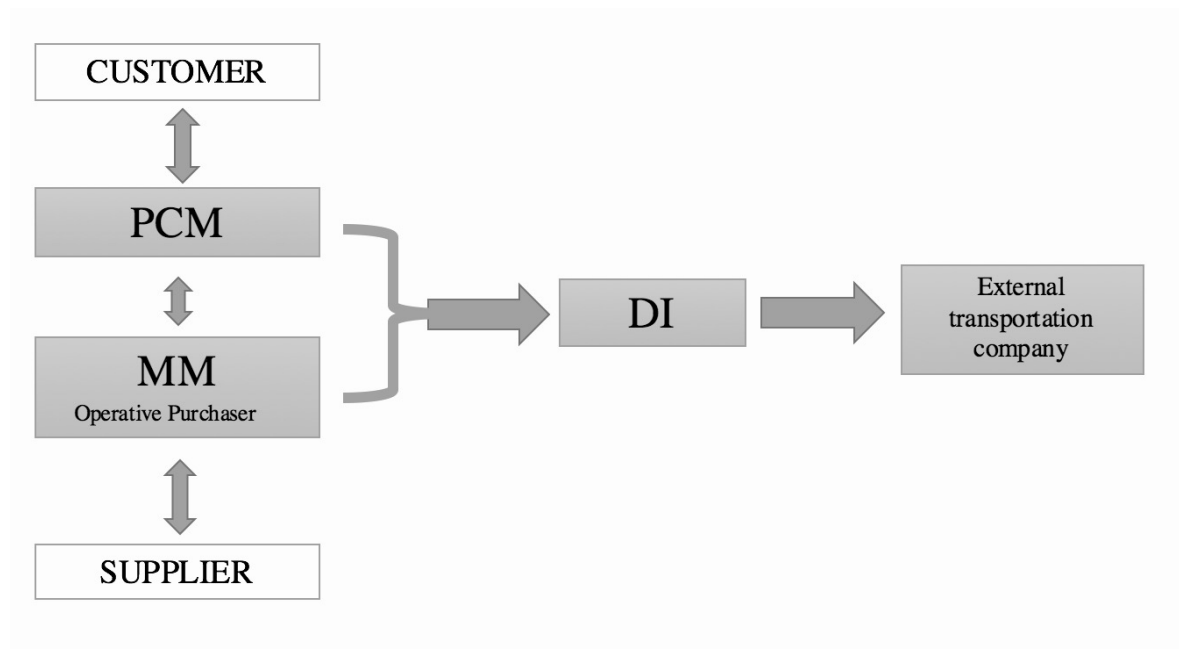


- internal supplier to an external customer: internal supplier includes case company's own factories or production points that supply directly a customer avoiding the main stock in the central warehouse. In this case, a customer is external that also requires clearance of the documents that is handled by external logistics company at the moment of collection the goods from the internal premises.
- internal supplier to an internal customer: internal movement of the parts, that does not require document swap as it goes directly from company's premises to another company's premises.

Moreover, the entire process of drop-shipping contains both inbound and outbound shipments. In a case of stock in a warehouse, inbound deliveries are firstly located into the stock and then it proceeds as outbound deliveries to the internal or external customers. In this situation purchasing order to a supplier and sales order to a customer are separated and accomplished at the different time. With direct shipments, purchasing order and sales order are interrelated and should be maintained simultaneously. Additionally, merge of sales and purchasing order is recognised as one of the key parts of the departments' responsibilities, particularly in a case of urgent deliveries.

Accordingly, there are four main involved departments in the process: PCM or POS, MM with operative purchasers, DI, and an external logistics company whose transportation services and solutions are outsourced. Figure 3 illustrates, in brief, the main connections between involved departments. Respectively, the order from the customer is handled by PCM or POS, whereas MM in cooperation with operative purchasers prepares purchasing order for a supplier. According to nature of a customer, PCM and POS departments are taking the order, where PCM is mostly responsible for external customer, and POS for internal supply. MM and operative purchasers are grouped upon materials and divisions of spare parts, where internal and external suppliers are aggregated. Afterwards, the process is taken by DI in order to prepare documentation and ensure the correct information for a transportation company. As the last step, external logistics company secures the actual

shipment from a supplier to a customer and also completing the documentation by its exchange. In the further sub-sections, each department will be defined individually in order to better insight of the process.



**Figure 3.** Outline of connection between involved departments in a case company.

### 3.1.1 Overview of the processes in drop-shipping network

#### *PCM*

The customer has to contact network company in its own specific location to place an order, where network company follows information to the parts coordination management. In this research more emphasize is placed on PCM department as direct shipping to an external customer requires additional document swap and it is known to be more challenging. Therefore, PCM department is mentioned in the further description as a default, however, all information is valid also for POS, who is concentrated on internal shipments. Thus, when a professional from PCM department notices that an order has to be delivered by drop-shipping scenario, needed advice or consultancy can be asked from

nominated PCM experts for drop-shipping scenario or either from DI who is also known as very experienced party in the process. There are trained experts have been designated in PCM, DI and external transportation company, who has the most professional experience with this type of the process. However, it is stated that in PCM & POS, MM departments, each coordinator should be able to handle these deliveries. That is why, due to the low volume of the deliveries and its rarity, consultant and experts are available. After the consultancy, PCM coordinator has to receive an approval from PCM manager, who thoroughly checks why drop-shipping is the most efficient solution for this order. The decision is also based on the possibility to deliver to the end destination according to the nature of the parts, destination, urgency, transportation costs and etc. Moreover, there are several restricted destinations and special requirements that might influence the approval process. Some of the rejections criteria are listed below in order to highlight the reason of rarity of drop-shipping shipments:

- Deliveries that might cause high internal handling costs and also a business risk, as for instance, customs clearance, or supplier's document can be transferred to the customer without an awareness of a case company.
- Deliveries that requires physical inspection, non-conformity certificates or nuclear certificates.
- Letter of Credit or Cash against Document order, where the risk of bank interaction and rejection is sufficiently high.
- Shipments, where document swaps will be done without the involvement of outsourced nominated external logistics company.
- Deliveries from the suppliers who are not able to provide the correct classification of the materials and class certificates.
- Shipments to the restricted destination that have customs issues and restrained import control, e.g. Argentina, Brazil, Russia, Turkey and etc.

Therefore, all the above-mentioned deliveries with specific requirements and restrictions can be shipped only from the central warehouse. Nevertheless, after the approval, PCM

specialist is ready to make changes in the system and announce the main information to the colleagues in MM and DI department. Communication should be followed by emails and also as recommended and depends upon to the situation can be processed by the internal communication network that is currently presented by Skype.

As it was mentioned before, technical issues and task regarding changes in the system are not investigated in this study deeply enough, however, this question was raised during the interviews. Moreover, technical aspects are included into consideration as it has a definite influence on communication and cooperation between involved parties. However, due to the confidential aspects, technical steps are not specified in the methodology.

To conclude, PCM department is responsible for creating a sales order and coordinating the process from the beginning till the end. The ultimate task is that PCM professionals are a contact to the customer whose expectations are prioritized the most.

### *MM*

Material management is liable for contact with a supplier that begins with checking of product availability and further purchasing order, where material management unit and operative purchasers are closely cooperated. Therefore, in the further chapters of the study, discussions are generalised to MM department. As soon as preparation of a supplier is followed after receiving an order, MM and PCM departments are strongly dependent from each other, especially MM from PCM. Thus, after the receiving a notification from the PCM of a creation of sales order, MM professional considers the possibility of direct shipping and parts availability status with a supplier. Once a supplier is agreed to use drop-shipping scenario, MM creates purchasing order and updates PCM and DI about supplier's location. In practice, purchasing order creation process for drop-shipping deliveries differs from usual purchasing order. Therefore, MM coordinator should be aware of the instructions and special modifications that have to be marked in the system. Documents that

have to be attached to the goods, MM discusses with DI in order to update supplier with necessary information. PCM and MM together are responsible for correct merge of sales and purchasing order in the system and correct update of pick up and shipping addresses.

Due to the cogent dependence between departments, communication between coordinators are mainly done by emails, and it is recommended to keep each coordinator in the loop in every conversation. Chats and calls in Skype are also advised in order to provide more clearness in the process and prevent misunderstandings. As there is no especially established workflow in the system for this type of deliveries, each coordinator should be aware of handling own emails correctly and be in contact if it is needed. Due to mostly urgency and special level of the direct deliveries, communication is currently defined is one of the most problematic issues, that is also highlighted in the actual interviews and discussed with individuals in more details.

In general, MM aims to sustain a connection with supplier and ensure availability and readiness of the parts. Moreover, MM is tightly interrelated with PCM in order to update a system correctly and complete merging process of purchasing and sales orders.

### *DI*

The main task of DI department is ensuring that all system requirements have been accomplished correctly, preparing valid documentation, and contacting external transportation company to proceed with actual physical shipment. DI department is recognized as the most experienced professionals in the process, that is why before confirmation for actual transformation, DI experts generally validate all information in the system e.g. addresses, incoterms, and how the orders have been created. One of the most issued document that should go along with the shipment is proforma invoice, that is prepared by DI for further document exchange. Other specific documents as, for example, Certificate of Origin might be created by DI according to final destination and agreement

with a supplier. Afterwards, after preparing all needed documents, DI notifies external transportation company about required transportation and also inform about details, e.g. document swap, preferred mode of transportation and etc. It is also suggested to notify logistics company in advance, as the finding the most appropriate and cheapest way of transportation might take time. Moreover, DI is also liable to invoice all deliveries in end in compliance with value-added tax, foreign trade data, freight costs, amounts and et. Nevertheless, final invoice can be issued only after receiving invoice from a supplier on purchasing order.

In this study, invoicing part have not been considered in details, due to the complexity of mainly VAT issues. As VAT settings are fixed in master data, customer data in the system and also maintained automatically according to final destination. However, by rarity and special nature of drop-shipping delivery, VAT might be defined incorrectly that causes problematic issues at the invoicing stage.

One of the most crucial risks in drop-shipping model is that customer might define supplier by supplier's involved document and afterwards have a contact with supplier directly. Thus, DI qualifies the exact package of documents that should be attached to the shipment, and that is why involvement of DI experts in the process is ultimately essential. Furthermore, in the communication with external logistics company DI is responsible for mentioning PCM and MM in the emails, as they are main contacts to the customer and supplier accordingly.

After all, DI is viewed as fundamental intermediate member in drop-shipping chain that coordinates work of PCM and MM and as the key step prepares documentation and informs logistics company about readiness of the delivery. The last responsibility of DI department is invoicing of the transported deliveries and ensure that all information in invoice is stated valid and accurately.

