

Stickering of Food Products at IKEA – Improving a Process Through Learning from Others

Increasing process maturity to ensure future performance

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Abstract

Title: Stickers of Food Products at IKEA—Improving a Process Through Learning from Others; Increasing process maturity to ensure future performance

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Problem description: Stickers has been used at IKEA for a long time to create compliant food products on markets where volumes are too low. Low volumes make it economically challenging to create compliant artworks and to produce large enough batches to meet cost requirements. This results in that stickers is the most cost-effective solution in some niche cases. Previously, stickers has been performed at IKEA retailers, and the translation and validation of stickers has been handled by different actors in the supply chain. IFSAG, IKEA's food wholesaler, has set new requirements on stickers, saying that food products must be compliant when sold to retailers. This, along with the requirement that translation and validation should be run centrally at BA Food, means that that the volume of products which require stickers will increase. Today, capacity is strained at DC Helsingborg, meaning that to prepare for increasing flows in the coming years, the stickers process needs to be investigated.

Purpose: The purpose of the study is to *increase the knowledge of stickers of food items at IKEA's DC Helsingborg, as well as propose recommendations to improve the stickers process.*

Research questions:

RQI: How is stickers performed at DC Helsingborg today and what are the challenges?

SQ1: What does the stickers process look like?

SQ2: How is performance measured in the stickers process?

SQ3: What are the current challenges in performing stickers at IKEA?

RQII: What can be learnt from academia and industry cases?

RQIII: How can the stickers process performance at IKEA be improved?

Methodology: As little was known in previous research on stickers as an activity and the study intended to make way for future studies, the methodology of choice was an exploratory study. Case studies were utilized as this aligned well with the less structured data collection in the form of interviews as well as the goal of the study to be descriptive. A single case was formulated for IKEA to answer RQI and SQ1-3. A multiple case involving three sub-cases of Similar Players, 3PLs and Technical Solution Providers was designed to provide three different perspectives on the stickers process and answer RQII. Lastly a cross-case analysis of the single and multiple case was conducted to answer RQIII.

Conclusion: It was found that the stickers process at IKEA was immature on several process capabilities. Recommendations were formulated to address process maturity and elevate the process to ensure future performance such as deciding whether to keep stickers at DC Helsingborg, appointing a process owner with formalized responsibility and increasing understanding of process performance.

Key words: Stickers, labelling, packaging information requirements, food supply chain, process maturity

Sammanfattning

Titel: Etikettering av matprodukter hos IKEA – Förbättring av en process genom att lära från andra; Öka processmognad för att säkra framtida processprestation

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Problembeskrivning: Etikettering (Stickering) hos IKEA är en process som genomförts under lång tid för att skapa säljbara matprodukter på marknader där produktvolymerna är låga. Låga volymer gör att det är dyrt att skapa marknadsanpassade förpackningar, då det är ett dyrt att skapa förpackningar med marknadsspecifik information, samt att små partier blir dyra för producenten. Detta gör att etikettering är den mest kostnadseffektiva lösningen i vissa situationer. Tidigare så har etiketteringen genomförts på IKEA:s varuhus på de marknader där etikettering har varit nödvändigt, och ansvaret för att översättning och validering av produktinformationen har hanterats av olika aktörer i försörjningskedjan. IFSAG, IKEA:s matgrossist, har satt nya krav på etikettering, där de kräver att IKEA:s produkter måste vara kompletta och säljbara på marknaden där produkten skall säljas. Detta, i kombination med att översättning och validering av produktinformation skall hanteras central hos BA Food, betyder att volymerna av produkter som skall etiketteras kommer att öka. Idag är etiketteringskapaciteten pressad på DC Helsingborg, där en stor del av etiketteringen genomförs. För att förbereda företaget på kommande ökning av etikettering, måste etiketteringsprocessen undersökas.

Syfte: Att utöka kunskapen om etikettering av matartiklar i IKEA:s distributionscenter i Helsingborg och föreslå rekommendationer för att förbättra processen hos IKEA.