*External logistics company*

Actual transportation is outsourced by a case company and presented by external logistics company who also nominated of transportation of usual deliveries that are shipped from the central warehouse. After receiving all required information from DI, logistics company is responsible for planning transportation from supplier address to the end destination in the most affordable and accurate way. The key duty is to arrange document swap if customer is external in order to prevent expansion of supplier's data. As know, external transportation company works with their agents according to the destination, thus, agents are mainly liable to the actual exchange of the documents. The main problematic issue relates to the availability of agents to accomplish document swap, in fact that major amount of agents does not provide this option. Document exchange is mainly required due to the export-import clearance procedure. Ramagopal (2006: 1-6) states that export and import policy is one of the main representatives of international foreign trade that consequently influence on transportation flows and complicate documentation clearance. Nevertheless, transportation company requires more time to find the right agent who will take a responsibility of customs clearance according to the given instructions from DI and pick up and shipping addresses. After booking of transportation, logistics company informs DI back with freight costs that will be invoiced further to a customer.

Hence, external transportation company operated already with available and valid information from DI, where the main duty is to delivery the goods accordingly with the best option of transportation and costs. Moreover, external transportation company functions additionally as control tower. According to Cooke (2014:113-130), control towers is an essential modern tool that complies monitoring management, demand planning and represents central data archive.

By overviewing responsibilities of each department, significance of interrelations can be clearly defined. Only with structured communication and presence of each department, the efficiency of the process can be maintained. Therefore, dependency of the departments is

identified as the main topic for investigation in order to standardize the deliveries. This issue is also accentuated in the interviews that are described further in the next sections. Accordingly, the current performance of the process is not stable and the feedback about process in general varies upon the department. By this study, the clarification of the process is provided through investigation of opinions of each department. Due to the low volume of the deliveries and blurred communication flow, the transparency of the process is estimated to be low. Where this research aims to provide more information about current assets, weakest parts that are followed up by improvement recommendations.

### 3.2 Data collection

Qualitative nature of the research is selected in order to observe perceptions and collect opinions of experts who are involved in the process. Therefore, obtained information is gathered by semi-structured interviews with twelve participants from each department, where the main targets of data collection are listed as follows:

- To overview practically the drop-shipping scenario in general
- To define the role and importance of each department
- To explore the actual performance of the process
- To define the weakest aspects of the process
- To provide improvement recommendation for further researches and projects

All the targets have been simultaneously followed during all data selection process. For deeper insight, the main three steps of data collection process are defined: selection of a case company, selection of the potential candidates for the interview and ultimately, creation of interviews, preparing of interview guide and alignment of interview questions to the research questions.

#### *Case company selection procedure*



Due to the familiarity with the case company and also experience of working in one of the departments, this case company was defined as the perfect match to achieve all targets of data collection process that are described above. The other reason of selection describes that this case company is compatibility of two types of distribution network designs: the existence of distribution center and drop-shipping model, where shipping via distribution center is prioritized. Investigation of minor distribution process is attractive due to its nature, minority and rarity. Moreover, approach focused on improvement of secondary service also is dedicated to bringing necessary information to a case company about current performance of the process.

Generally, drop-shipping has been reviewed more as e-retailing (section 2.4.). Thus, presence of drop-shipping scenario for heavy, hazardous, urgent and deliveries aims to reduce transportation costs is considerable opportunity to review different application of direct shipping model. Furthermore, as drop-shipping process is already established in a case company for several years, this study offers an outline of how the drop-shipping can be applied in a business and which weakness can be faced.

#### *Selection process of potential candidates for interviews*

Complexity of the drop-shipping scenario follows involvement of four main members: PCM, MM, DI and external transportation company. It also additionally supported by process operation support department in case of evident difficulties in the process. Hence, the interviewees were selected from these above-mentioned departments. Moreover, one of twelve participants was involved in the past on development group for drop-shipping, that is why his/her experience was also highly appreciated in this research. Roughly two experts were chosen from each department in order to gather as many opinions and practical examples as possible. Due to the limitations, participants were only coordinators who are currently handling drop-shipping deliveries on a daily basis and more familiar with the process than others. As it was defined before, each coordinator of PCM and MM

department should be trained and able to proceed with drop-shipping deliveries, however, the scope of the departments is vast and this research is not dedicated to exploring it due to the limitations. Therefore, twelve participants include the following representatives: 3 from PCM & POS, 2 from MM, 2 from DI, 2 from external logistics company, 2 process experts from operations support department and one with the previous experience in development group for drip-shipping model. Within twelve volunteers to be interviewed, nine are located in Finland, and two abroad in The Netherlands.

Consequently, the goal of selection was to define the most experience professionals to gather the most recent, valuable information for further analysis. The contact has been proceeded mainly by emails for later arrangement face-to-face, skype, and phone interviews.

#### *Developing process of interview guide and structure*

In order to overview background of the participants, their practical examples, opinions, and also, discuss possible weaknesses and brainstorm about improvements, semi-structured interview was developed. Interview guide and questions are presented in Appendix. Structure of interview was defined by a consistency of examined targets of data collection process. Table 2 illustrates the main interview themes and its aims.

**Table 2.** Interview structure.

<b>Interview parts</b>	<b>Purposes</b>
Part 0. Outline of main topics	Determine general ideas by six scale question that overview the main topic of the further interview discussion
Part 1. Background & Interviewee's knowledge about the process	Define background of a participant, main responsibilities and duties in the process

Part 2. Process in details	Discuss practical examples, opinions and examine perception about the main topics
Part 3. Improvement stage of the process	Explore weakest parts in the process and consider possible improvement for further implementation

After general investigation of the process by studying the instruction guidelines and also general discussion with some of the coordinators in the process, five main areas for the interview were defined. Thus, above presented interview structure are focused to investigating, in particular, the following main areas: complexity of the process, communication, organisation of the departments, technical aspects (in brief), resources & materials. In the part 0, scaled question covers all main aspects in order to comprehend general opinion and awareness of the interviewees about the process. Furthermore, part 1 is based on the description of the task and duties, and how participants are aware of their own responsibilities. Part 2 and Part 3 are the most valuable that state to outline current performance and gaps for improvements. Due to the variety of participated department, interview guide (Appendix) was also slightly adjusted accordingly. As for example, questions for external logistics company about other departments in a case company were simplified, due to their internal nature. Moreover, scaled questions were presented only in the departments who are currently working with drop-shipping departments, hence scaled questions were eliminated in the interview for experts from process and operations support department.

According to the research questions of the study, the interviews aim to define the roles of each department, its functions and also review the most challenging tasks and duties by relevant examples and experience. The interview concludes the last research question about improvement of the process by presenting a discussion about development possibilities from each department in entire structure of the process, and also individually in each department. Therefore, the second research question *“How is drop shipping process*

*organized in case company?*”, is answered by Part 1 (Table 2 & Appendix), where respondents are entitled to provide particular information about their departments, responsibilities and working experience. The next research question “*What are the weaknesses in the drop shipping scenario in a case company?*” is referred to the Part 2 (Table 2 & Appendix). Accordingly, the questions about the possible tasks where delays and confusions might be faced are stated in the Part 2 of the interviews. For the justification reasons, examples and practical problems are placed that also continued with communication process about painful lessons and samples. The third research question that concerns weaknesses of the process, include the sub-questions about the existing gaps and opportunities of its fulfilment and continuous development in the future. This sub-questions are defined by Part 3 in the questionnaire (Table 2 & Appendix). The potential risks and personal attitude toward the process is investigated in this part, by also concerning the room for improvement of the process and the main qualities of the successful accomplishment.

Interviews were held in an open format with brainstorm tactics that were intended to review personal opinions. As it was mentioned, there were three main types of interview handling: five face-to-face meetings, five skype interviews, and two phone interviews. All the meetings were arranged in case company offices. Moreover, interview guides were sent to the potential candidates in advance for deeper familiarizing of the participants with the question and research idea.

### 3.3 Data processing

By the above-aligned research questions and questionnaire, the collected data is presented by open answers of the respondents that contains opinions and personal experiences. The Part 0 in the interview guides captures the quantitative data that was performed by scaled questions. Other parts of the questionnaires are ultimately overview the information about the process, operations. Set of data is divided into the the main coded topics in order to have better insight of the information. As it department is processed separately, the data

firstly interpreted per department and further summarized into the general recommendations for an improvement.

Data analysis is performed by mixed-methods that include a combination of data collection and analysis procedures. According to Tashakkori & Teddlie (2003:25-30) mixed-methods describes usages of qualitative data with a simultaneous or parallel representation of quantitative data. Hence, quantitative data can be considered as a “confirmation” to enhance reliability and validity of the information. Silverman (1993: 32-40) proposed that verbatim transcription is one of the methods to capture verbal data, however, it might be followed to research filled with dilemmas. However, by mixture of a thematic and content analyses might bring an opportunity to define general ideas of the topic by elimination complex time consuming verbatim transcription. Halcomb & Davidson (2006) states that several types of analysis can be applied in order to provide the precise scope of the collected data, such as immediate notes, sharing the summary of the interview with interviewees right after the interview, indexing of the interviews and preliminary and secondary content analyses.

In this approach, data is analysed through three main stages: immediate notes and summary discussions, indexing the main themes, content analysis, that according to Saunders, Lewis & Thornhill (2009: 500-514) represents deductively based analysis with a combination of an inductive approach. Hence, all the records were not transcribed due to the complexity and amount of the interviews. However, alternative ways of the data analysis were defined. Moreover, each interview had Part 0 (Table 2), where scale questions were stated. The answers are performed in a range from 1 to 5 that provide a general idea of the main topics before the discussion. This data is performed in average estimators as a confirmation to the qualitative analysis and is presented in the end of findings.

Consequently, in the next chapters each of the departments is examined separately in compliance with data analysis stages. Findings chapter states for pure results of the

interview according to the defined themes and confirmed by an average estimator of scaled questions. Whereas, discussion chapter results in a proposal of improvement recommendations and concludes interpreted data. The analysis begins with a statement of five main themes that have been defined through an inductive method in all interviews. Moreover, sub-themes and relationships between themes are examined in order to a deeper insight of why the particular theme was taken into the considerations. Afterwards, each department is presented separately, where analysis is based on the notes, summary, indexing and content analysis.

There is considerable risk of validity and reliability by implementing nonverbatim transcription of the interviews. The scope of transparency of records is relatively low that leads to the accuracy issues and understanding of the interview matters. Golafshani (2003) highlights that quality of qualitative research relies on its credibility. Furthermore, credibility correlates to an ability of the researcher. Thus, any of performed data analysis methods should be handled accordingly and evaluated as trustworthy, transferable and creditable.

## 4 FINDINGS AND DISCUSSION

This chapter observes the actual results of the interviews, that is divided by separate analysis of each department according to the main themes. Topics were closed coded from the summary and notes of the interviews, where summary and notes were systematically organized and captured several times for a stronger sense of coherence. All separate analyses of the departments are concluded by the average estimators that are calculated from the scaled questions that prove the value of the themes and its transparency.

The findings chapter aims to present an emergence of new ideas and themes, that is systematically analysed and based on gathered data through interviews. The main purpose of the results is to perform transparent and coherent presentation of the ideas, that will bring valuable input into further discussion of improvement recommendations.

### 4.1 Findings framework overview

The framework of the analysis is formed by identified themes and sub-categories that emphasize the most highlighted topic in the empirical examination of the process and interviews. By coding process and followed closed coding, the main themes are defined and listed as per below:

- Complexity
- Communication
- Organisation
- Technical aspects
- Resources and materials

These codes are detected as the most frequent and considered as the main explored topics. The themes are not indexed and listed in compliance with hierarchy while the significance of each topic is examined separately. Moreover, according to the theoretical part, the

themes more closely related to information flow and also can be considered as bases of any of the supply chain driver.

### *Complexity*

This category specifies the structure of the process, that declares its nature and difficulty. In order to investigate the complexity of entire drop-shipping scenario, responsibilities and duties of each department separately are reviewed. Duties of each member of the process refer to all the tasks including both communication and technical assignments. It was proposed because as known a complexity of the drop-shipping scenario stands to reputation among employees as a comprehensive and time-consuming process. Hence, it results in people's attitude towards their responsibilities and willingness to work with this particular scenario. Therefore, reputation and attitude are considered as sub-themes that are outlined as possible consequences of the main theme: the complexity of the process. Moreover, these sub-themes are correlated also with other further themes, e.g. communication and technical aspects. Nevertheless, complexity is observed as the key topic in order to investigate an opportunity of future process standardization.

### *Communication*

Interrelation of departments is highly emphasized in drop-shipping scenario due to the urgent and special deliveries. Thus, communication between all the members is considered as the major way of working and the main source of information. Moreover, a large percentage of the drop-shipping deliveries requires the participation of all departments, in some cases even simultaneously as consultancy is essential to complete the process successfully. Through investigation, communication aspect is also defined as the most unpredictable factor, as it purely depends on human resources. However, dependence on awareness of own tasks and responsibilities is examined as sub-topic. Awareness of your own tasks and duties of other department results to successful completion of the process



that simplifies communication and prevents possible errors. By this criteria, approach outlines also helpfulness of the departments and team working knowledge. To conclude, an involvement of each department is necessary for smooth procedures, while communication theme is dedicated to exploring communication flow in an entire process.

### *Organisation*

Mainly this topic considers the organisation of the departments and allocation of human forces. Organisation observes current situation in the department: who is proceeding with the drop-shipping scenario and who is contact experts in this process. There are two possibilities of re-organisation: nomination of the specific group of people to proceed with this scenario or either standardizing the process and ensuring that every coordinator in each department can proceed with it independently. As a sub-theme, the topic of contact experts is stated in order to define the most experience coordinators within departments that might simplify the consultancy factor. Moreover, in this topic, each department considered individually due to different scope, size, and structure. Therefore, re-organisation possibilities are considered for each department separately and not commonly.

### *Technical aspects*

As stated in the approach, system based functions are not observed in details according to confidentiality. Moreover, technical errors and difficulties are not found currently the most discussed topic, while technical aspects consider a possible improvement of the system that leads to better visibility of the process. This category also examines the dependence of the department in the utilized system, where errors and mistakes might result to more communication and less effectiveness of the process. Therefore, the risk of mistake occurrence is taken into consideration and prevention strategies are considered from each member's point of view. As follows, system inaccuracy is granted as a sub-theme.

### *Resources and materials*

Resources outlines availability of the valid instructions and materials for every department. Validity and continuous upgrade of the materials are reviewed as an opportunity to maintain the process mainly process knowledge of coordinators. All available materials are reviewed in order to consider its validity and how the instruction are followed in the current situation. Therefore, the update process of information is defined as first sub-theme, and as the second sub-topic, meetings and trainings are considered as a possibility to support the process. Awareness of the responsibilities in each department can be also maintained by relevant trainings and possible job rotations.

To summarize, all five main topics is identified as the main areas of possible difficulties, and then as the key areas for future improvement and risk presentation. Each department is analysed separately from its point of the process, that outlines necessity of considering each department individually. By sub-themes, the most observed and mentioned in interviews ideas are stated. These secondary topics ultimately underline the significance of the topic as sub-themes are presented as consequences and the most closed influencing factors.

#### 4.2 Processes performance outline: challenges and weaknesses

The analysis is divided into five sections, where each department is analysed separately. As it was also examined in the methodology the following departments are taken into consideration: PCM & POS, MM, DI, external logistics company and additionally process and operations support department. There were 12 interviews in all departments and analysis presents interviewee's' ideas and opinions about above discussed topic.

#### *PCM & POS*

From PCM & POS in total 3 experts participated, all three are allocated in Finland and working in the following areas: internals customers, Southern, and Northern Europe. All

interviewees expressed their opinions about the process by mentioning various examples from daily drop-shipping cases.

According to employee's attitude towards the complexity of the process, the positive feedback was noticed from all of the interviewees as the process is relatively easy and nowadays working quite well. It is noticed that system based tasks do not require a lot of time and do not differ sufficiently from the usual deliveries from the central warehouse. The biggest time-consuming part was defined as reaching correct people and coordinating the deliveries from the beginning till the end. Being in the loop from starting point to the actual shipment can be considered is the main duty of PCM & POS department. Moreover, the reputation of the drop-shipping scenario is identified as not absolutely positive, as this process is known as q challenging and special service. Therefore, persons who are dealing with the deliveries have their own perception to it as a source of interesting and sometimes difficult cases where they can learn and explore more things. Poor concentration was mentioned as a cause of any system wise and communication wise mistakes and errors. However, due to the variety of nationalities and cultures within departments, contact with different persons leads to different consequences. Thus, attitude towards the processes, as it was found, mostly depends on communication flow, rather than on system difficulties. It is also investigated that many drop-shipping deliveries can appear late in the working day that also have an impact on a lead time, as contacting right person, in this case, might be more complicated and usually. Therefore, availability of the materials and parts is defined is one of the biggest risks in the process. Furthermore, completing approval from PCM manager is also stated as a time-consuming task in some examples that has an influence on further operations.

Communication with other departments is examined as the most complex question in the drop-shipping scenario. It is also defined as the most time-consuming process that depends on a particular case. Due to the rarity and special requirements for drop-shipping deliveries, smooth communication and helpfulness between departments are key points to complete

the process successfully. The main consequence of extended communication flow is a level of employees' awareness of own tasks. One of the opinions states that tasks and responsibilities of the departments are not clearly framed, that might cause unnecessary communication. It is also noticed, that communication behaviour differs among countries, that sometimes have a great impact on the complexity of the process. Therefore, the dependence between department is identified as a major factor of problematic communication. It is also found that by correct accomplishing its own task each department could avoid overlapping communication. Hence, *on-time communication* is an essential tool in order coordinate the process. However, by all the interviewees the helpfulness of the colleagues was highlighted, that proves willingness of coordinators to achieve a common goal: provide quality service to the customers.

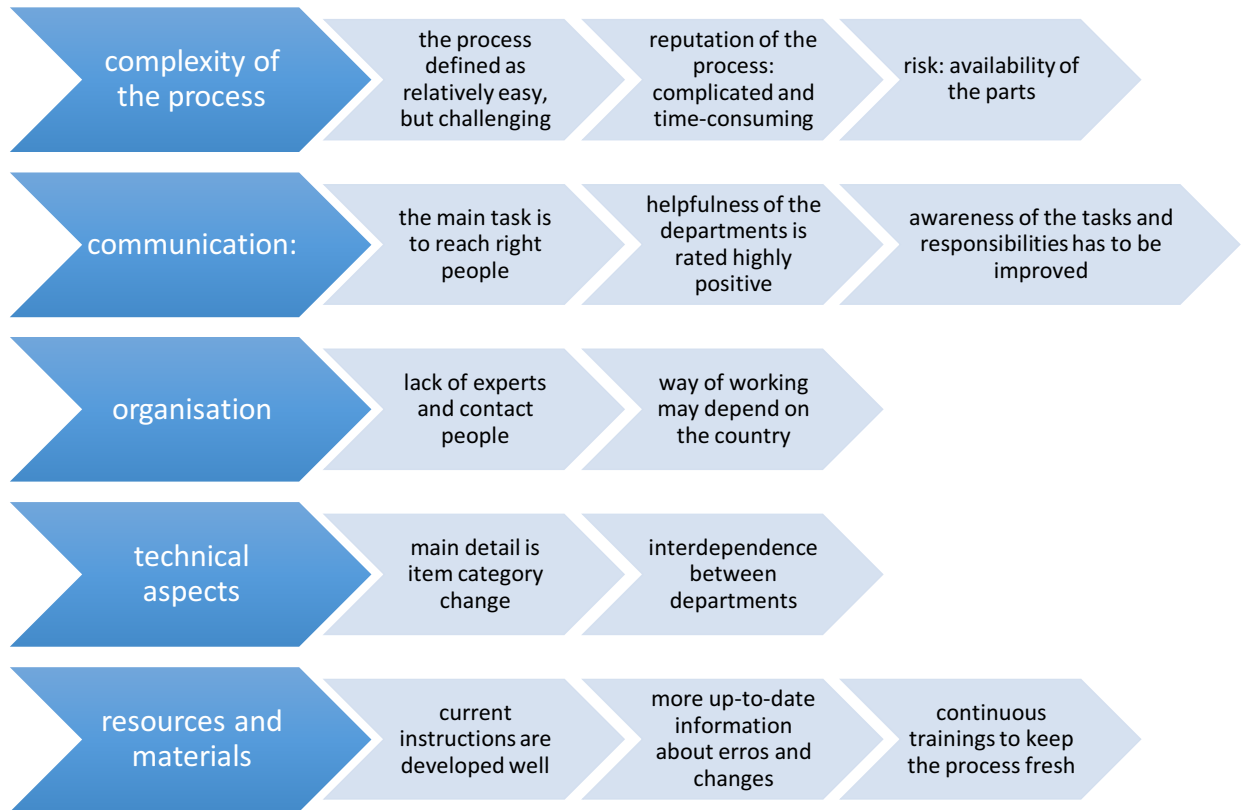
Regarding the organisation of the departments, interviewees considered a possibility of nomination more experts within departments. As the volume of drop-shipping deliveries is relatively small, all coordinators do not have enough knowledge and experience to process with this special service. Therefore, assigning drop-shipping deliveries to specially dedicated persons can result in higher professionalism and smoother communication. However, impartiality of nomination of the experts is also reviewed by considering the scope of the departments and types of the deliveries. As communication strongly relies on employee's experience, re-organisation is defined as an opportunity to strengthen communication flow. Interviewed coordinators explained that dedicated experts in the process are very helpful, and consultancy can be easily received. However, as it is found nomination and training of more experts could sufficiently support the process.