Forskningsfrågor:

FFI: Hur utförs etikettering på distributionscentret i Helsingborg och vad är utmaningarna?

SFF1: Hur ser etiketteringsprocessen ut?

SFF2: Hur mäts etiketteringsprocessens prestation?

SFF3: Vad är de nuvarande utmaningarna i att utföra etikettering hos IKEA?

FFII: Vilka lärdomar kan hämtas från teori och industri?

FFIII: Hur kan etiketteringsprocessen hos IKEA förbättras?

Metod: Då väldigt lite var känt om etikettering som process och att studien syftade till att förbereda för framtida studier, så valdes en explorativ förstudie som metod. Fallstudier valdes då metoden passade väl med att den primära datainsamlingen var i form av intervjuer och studiens mål att vara explorativ och beskrivande. En fallstudie genomfördes på IKEA för att besvara FFI och SFF1-3. En flerfallstudie, som inkluderade Liknande Spelare, 3PL och Tekniska Lösningssleverantörer, designades för att förse tre olika perspektiv på etikettering för att besvara FFII. Slutligen genomfördes en korsanalys av fallstudien och flerfallstudien för att besvara FFIII.

Slutsats: Efter resultatet av studien analyserats, visade det sig att etiketteringsprocessen hade en låg processmognad. Rekommendationer formulerades för att motverka detta, till exempel att bestämma ifall etikettering skall ske på DC Helsingborg eller ej, en processägare med formaliserat ansvar bör utses och förståelse för hur processen presterar bör öka.

Nyckelord: Etikettering, förpackningsinformationskrav, matlogistik, processmognad

Terminology

Generic assortment – When the assortment is described as generic in this thesis, the authors refer to that the range is the same across all IKEA retail stores, i.e., not with a negative connotation.

Language clustering – When product information for several markets are compounded onto one SKU, so that the same SKU can be sold on several markets

Product compliance – Where a products packaging is in line with essential legal requirements of the market on which it is sold, e.g., has the required content and format on the nutritional information.

Primary packaging – The packaging that is closest to the product.

Secondary packaging – Packaging that contains several primary packages.

Sticker – The physical sticker applied to a package.

Stickering – The activity to apply a sticker to a packaging. It can also be called labelling, relabeling etc.

Abbreviation

DC – distribution center

IKEA

BA Food – Business Area Food, develop the food concept at IKEA.

CA Food – Category Area Food, are the ones responsible for finding and contracting food product suppliers.

IFSAG – IKEA Food Supply AG, the food wholesaler of IKEA, that procures and owns the food supplied to IKEA Retailers.

IKEA – IKEA as a company compared to external sources such as other companies. If a specific part of IKEA is referred to, then the specific organization/department will be referred by name.

Inter IKEA – The organization that owns the IKEA Concept and are responsible for developing it.

SCO – Supply Chain Operations, responsible for produce supply chain services for the food at IKEA. The thesis is written for CA Food Logistics Services, a sub-division of SCO. The name SCO will be used to describe this unit.

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1 Introduction

This study is placed in the food products' supply chain at IKEA, focusing on the challenge of providing packaging to all products to be sold at various markets around the world, where the legal requirements are greatly different. To set the scope and present the situation, a background description of IKEA and IKEA Food is presented, followed by a specific problem description. Following, the purpose of the study as well as the specific focus and delimitations are presented, and finally an outline of the report's following sections.

1.1 Background

When a company is present on multiple markets, where legal requirements and languages differ, product packaging needs to display the correct information to meet the essential legal requirements on the specific market, i.e., the product needs to be compliant.

For a product to be compliant, it must fulfil all essential requirements regulated by policies that can be specified on a market, industry, or international level. Compliance is especially complex when it comes to food products, as a lot of information must be presented on the packaging (Food Standard Agency, 2020; European Commission, n.d.). The specific requirements on what information must be present, as well as how it is presented differs greatly between markets.

One way of dealing with compliance requirements in a multi-market setting is through *stickering* (also called labelling, re-labelling). Market specific information is printed on a sticker which is applied directly on the primary packaging, altering the information presented and ensuring compliance.