Technical aspects were defined as especially easy by all the interviewees. The process slightly differs from usual deliveries, however, can be easily learned. The main specific detail that is important and might be forgotten is *the item category change* in the system. Attention to the item category change was emphasized during interviews, as this mistake has been defined as one of the most frequent from PCM & POS department. However, as it

was discussed, common sense and familiarizing with the process result in stronger concentration and less mistakes and errors. System based tasks are underlined as trivial while experience and education are crucial parts in order to decrease an amount of mistakes and human errors.

The question of resource and materials was especially stressed in the interviews, as experience and awareness of the tasks can be reviewed are major leading factors in the process. All the interviews found that current instructions are sufficient enough, however, continuous update of the instruction should be maintained stronger. Discussion and meeting about painful lessons and experience with problematic drop-shipping cases should be shared more, so everybody could have an overview of possible mistakes and unfortunate events. Interviewed coordinators mentioned that process development is having a sufficient input to the process and within several years process sufficiently improved. However, due to the large scope of the departments and rarity of the drop-shipping deliveries, there is a necessity to have more training and updates about the process. *Lack of knowledge and experience* is defined as the main cause of mistakes and poor communications, therefore, interviewees were strongly agreeing to implement more meetings, and information sessions about the process.

In conclusion, from PCM & POS department view, the process seems feasible, however as it is found, the process has to be improved and developed in order to increase effectiveness. Communication is identified as the most influencing part of the process, that can be strengthened by increasing of employee's awareness of their tasks. Furthermore, resources and materials topic is stated as a key development point. As a summary, figure 4 illustrates the main coded findings from this department on each theme.



**Figure 4.** Findings from PCM & POS department.

*MM*

Two interviews are gathered from Purchasing department, where both of interviewed coordinators are allocated in Finland and have sufficient experience with drop-shipping deliveries.

As it was outlined in the interviews, entire process does not differ a lot from the usual purchasing order, therefore, cannot be called complex or problematic. Some of the deliveries have challenging matters, however, the reputation of the process does not derive from its complexity. People attitude towards the process occurs from complicated communication and *urgency of the deliveries*. It is noticed that due to the reputation of the

process and its rarity, deliveries are mainly proceeded by several experts in the departments who are the most experienced with it. Nevertheless, everybody is obligated to know how to deal with drop-shipping deliveries.

Communication is found as the most complicated tool in the process. Interviewees mentioned high dependency and correlation within PCM & POS departments, where usually problematic issue happens. It is declared that enhancing the effectiveness of communication, thus decreasing of *overlapping communication* can save time for about 15-20 minutes in each case. Whereas it is also found, that communication is extended because of the employee's unawareness of their tasks. Communication with suppliers was raised is challenging and especially comprehensive for MM department. Most of the supplier are working with a case company in daily bases and communication is organized effectively and smooth. However, in a case of drop-shipping delivery requires special documentation, MM is responsible to aware a supplier about needed documentation, where confusions are noticed. The main risk of inserting supplier invoice into the box is also emphasized and in order to prevent it, MM department clearly understands the importance of accurate communication with suppliers. Moreover, helpfulness from DI department was mentioned as highly appreciated and needed, that enhance communication flow between DI and MM departments.

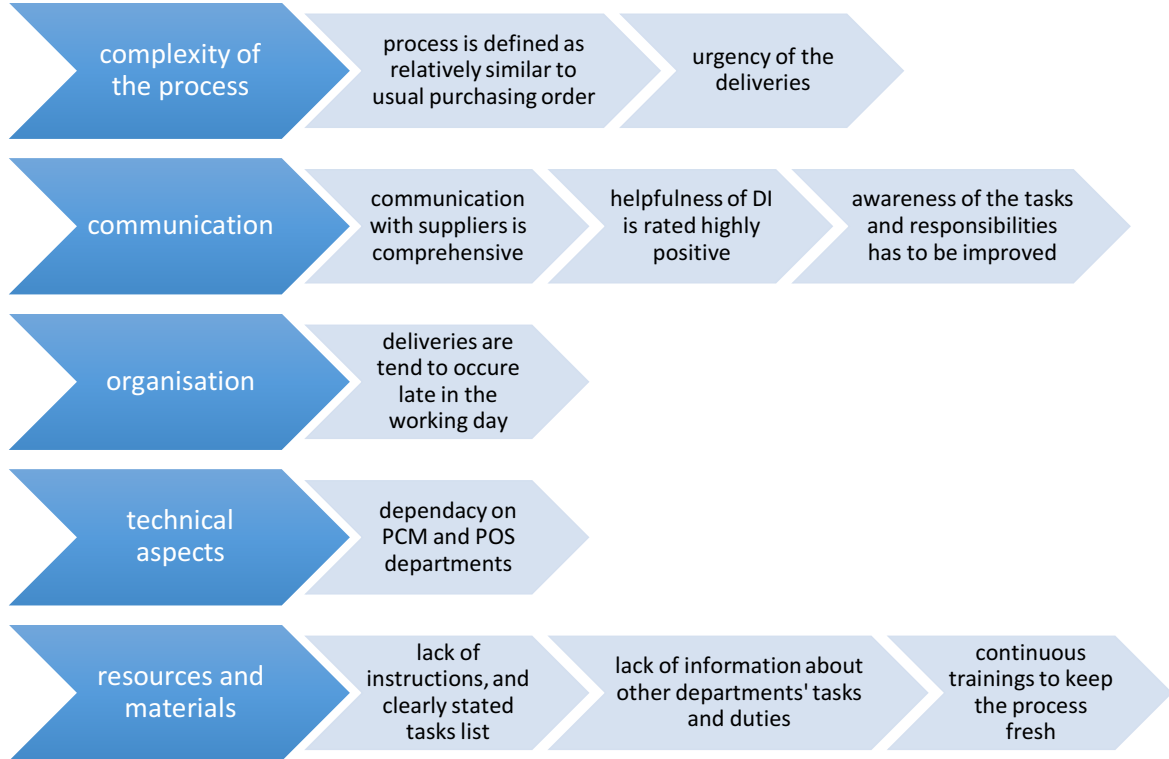
Even though every coordinator should be able to handle drop-shipping deliveries, there are several people among the teams who are handling the most volume of the deliveries. The reason of not equally spread of the deliveries is its rarity and special requirement where experience is a crucial point. Moreover, it is discussed that some of the deliveries are occurring late in the working day, approximately at 3 pm, while most of the people are already out of office. Thus, this criterion is also forming experts who are working until a later time.

System based changes are considered as trivial, however highly depended on the PCM & POS department. Thus, if the mistake or error occurred in sales order, purchasing department is not able to proceed correctly, where additional communication appeared with upper PCM & POS departments. The question of oversized shipment as e.g. generators was discussed, where shipments cannot be transported via central warehouse and thus should be shipped only as a drop-shipping delivery. These shipments are found not prepared by PCM & POS department from the technical, system based side. For instance, deliveries have proceeded to the purchasing department without item category changes that should be marked by PCM. Therefore, it causes extended communication and time-consuming process. This example emphasizes *dependency between the departments* and necessity of accurate completion of each task and higher concentration.

Current problematic issues are result into a lack of instructions and trainings, that is the main indicator of unawareness between employees. Interviewees agreed that current instructions are too complicated and not updated. The necessity of more training and information sessions with other departments is stated clearly and defined as an opportunity to understand task and duties of other departments. Both interviews also mentioned that within MM department drop-shipping deliveries are discussed frequently that helps to be updated.

After all, interviewees expressed a positive attitude towards drop-shipping scenario, however, it is clearly noticed that process has to be improved. Cooperation between MM and PCM should be strengthened in order to decrease an amount of communication. The causes of the current weak part of the process are found in *poor concentration*, lack of knowledge, instructions, and trainings. Figure 5 illustrates all relevant and sufficient topics from the interviews in MM department.





**Figure 5.** Findings from MM department.

### *DI*

There is one dedicated expert who is mainly responsible for drop-shipping deliveries in DI department, while three more persons are additionally nominated as a back up. In total two interviewees participated in the research, where one is located in Finland and the other in The Netherlands.

By determination of complexity of the process, it was agreed that current process is functioning well, however there is always room for improvement. DI experts considered that task and responsibilities varies from the case to case and difficulty depends on destination and supplier. As it is known, DI experts are found the most experienced in the process, and also can provide general consultancy. Thus, during the interviewees, it was mentioned that recent performance of the process slightly improved during the years, that

bring more transparency to nowadays process. However, *reputation of the process* was outlined and *employee's attitude* is defined as the main source of poor communication and occurred mistake and errors.

Communication that is based on mostly emails is the spine of the process, and as it was found, there are too many emails for each case that cause confusions a lot of time. DI is the main contact for external transportation company, where communication is organized well and effectively. Thus, DI summarize work of PCM and MM, where the most delays and difficulties were discussed. Cultural differences and various personalities play sufficient role in the process, that could be simplified by common stated rules and more clearness in the process. The main problem was faced is not involving of DI department in the process, that cause wrong document exchange and adding not correct documentation to the shipment.

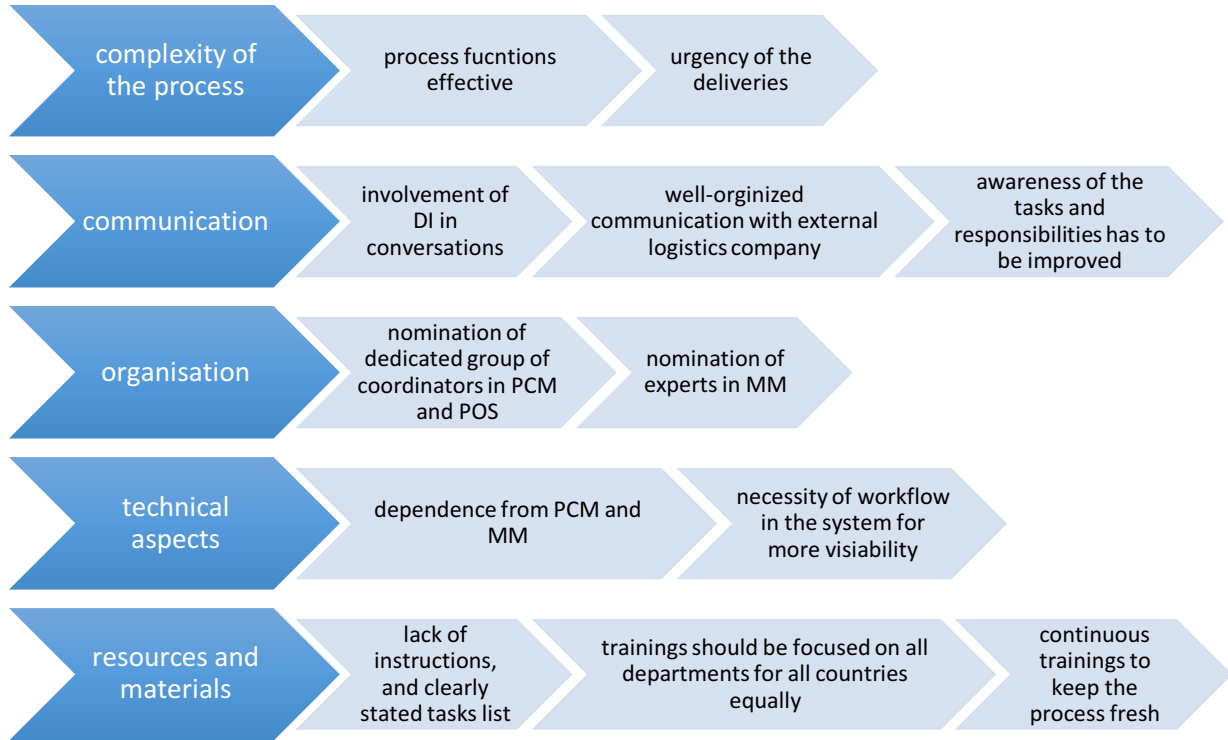
According to organisation theme, interviewees agreed that there are too many employees involved into the process, as in PCM and MM any coordinator is able to the drop-shipping deliveries. These varieties complicate the process, as not each coordinator is experienced in these types of the deliveries. The main suggestion was stated towards nomination of special group of people in PCM and POS for these deliveries, back ups also should be considered. Moreover, nomination of experts was considered in MM department, that will represent by announcement of experts who are able to consult about the deliveries, whereas every operative purchaser could proceed with drop-shipping deliveries. By structuring the departments, communication flow can be cleared that will bring more accuracy and efficiency to the process.

The key technical consideration was willingness to implement *workflow in the system*, as it would be the main step towards visibility of the process. Emails are defined as the main source of information, therefore system based workflow, where DI is able to track a status of the delivery would sufficiently simplify a work and also reduce amount of emails.

Interdependency between department is also highlighted during the interviews, and currently this feature brings problematic issues. However, regarding to the desired performance of the process, interdependency should be considered as mutual cooperation and team work.

To enhance cooperation between departments, it was agreed to implement more compulsory trainings in PCM and MM departments, to make sure that employees re familiar with instructions. Interviewees also mentioned that current process development functions well, however trainings should be reviewed with more focus on equal development of all departments in all countries. *Unawareness of the task and duties* was also noticed from DI departed, thus nomination of more experts is advised in order to have more trained coordinators.

To conclude, DI department is responsible for the last stage before contacting external logistics company, therefore DI overviews all before dove operations. The cooperation between department is currently viewed as weak, due to the unawareness of the tasks, communication issues, and lack of trainings. Thus, figure 6 highlights the main topic of the interviews in DI department that are used further in discussions.



**Figure 6.** Findings from DI department.

### *External logistics company*

External logistics company is located in The Netherlands, and two coordinators who are currently handling drop-shipping deliveries are volunteered to participate. Both interviewees have sufficient experience within logistics and transportation planning for more than 5 years.

The main responsibility of the external logistics company is to plan the most appropriate transportation, with affordable price and shortened lead time. This logistics company has one special department who are working on a case company, and especially dedicated urgent deliveries and drop-shipping shipments. The scheduling process was not defined as complex, however it identified as urgent and directly depends on how early quotation is announced. DI department of a case company is responsible to send required information as

soon as all details are ready to external logistics company, thus they can find the best mode of transportation. On time quotation bring an opportunity to find the best solution for transportation, estimate accurately the most suitable way from different samples. However, it was noticed that earlier quotations are preferable as it provides more flexibility. Moreover, interviewees stated that some of the deliveries are not urgent, however could be announce for quotation earlier in order to prevent additional costs because of urgent booking.

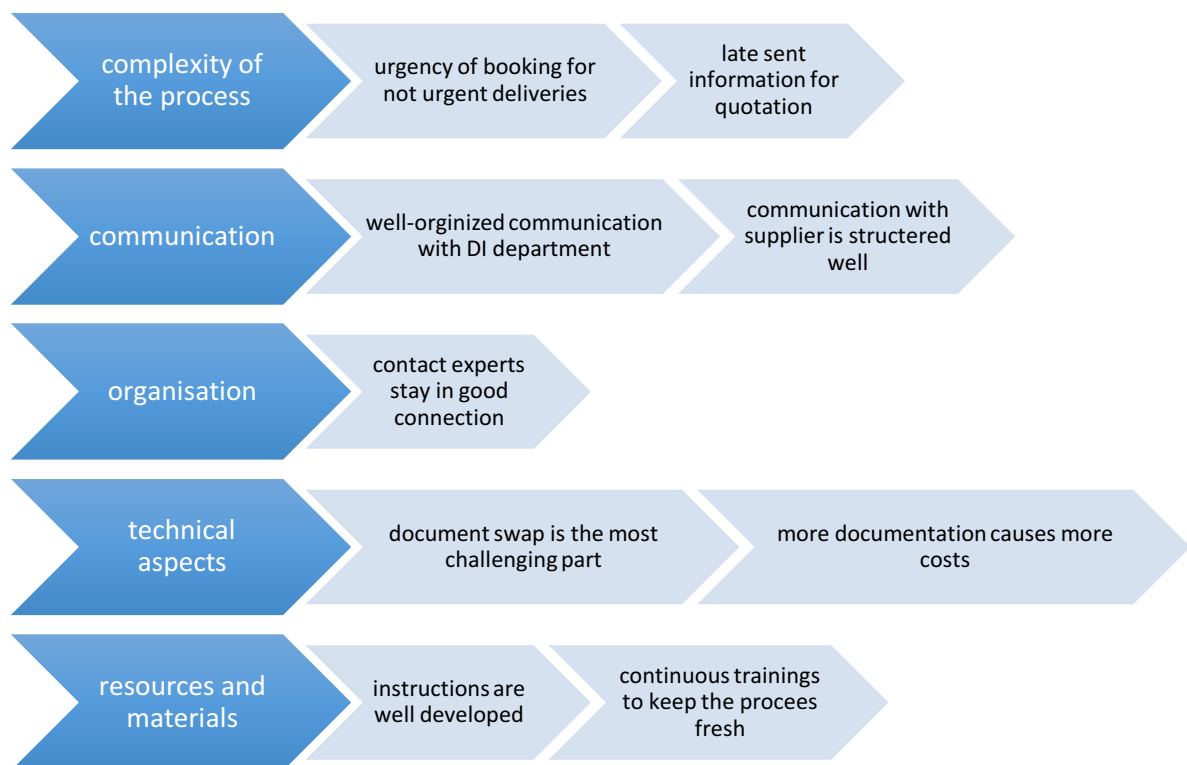
The main contact person from a case company is DI department, and this communication flow is valued as definitely supportive and well managed. No specific comments and details were mentioned on this topic, as communication is currently developed smooth enough. External logistics company is also closely contact supplier in order to pick up the goods, however this point also have been mentioned as currently functioning well.

As it was mentioned, there is separate group of people who are handling drop-shipping deliveries in external logistics company, and all the marked names in the case company instructions stays valid and up to date.

Concerning technical aspects, factors of actual planning of transportation was discussed. The main challenging process is preparing *document exchange*, where the shipment is dispatched to an external customer. Interviewees outlined that due to the difficulty and more responsibilities, not many agents of external logistics company are agreed for the shipments with document swap. It also causes higher costs for transportation and more communication with agent ensuring that all instructions will be ultimately followed. Many examples were discussed where costs of document exchange were noticed to be extremely high, and transportation to nearest internal customer would be easier, faster and more affordable. Hence, document exchange leads to high handling costs and real costs for both of the companies.

Resources and materials were states as well developed within external logistics company. Process development experts from a case company are continuously contact logistics company in order to maintain the process effectively and have recent updates about the performance.

To conclude, communication flow with external logistics company is well maintained, however suggestion for earlier quotations were marked. Additionally, document exchange was defined as the most complicated step of the booking that cause significant handling costs. As it was advised that in some cases, costs of documentation swap is too high to implement it. Figure 7 briefly describes the main findings from the interviews in external logistics company.



**Figure 7.** Findings from external logistics company.

*Process and operations support department*

The interviewees from this department are responsible for development of the operation and support to the department in daily basis. In total there were 3 candidate who are currently working as process experts and also have participated in process development in the past.

The process was defined as lean and well structured, where each department has a clearly stated role in operations. Regarding to process reputation and its influence on performance an employees'' attitude, the opinion was that *common goals* is not properly explained to the departments. The main complexity goes from amount of people involved into the process, while to keep updated all involved members with all the scopes of departments is extremely difficult. Therefore, the main goal of providing quality service to the customer should be emphasized daily in order to prevent attitude. Besides identification of common goal, organisation of the departments was outlined as the main source of communication failures and problematic issues.

Communication was raised as one of the weakest links in the process. The accent was stated mostly on *communication flow between PCM and MM departments*. As DI experts are defined as the most experience, attention to PCM and MM should be taken into serious consideration. It was mentioned that majority of the mistakes and failures are occurred due to the misunderstanding and poor cooperation between these departments. Moreover, as per instructions, skype meetings and short calls were recommended in order to prevent misunderstanding and extended communication via emails, however, as it is noticed instructions are not followed appropriately. Therefore, the one of the causes of the inefficient communication is that instructions are not read and followed. As there are many employees and department involved into the process, common instructions should the main general source of information. Contact experts are also advised to be updated and highlighted more in order to make sure that all coordinators know whom they could contact according to the situation.

Organisational issues are mostly observed through the aspect of *large scope of department* and difficulty to aware each employee about the process. Thus, re-organisation is considered as a key step to shorten communication chains and handling costs. Special focus was stressed on PCM and MM units, as their cooperation is found the most problematic. By specifying dedicated experts in these department, coordinators could learn from the process and could be educated faster and efficiently. It was also agreed that PCM and MM are the most unprepared departments. Therefore, developments process should start especially from PCM, as this department begins the process and accuracy in the beginning could sufficiently increase further performance.