Stickering as an activity in the supply chain is, as of the time when this report is written, not very well covered in academia. Few academic sources exist where the phenomenon is researched and analyzed, leading to an opportunity to fill this research gap. This thesis will aim to describe and analyze stickering as a process through a single case study at Inter IKEA's DC Helsingborg, as well as a multiple case study where *Similar companies, third party logistics (3PL) partners and technical solution providers* will be studied.

1.2 The IKEA Concept and IKEA Food

IKEA is one of Sweden's most well-known brands and currently serves a global market of 60 markets around the world through 445 stores (Inter IKEA Group, 2020a). Founded in 1943 by Ingvar Kamprad, the company has become famous for its ready-to-assemble furniture with an affordable price, aimed to "*create a better everyday life for the many people*" (Inter IKEA Systems B.V., 2021).

The IKEA Concept is based on this idea of providing products of high quality to the many people. This is achieved by combining function, quality, value, design, and sustainability all throughout the company. (IKEA, 2021). The IKEA Concept is brought to the many people through a franchising system, where franchisees are responsible for continuously developing the IKEA Concept and to ensure its implementation on new and existing markets (Inter IKEA Systems B.V., 2021).

IKEA is famous for having a complex organizational structure. Figure 1.1 shows the three different areas of IKEA's organizational structure, Franchise, Range and Supply, as well as presents the main responsibilities of each area and selected sub-areas.

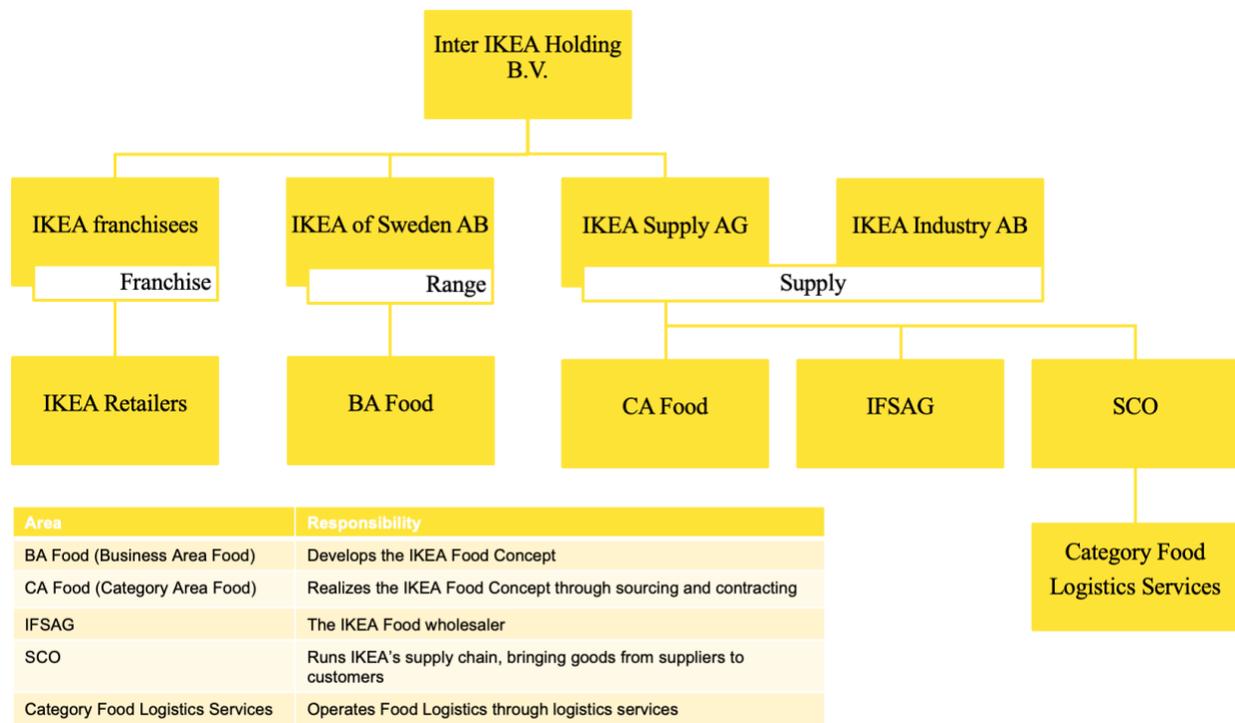


Figure 1.1: A simplified version of IKEA's organizational structure, with three different areas of Franchise, Range and Supply. Based on Inter IKEA Group (2020a).