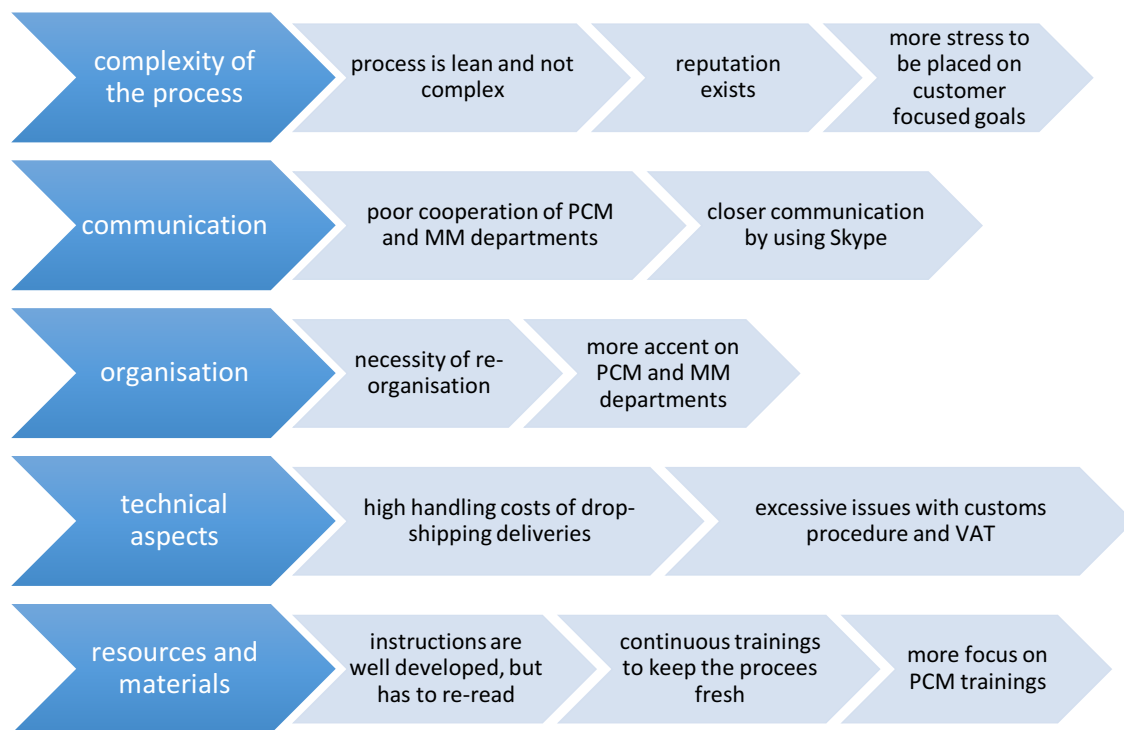
Technical aspects were clarified as highly developed and currently system based errors are mainly occurred because of the human mistakes, and not by the system. Workflow for more visibility was discussed, however opinions are divided between interviewees. The main concept of workflow will definitely increase transparency of the process, however with current small volume of the deliveries, workflow is considered to be not the first way to improve the process. Moreover, drop-shipping was considered from customs and foreign trade procedures, where nowadays the VAT issues are stressed to be the most complicated issue. According to current handling costs and issues with customs procedures, drop-shipping deliveries are estimated as highly complicated design. It was mentioned that, in order to consider standardization of the process, whole *handling costs* should be properly estimated, that includes development expenses, technical possibilities, opportunity of improvement in customs and VAT procedures.

Current instructions are evaluated as sufficient and valid, however also the materials were called too complex, that leads to employees' attitude to study it. Trainings were considered as a step towards increasing awareness of the process and tasks among coordinators. However, PCM department was mentioned as the starting point of development, where coordinators should be aware about entire process. It is crucial for PCM experts



comprehend an impact of each step, as this department is responsible to coordinate whole process.

To conclude, figure 8 is created to overview the key mentioned ideas during the interview. The accent was set to organisation of the process, where currently too many employees involved into the process. It cases unawareness, poor cooperation, and failures in the system. Also profitability of drop-shipping is discussed due to the high handling costs and the one of the most problematic question – VAT topic.



**Figure 8.** Findings from process and operations support department.

#### 4.3 Summary of the findings and current performance of drop-shipping model

Finding were analysed separately for each department to bring visibility of the process from each stage of the process. Hence, figures 4 – 8 represents the general finding for each department. In order to prove validity and reliability of analysed information, scaled questions were included in the interviews. These questions were focused on asserting

general ideas about the process (Appendix 1). Answers on scaled question were also asked to be returned before the interview as it provided an overview of candidates' attitude towards the process. These questions were estimated as a source of the further discussions about the process. Questions included consideration of effectiveness, communication flow, awareness of own task and duties of the colleagues, helpfulness and cooperation between departments, and availability of the instructions. In total, 10 participants filled in scaled questions, and the results are interpreted in the table 3 below.

**Table 3.** Scaled questions results. The general interpretation of the process.

Effectiveness	4	2	3	1	4	3	3	3	4	2	2,90
Communication	4	2	2	2	3	2	4	2,5	3	2	2,65
Awareness of tasks of other departments	2	2	4	2	3	4	4	3	4	4	3,20
Awareness of your own responsibilities	4	2	5	2	5	5	5	4	5		4,11
Helpfulness from other departments	5	2	4	3	5	5	4	3,5	4	4	3,95
Availability of the sources	3	1	4	1	4	4	5	2	1	3	2,80

The lowest 3 estimators are marked red in the table and it shows an extra accent on weak communication side of the process, that is followed from lack of materials and training, and that results to low effectiveness of the process. All interviewees were the coordinators who are experience in handling of drop-shipping deliveries, that is why average estimator of awareness of own tasks is sufficiently high. Interviewed candidates are also familiar with tasks of their colleagues, however as it was mentioned by many participants, job rotations and information sharing sessions is an opportunity to bring even more accuracy to the process. Due to the dependency between departments, all members are merged to united

team and team work is the key point to successful completion of the process. Helpfulness rate presents a supportive attitude of employees and willingness to accomplish the process accurately. This estimator also indicates a common goal of the department: prioritizing customer needs and expectation by providing quality services. Therefore, by estimators higher than 3, the findings outline cooperative atmosphere and willingness to complete own tasks successfully.

Nevertheless, red indicators that are estimated below than 3, points on overall performance of the process. It highlights that process's main weakest parts are communication and employees' trainings. The process is rate 2,90 for effectiveness that ultimately states that there is a room for improvement and drop-shipping scenario should be brought to improvement stage. According to interviewees, process function well, and it is not complex by its nature, however, it could be proceeded in more effective way with less handling costs. Communication is observed as one of the most time-consuming duties in each department, and the main reason of extended and overlapping communication is unawareness of own tasks. Thus, employees defined that not everybody in the department are trained and educated sufficiently and appropriately to accomplish this process. The biggest part of communication problem can be solved by ensuring proper training in all teams in all the countries. Current instructions are partly considered as efficient, partly not, that also is a gap in the employees' education.

Therefore, these estimators from scaled questions performs a confirmation to the analysed interviews. Nevertheless, the limitation of the research should be considered as these results only illustrates opinions and experience some specific range of experts who are especially mostly located in Finland. Interviewed experts considered situation in the departments, but were not stated as representatives. Hence, improvement recommendations are described in the next sub section that is based on each department consequently.

#### 4.4 Improvement proposals

This section overviews the improvement discussions in each department separately and also concludes research and its findings. Based on the findings, recommendations are presented as a considerable summary of the interviews and analysis. Thus, in order to visualize, tables are created for each department that summarize results and improvement recommendations.

From PCM and POS point of view, improvement discussions were related more to organisation and resource and material topics. Standardization of the process is an opportunity to make it more transparent and less challenging, however rarity and special nature of the deliveries are considered as the main obstacle. The defined risk of availability of the parts derives from the nature of drop-shipping deliveries. As majority of deliveries are appearing in the end of working day, interviewees mentioned short working hours of picking and packing departments, and also working hours of suppliers. The delay can be also faced that many employees finishes their day at 3 pm, however only few are working until 5 or 6, where urgent drop-shipping delivery can occur. Therefore, contact and dependence between department is the most challenging part. Many interviewees created by themselves email templates in order to provide all information accurately, that prevent extended and overlapping communication. Thus suggestion to build standardized tasks lists for each department, email templates, and handy instructions was discussed as the small step towards increasing employee' awareness. An argument towards nomination of the experts in each department was also supported as a possibility to simplify communication flow. Moreover, in order to standardize the process, simplification of PCM manager approval is observed. As soon as there are frequent deliveries from the same supplier to the customer, PCM manager approval can vary per value for the delivery. However, risk of loosing control by elimination of manager's approval is also considered as crucial and can be maintained by employees' familiarization to the process. The variety of cultures and nationalities is also found as the cause of communication problems, therefore more investigation for other departments that are allocated not in Finland is advised. Moreover, it

is noticed that due to the interdependence between members in the process, it is compulsory to remember to mention all specialist in emails, that should be stated more clearly in the instructions. Thus, table 4 outlines the weaknesses and improvement recommendations from PCM and POS departments.

**Table 4.** Weaknesses and improvement recommendations from PCM & POS departments.

<i>PCM &amp; POS</i>	<b>Weaknesses</b>	<b>Improvement recommendations</b>
<b>Complexity</b>	Poor concentration, and weak reputation of the process	Standardization of the process, by e.g. elimination of PCM manage approval by value of the deliveries
<b>Communication</b>	Interdependence of the departments	Clarification of the tasks and increasing employee's awareness of the process
<b>Organisation</b>	Not enough experts and contact persons, especially in MM part. Cultural difference and not equally educated coordinators.	Identifying dedicated experts in each department or at least the main contact persons. Consider development in all departments at all the countries equally
<b>Technical aspects</b>	Human mistakes and errors that is a result of lack of experience and knowledge	Clarified tasks list for each department, with highlighted details where more attention should be considered
<b>Resources &amp; materials</b>	Current instructions are clear and sufficient, however not updated. More information sessions to keep the process fresh and remind all	<ul style="list-style-type: none"> <li>- Email templets</li> <li>- More information sessions</li> <li>- More frequent update of information</li> </ul>

	coordinators about nuances	
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Improvement in communication flows are discussed the most in MM department. MM coordinators stated that their tasks are highly related to completed tasks by PCM and POS departments, that recently is defined as problematic issues. In order to change dependency into smooth cooperation, trainings and task lists are suggested. Job rotation is also seemed as an opportunity to have a deeper insight of the neighbour department. Rotations within the process could bring a valuable experience and understanding an importance of own/colleagues' duties. Unawareness of the process can be also improved by proper update of the instructions and more sessions concerning news and changes in the process. Communication with supplier is also mentioned as the main challenging tasks, where employees have a not enough information about documentation in case of specific documents are required. Helpfulness from DI department is highly rated, however in order to simply consultancy and extended communication, more information should be provided regarding document exchange procedure. Regarding other aspects, excluding communication, interviewees mentioned late appearing of the deliveries. Urgency of the deliveries leads to immediate actions, that take sufficient time that depends on the case. Thus, employees who are working until earlier hours, are not able to assist with late deliveries. As MM tasks correlate with other departments, update of experts lists could supportive in case of needed consultancy or assistance. It was also identified that some of the deliveries that per sales quotation are tend to be dispatched as drop-shipping should be proceeded right from the beginning as drop-shipping deliveries. As communication back from MM to PCM is found time-consuming and could be prevented in advance. Additionally, table 5 is created to summarize the weakness and improvement recommendations from MM department view.

**Table 5.** Weaknesses and improvement recommendations from MM department.

<i>MM</i>	<b>Weaknesses</b>	<b>Improvement recommendations</b>
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<b>Complexity</b>	Urgency Deliveries occurs late in the working day	Nomination of the experts who are available in the afternoon
<b>Communication</b>	Communication with a supplier in case of additional documents	Instruction about documentation exchange Clarification about how to handle questions about documentation
<b>Organisation</b>	Not enough contact persons and experts	Update the list of experts in all the departments
<b>Technical aspects</b>	Dependency to PCM & POS departments	Consideration of drop-shipping deliveries in advance (example of oversized deliveries)
<b>Resources &amp; materials</b>	Unawareness of the task of other departments	Job rotations Continuous update of the instructions

According to DI department, the communication is also defined as the weakest part of the process, and could be improved by continuous training of the employees. Reorganisation of the departments is also discussed, that can be viewed as an opportunity to maintain proceed more effectively. The idea of nomination of dedicated group of people for especially drop-shipping scenario in PCM departments is strongly recommended. Moreover, consideration of nomination of experts for MM department should be taken into account in order to bring more effectiveness into communication. In order to make a communication more effective, check lists were suggested for each department as the main source of information that should be kept on the table. Check lists should have the step-by-step instruction of the main points for each department and it would very supportive during the process. Regarding technical improvement, workflow was considered as the one of potential supportive tools that can bring more visibility to the process. As DI experts are responsible to summarize the

information and prepare documentation and contact logistics company, workflow would be helpful in order to have all information together stated in the system and that will also might decrease amount of emails.

Ultimately, reputation of the process was discussed, and as it is agreed known complexity of the process has a great negative influence on employee's attitude. Drop-shipping is presented as very complicated process, however it currently functions well and it has to be standardize in order improve its reputation Standardization is discussed as representation of the process in more simple way and for each department individually, bringing more openness to information sharing and enhancing team work. Therefore, table 6 generally presents the main weaknesses and improvement recommendations from DI department.

**Table 6.** Weaknesses and improvement recommendations from DI department.

<i>DI</i>	<b>Weaknesses</b>	<b>Improvement recommendations</b>
<b>Complexity</b>	Reputation of the process has an impact on employee's attitude	Standardization of the process: presentation of the process in easier way
<b>Communication</b>	Not involvement of DI into conversation	Clear individual instructions each departments Sharing information sessions between departments
<b>Organisation</b>	Too many people are involved in the process, thus unawareness rate of the tasks and process is too high	Nomination of experts in MM, and nomination of separate group of people who will handle only drop-shipping deliveries in PCM
<b>Technical aspects</b>	Dependence of MM and PCM &	Implementation of workflow in



	POS departments	the system in order to bring more visibility to the process
<b>Resources &amp; materials</b>	Well developed current instructions, however more updates and news about deliveries could be supportive	More compulsory trainings from all departments

During the discussion about improvement of the process with external logistics company, the main emphasize was set to documentation exchange. As not all of the agents of logistics company can offer this service, handling costs and transportation are estimated higher than usual. Therefore, possibility of transportation to internal customers was considered. However, it was also advised to create a list of the most frequent destination and location of suppliers, as external logistics company could make a research in advance in order to minimize transportation and handling costs in advance. Thus, by preliminary research and earlier quotations are supported as one of the opportunities to decrease handling costs and especially costs of urgency planning. Furthermore, the main improvement recommendations are briefly presented in table 7.

**Table 7.** Weaknesses and improvement recommendations from external logistics company.

<i>External logistics company</i>	<b>Weaknesses</b>	<b>Improvement recommendations</b>
<b>Complexity</b>	Due to the late announcement, non urgent deliveries require urgent planning	Information for quotation to be sent earlier and as much as possible in advance
<b>Technical aspects</b>	Document swap cause to high handling costs	Consideration of the destination in advance by research of the most frequent

		external customer destinations and location of suppliers.
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Process and operations support departments consider communication and organisational aspect the most. The most undeveloped communication is found between PCM and MM department, as these units have the main task to merge sales and purchasing orders together. Nevertheless, misunderstandings and failures are stated to happen because of the two main criteria: involvement of too many employees and lack of knowledge to accomplish tasks correctly.

Profitability of drop-shipping is discussed and in order to proceed with development, standardization and increasing the volume of the deliveries, handling costs should be evaluated more. The main directions of development were reviewed as following: 1) re-organisation of the departments, 2) trainings of PCM and POS coordinators in order to enhance their knowledge about entire process, 3) developing cooperation between PCM and MM. All and other improvement recommendations and defined weaknesses are performed in the table 8 below.

**Figure 8.** Findings from process and operations support department.

<i>Process and operation support department</i>	<b>Weaknesses</b>	<b>Improvement recommendations</b>
<b>Complexity</b>	The main customer focused goals are not remembered well	Presentation of the process in easier way
<b>Communication</b>	Communication between PCM and MM departments	Compulsory PCM trainings Strong recommendation toward using Skype as a

		communication tool
<b>Organisation</b>	Too many people are involved in the process, thus unawareness rate of the tasks and process is too high	Nomination of separate group of people who will handle only drop-shipping deliveries in PCM and MM Nomination more trained experts in all departments
<b>Technical aspects</b>	Poor cooperation of MM and PCM & POS departments causes technical failures and mistakes	Correcting departments attitude towards the process
<b>Resources &amp; materials</b>	Well developed current instructions, however more updates and news about deliveries could be supportive	More compulsory trainings from all departments in all the countries Handy instructions to the table

In conclusion of empirical research, all the tables summarize all discussed ideas that are indexed according to five defined topics. The main aim of the research is to investigate current gaps in the process in order to fulfil in the future. Therefore, approach present current performance of the process by analysis of each department separately. Weakness are defined according to each criteria and improvement recommendation is stated consequently.

#### 4.5 Proactive implementation of the improvement recommendations

According to the findings of the research, processes in current model of drop-shipping in operational level are lean and function efficiently. Therefore, there is no overlapping tasks that may influence on lead time and delays in the processes. The main stopover in the

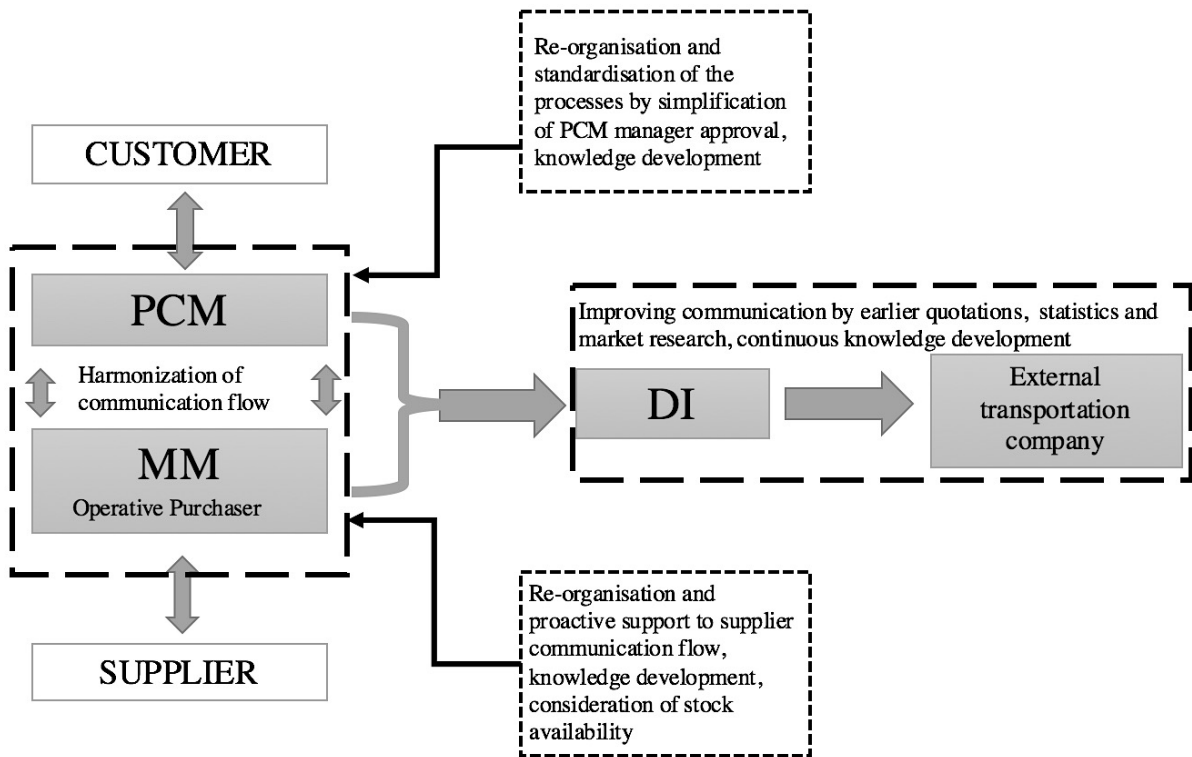
model is communication that can be improved by supporting each department individually and entire model in general. Re-design of the model is mostly defined by examination of the most challenging chains in the model and continuous maintenance in order to harmonise operations. The level of the re-design is evaluated as moderate and focus of the development is based on improvement of team work and processes sustainability. Correspondingly, there are three examined paths for further re-design of drop-shipping option in a case company:

- Widespread continuous improvement of:
  - Communications (sustaining cooperation between departments by developing stronger communication via clarification of the tasks, creation of the templates)
  - Team work knowledge (team building and familiarization of the colleagues' tasks by job rotations and workshops)
  - Information sharing within department and in the departments (creation of work spaces, information sessions)
  - Employees' competences (more developed trainings for the experts and nominated people, by progressive empowering, elimination of PCM managers' approval according to delivery value can be applied)
- Standardisation of the process by:
  - Maintenance of the system (visualization of the information by building task workflows and proactive workflows to transfer communication into the system)
  - Statistical analysis of the data (investigation of the most used destination, suppliers' location, purchased and transported materials in order to prevent handling and transportation costs)
- Re-organisation of the process:
  - Identification of the dedicated experts (nomination of the experts for narrowing communication flow between departments)

- Establishing team for continuous development (creation of the development process where the employees' and experts will lead the improvement recommendations)

These three directions are defined for all the departments at all locations in order to optimize the development of the model. Nevertheless, the starting point of re-design can be presented by the most currently challenging and problematic part in the process: communication flow between PCM and MM departments. Afterwards, in order to sustain short lead time of the deliveries, connection between DI and CEVA can be maintained by deeper investigation of statistical data, quotation requests, purpose of documentation exchange that leads to support physical distribution in this model. As the last, the complex of communication flows has to be considered by implementation of stronger trainings system, re-organisation of the departments and utilization of the statistics in order to control volume of the deliveries.