Figure 1.2 presents how the different organizational entities presents the different organizational entities of Figure 1.1's responsibilities from when a new food product concept is developed up until it is delivered to the retailer.



Figure 1.2: Visualization of a Veggieball's journey from concept creation to customer.

"It's difficult to do business with someone on an empty stomach."

- Ingvar Kamprad (Inter IKEA Systems B.V., 2018)

In 1956, the IKEA brand added food to the mix and the first ever store restaurant opened in the original Älmhult store. Since then, the food concept has developed from only a restaurant to also include concepts like IKEA Bistro and Swedish Food Market where customers can purchase food to enjoy elsewhere. (Inter IKEA Systems B.V., 2018) Food is an important part of the IKEA Concept, and in addition to these globally established foods selling channels, new concepts are being developed, Simon Sturesson informs (personal communication, 3 February 2021). Sturesson presents Swedish Fika, an in-store café, as an

example of this. In 2019, 5% of the total 41.3 billion EUR retail sales came from food, i.e., about 2 billion EUR (Inter IKEA Group, 2019 p. 2).

Although introduced early, the food segment at IKEA has historically not received a lot of attention internally. Up until 2017 all operations regarding food were outsourced to Bring Group, a Swedish 3PL company based in Helsingborg. The administrative part of Bring responsible for IKEA’s food logistics was acquired by IKEA in 2017. In addition, a food wholesaler IFSAG that owns the products until handed over to the retailer was established (Inter IKEA Group, 2017 p. 9). IFSAG acts as a wholesaler, in that they purchase food from suppliers and sell and distribute to the retailers i.e., IKEA stores. This supply chain setup, with a separation in who owns, manages, and operates the goods through the chain, is presented in Figure 1.3.

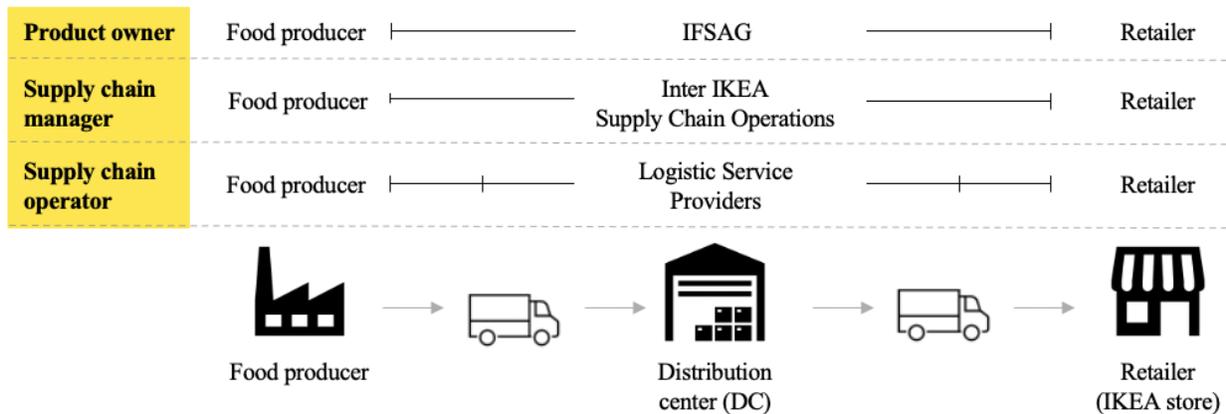


Figure 1.3: Visualization of product supply chain, originating at the food producer and passing one or several distribution centers on its way to the retailer, depending on where in the world the retailer is located.

As IKEA sells food to various global markets, there exists a need to create packaging that fulfills a large variation of requirements on e.g., information content and format on the packaging. For most markets, a specific packaging has been designed to fulfill the requirements. But as the distribution of volumes between these markets vary greatly, it is not viable to create specific packaging for the smaller markets. To make it possible for products to be sold on these markets, IKEA uses stickering. By applying market-specific stickers with the correct information onto packaging designed for another market, products can be sold on all markets. Today, stickering is done in multiple places geographically and in the supply chain, e.g., at IKEA’s main distribution centers in Helsingborg and Taiwan and by the retailers themselves out in the stores, shown in Figure 1.4.



Figure 1.4: Locations for stickering, where red marks are global DCs and blue marks are local retail warehouses, based on Inter IKEA Group (2020b).

In 2019, IKEA stickered about 22 million primary packages each year, at a cost of about 2.4 million EUR. A very high percentage of primary goods sold in Asia and Middle Eastern/African/Israel markets were stickered in 2019, 100% and 92-100%. As for European markets, the markets that use stickering do so in very varying degree, ranging from 100% of all primary packaging going to Turkey to 0.2% destined for Czech Republic. (Inter IKEA Group, 2020b p. 26).

1.3 The Stickering Process

Stickering (or labeling, re-labeling, overstickering etc.) is the process of applying a sticker with information on a package, which has other information already present on it. Stickering is used when a package has to be altered, so that it is compliant on the market on which it is supposed to be sold. For example, a package of meatballs with information in English on the artwork can have a sticker with Arabic information applied to it, making it compliant on such a market.

The stickering process at IKEA is described in detail in 6.1.4 Process Mapping, as an output of the study.

1.4 Problem Description

In this section, the background and conditions for IKEA's situation is explained, describing the setting in which the issue of product compliance on the many markets is formed. The problem is also formulated and described in detail. Data concerning the background and setting is derived from the pre-study written by Anna Wittrup for IKEA as well as input from Simon Sturesson and Per Mejborn.

Stickering at IKEA is performed on a regular basis today in a few different situations:

- i. **Huge variance of sales distribution over markets:** As markets have huge variance in their volumes sold, some smaller markets will always be excluded from language clusters. This means that batches would be too small to justify manufacturing of compliant products with the correct language on the packaging. When batches are small, stickering of products is a cost-effective solution.

- ii. **New market expansion:** When expanding to additional markets that are not easily included in language clusters, stickering will often be used as an initial solution for compliance.
- iii. **Low rotation products:** Low rotation will always be an issue, as some markets are too small to consume complete pallets of products before the best-before-date is reached. Stickering can then be used to quickly re-label information to make the products sellable on nearby markets to reduce waste.
- iv. **As a correctional measure:** If a mistake has been made with the original label, products need to be re-labelled or otherwise corrected.

Three main reasons have been found as to why IKEA finds themselves in the position that is currently solved by stickering:

- i. **Through their many franchisees,** IKEA has a wide global presence of retail stores.
- ii. **The IKEA Concept** builds on the generic experience of the assortment, resulting in that many products must be accessible on all markets.
- iii. **As the food is an important part of the IKEA Concept,** food must be available on all markets where IKEA retail stores are present.

In addition to this, there are three factors that will increase the need to perform stickering in the future:

- i. **IKEA has changed their policy on product compliance,** forcing them to deliver completely compliant products to the retailers. This removes the possibility to let retailer's sticker themselves and increases the amount of stickering handled by IKEA.
- ii. **IKEA will take over some product flows from the largest retail franchise-taker Ingka.** Currently, Ingka purchases some food from the same producers as IKEA. This will increase total flows by an approximated threefold, Simon Sturesson estimates.
- iii. **IKEA will expand to new markets:** As these new markets will often have too low volumes for a market-specific packaging to be developed, stickering will be used at least initially.

The problem at hand is that the current stickering process does not satisfy the demands of these three future factors. As product compliance responsibilities are moved completely in-house, more capacity is required. When product volumes increase with the inclusion of Ingka's products, capacity is once again strained, and lastly as IKEA expands to new markets the need to conduct stickering increases further.

The aim of this thesis is to investigate a current process that are in place to facilitate stickering within IKEA's supply chain and determine relevant challenges. In addition, learn how external parties solve similar situations and finally suggest how IKEA's current process can be improved based on these learnings.

1.5 Purpose and Research Questions of the Study

The purpose of the study is to *increase the knowledge of stickering of food items at IKEA's DC Helsingborg, as well as propose recommendations to improve the stickering process.*

The purpose is fulfilled by answering three research questions (RQs), and three sub questions (SQs):

RQ1: How is stickering performed at DC Helsingborg today and what are the challenges?

SQ1: What does the stickering process look like?

SQ2: How is performance measured in the stickering process?

SQ3: What are the current challenges in performing stickering at IKEA?

RQII: What can be learnt from academia and industry cases?

RQIII: How can the stickering process performance at IKEA be improved?

These research questions are connected as Figure 1.5 presents, with the first and second research question feeding into the third research question.

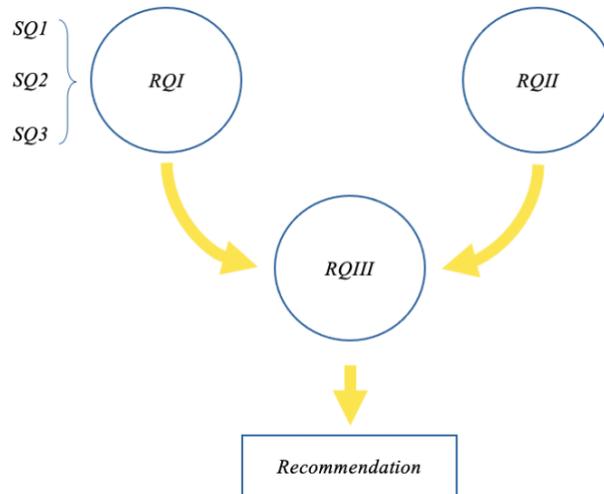


Figure 1.5: Research Outline: A graphical demonstration of the research questions and their sub questions.

1.6 Focus and Delimitations

To keep the scope of the study narrow, some limitations have been placed:

- i. The operational process of the stickering will be investigated
- ii. The geographical location of DC Helsingborg has been chosen
- iii. No implementation will be performed, only recommendations of changes will be investigated and proposed.
- iv. Only routine stickering is investigated in this study

By only including the operational process of the stickering process, the strategic part (why it occurs, who shall be responsible, how the cost should be allocated etc.) is left out of the scope. This due to the time restraint and the operational nature of the division that the thesis is written for, presented in section 1.7 *Target Groups*.

Time is the main restraint that motivates *ii*, *iii* & *iv*. As the time horizon is limited, only one geographical location can be studied at the depth required to perform a case study. The two main DCs that currently conduct stickering are the DCs in Helsingborg and Taiwan, where Helsingborg was chosen due to proximity advantages. As for the recommendations, it is likely that solutions found would have a longer implementation time than time allocated to conduct this study, meaning that no significant results can be gathered for the authors to analyze. Routine stickering is conducted on a regular, order-based, basis. Ad hoc stickering on the other hand, is conducted with short notice and when something has gone wrong. Ad hoc stickering is handled differently than routine stickering and is left out of the scope for this study.

1.7 Target Groups

The thesis is written at the request of Category Food Logistics Services, the operational IKEA entity that procures logistics services in the food supply chain. Three target groups have been defined for the thesis:

- i. For the Department of Industrial Management and Logistics at LTH, as well as any other people within the field that are interested in the findings of the report.
- ii. For stakeholders at IKEA.
- iii. For external parties within the industry, that seek to increase their knowledge within the subject.

1.8 Outline of the Report

Table 1.1 outlines the report, presenting the focus of the subsequent chapters. In addition, Figure 1.6 illustrates how the Investigation Model (presented in section 3.4 *Investigation Model*) connects to the thesis's different chapters.

Table 1.1: Outline of the report.

Chapter	Focus
1. Introduction	To set the scope and present the situation, a background description of IKEA is presented, followed by a specific problem description. Following, the purpose of the study as well as the specific focus and delimitations are presented, and finally an outline of the report's following sections.
2. Methodology	Initially, the study's research approach, with methodology and method, is decided to be an exploratory case study. More specifically, a single case and a multiple case is chosen, and the research design with case selection and case protocol creation is presented. Next, the study's data collection is described, and research quality perspectives are handled. Lastly, research ethics are included, and the section is then summarized in the Research Outline Figure.
3. Literature Review	After having the limited previous research on stickering specifically, the literature review's main part will originate from the three research questions and sub-questions of the study. Lastly the authors' original general framework is presented.
4. Empirical Data - Single Case	The chapter presents the empirical data collected within the single case, through the pre-study of stickering, interviews within IKEA and digital observation of DC Helsingborg. Lastly a table summarizing the result is presented.
5. Empirical Data - Multiple Case	The chapter presents the empirical data collected within the multiple case, in the sub-case order of Similar Players, 3PL and lastly Technical Solution Providers. Lastly a table summarizing the result is presented.
6. Analysis	In this chapter the Investigation Model will be applied to facilitate the analysis, and the outputs from each step presented. Firstly, the single case and multiple case will be analyzed separately, followed by a cross-case analysis and lastly a process improvement analysis.
7. Recommendation	Here final recommendation towards IKEA is presented with an action plan and how these recommendations increase the process maturity. Lastly a risk analysis is presented and finally suggested future areas of study.

8. Discussion	This finishing chapter presents the conclusions of the thesis and answers its research and sub-questions as well as a discussion on purpose fulfillment. Next, the method of the thesis is reflected upon, followed by the validity of the results, the thesis's contributions to academia and lastly areas of further research.
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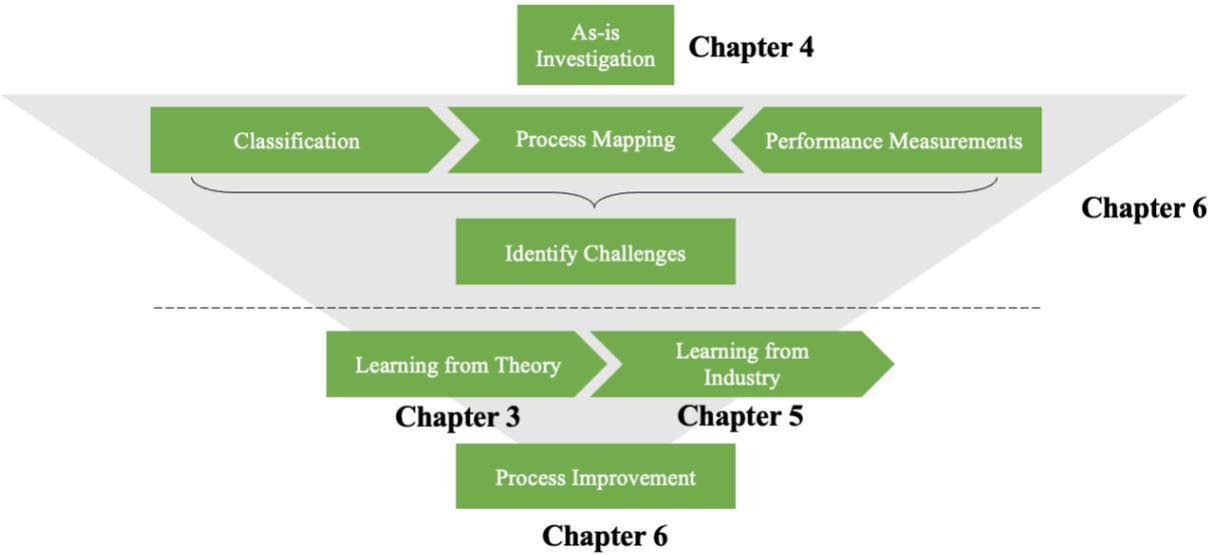


Figure 1.6