Brief scheme of starting points of re-design is presented in the figure below (Figure 9). The emphasized earlier areas are illustrated by dashed frames. Accordingly, the extensive development is ultimately considered as long-term process, where the main accent is stressed on standardization of the process in order to build sustain operations with higher workload and competitive lead time of the deliveries.



**Figure 9.** Starting points of re-design of drop-shipping model in a case company.

To conclude, the current drop-shipping model is already has built spine in operational level, and re-design aims to highlight an organisation of operations, where the main focus is based on daily communications. Due to the urgency of the deliveries, its rarity and individual approach at most of the cases, re-design is formulated in order to standardize the deliveries and processes. The expected outcome is identified as optimization of departments' role in the model, shortening lead time and establishing agile drop-shipping model.

## 5 CONCLUSION

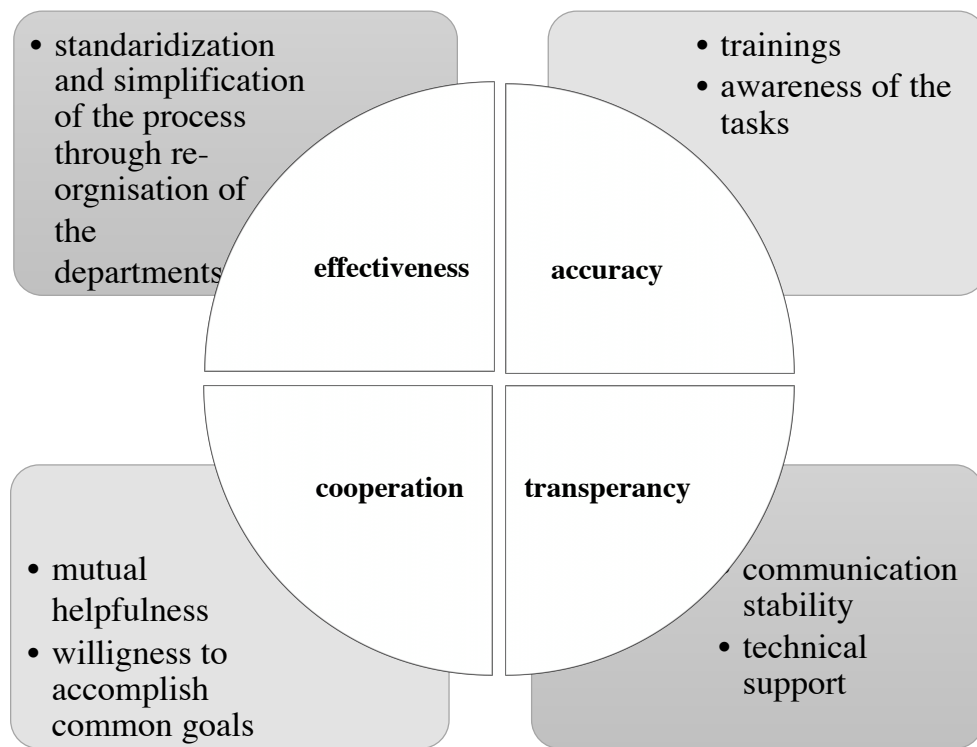
The final chapter summarizes contribution of this study and the main implications of the research. Theoretical contribution is examined in the beginning, afterwards it is followed to empirical approach results. Moreover, conclusions further describe limitations and direction for the further research.

### 5.1 Theoretical and practical contributions

Theoretical review outlines nature of supply chain design, where more investigation is placed on distribution network design. The definition and application of distribution network design is observed from its origin, thus the design is presented as it has not been implemented before in a company. It highlights a role of distribution network design and its impact on logistics performance. Moreover, network performance is described following the main drivers of the supply chain. The drivers are examined through literature review that specifies the most sufficient feature and aspects of supply chain design. Focus on distribution was prioritized due to the further investigation of particular model of drop-shipping scenario. That consequently explains design of the distribution network for a company that is performed by direct shipping from supplier premises to end customers. This model has been analysed mainly as an example of online platforms, however according to literature review, drop-shipping model for heavy and urgent deliveries was not investigated sufficiently. Therefore, case company is selected according to the usage of drop-shipping design that is already implement in a company and stated under development stage.

Practical implications are conducted on process performance analysis that aims to identify the weakness of the process and operations and propose improvement recommendation consequently. Four operational departments and process support unit are selected in order to obtain a data and current information about the process. Analysis is presented by

qualitative approach that consider 12 semi-structured interviews. By both inductive and deductive methods, data is interpreted into the results. Findings and discussions concludes that the weakest part of the process is communication flow, that has an influence in transparency and accuracy of the process. Lack of training and resource are considered as cause of problematic issued in cooperation between departments. Furthermore, current performance is evaluated as not sufficiently effective where room for improvement and further development is defined. Figure 10 illustrates the four main qualities of the process performance that were highlighted during investigation and analysis. As process is already implemented in a case company, the main improvement should be concentrated into accuracy, transparency, cooperation between departments and overall effectiveness of the process.



**Figure 10.** Key qualities of the drop-shipping process in a case company



## 5.2 Limitations and directions for further research

Limitations of this study are justified by capturing one model of distribution network design. According to theoretical review, concentration is declared on drivers of supply chain, that further applied on distribution network design. Further, drop-shipping is selected is key concept of investigations. The research complies to drop-shipping process specifically for urgent, heavy and transportation and handling costs profitable deliveries. Where, qualitative research is applied to define the mature of the process in a case company.

Therefore, empirical approach limits to investigate an opinion of experts from operational departments. Candidates are mostly located in Finland, that specifies the research. Thus, potential research can consider investigation in the departments in other locations. Moreover, further research might be concerned about investigation of the management side of the process, to gain an information of desired performance of the process. Comparison of actual and desired performance can contribute valuable knowledge of which parts of the process are key elements and foundation in order to successful completion of the process.

Additionally, focus on risk investigation could be taken into consideration in the future research. Failure Mode Effect Analysis is found considerable for more precise investigation of risks in operational level. By deeper insight investigation of potential risks is an opportunity prevent errors and failures in the process and particularly simplify communication flow.

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## APPENDIX

### **General Semi-Structured Interview Guide and Questions**

#### **Interview guide**

Interview date & place:

Name of the interviewee:

Job position/title:

Location of office:

Years in current role / generally in the company:

Dear \_\_\_\_\_,

Thank you for considering participating in the interview meeting for my Master thesis research.

The idea of my thesis is examination of distribution network design, particularly drop-shipping scenario in *Company X*. The main goal of the research is to define key weaknesses in the process and identify improvement recommendations in order to continuously improve the process in the future. I am especially interested to hear your opinions, experiences in particular processes and tasks.

The interview contains three main parts: background & process in details & improvement stage. However, there is also the pre-part that I would like to ask you to complete before the interview. The pre-part contains of six questions that should be ranked from 1 to 5 in order to interpret general ideas.

Please kindly notice that participation is voluntary and you may choose to not answer any question and withdraw from the research/interview at any time. I also confirm that any information regarding your identity will be kept confidentially and any personal opinions will not be cited in the research. The data collected will only be used for the purpose of this

Master's thesis research. An approximate estimated time of interview is 45 minutes to 1 hour.

Moreover, I would like to ask you permission to record the interview.

Best regards,

Olga Anisimova

## Interview Questions

### Part 0: Scale questions (rate from 1 to 5)

All questions consider general ideas, thus the answers are approximated. Any comments can be left in empty space for further discussion in the interview.

	<i>Questions</i>	<i>Survey scale:</i> (1) poor; (2) fair; (3) good; (4) very good; (5) excellent
1	How would you rate the effectiveness of the drop-shipping process?	
2	How would you rate the communication side in the drop-shipping process?	
3	How would you rate your awareness of the tasks of other departments?	
4	How would you rate awareness of your own tasks and responsibilities (in case, if	



	you consider a need of more training)?	
5	How would you rate the helpfulness from other departments?	
6	How would you rate availability of the sources and trainings?	

### **Part 1: Background & Interviewee's knowledge about the process**

1. To begin, please explain briefly about the background of your role in the company and how long is your working experience with drop-shipping deliveries.
2. What are your main assigned duties/tasks in the drop-shipping process?  
What is your role in the process?
3. What are the most complex and time spending tasks in your responsibilities, and why?
4. How transparent is your work to other departments (PCM, POS, DI, MM)?  
Do you update your colleagues once your tasks are done, and how?

### **Part 2: Process in details**

1. According to your rate in the Part 0 about communication in the process: could you please comment what exactly used as a tools for communication with your colleagues?  
What kind of communication is more effective in your opinion?
2. Practical examples. Could you please share any recently happened practical examples of the difficulties in the process?
3. Where could something (difficulties) happen?  
Why would it happen?  
Who is going to do what about it, and is it effective?  
How could the task/operation/point be changed to avoid these problems in the future?
4. Where do delays and confusions usually exist?

5. Do you use any summarize email template or skype meeting with you colleagues from other departments to sum up the processes' parts?
6. How do you communicate about the painful lessons identified on the process with others?  
e.g. staff meetings, 1:1s

### **Part 3: Improvement stage of the process**

1. From your point of view, what can be improved in the process?
2. What are the weakest parts where you faced problematic issues recently?
3. What are the main qualities that makes process efficient?
4. What parts of the process do you seek to eliminate if it exists, and why?
5. In which parts you see potential risks of the further problematic issues?  
e.g. risk that a supplier could insert own invoices inside the box; risk of not having available properly packed spare parts by supplier in case of urgent drop-shipping delivery and etc.

In case of additional comments, an executive summary of the results can be provided.

Immediate notes and comments: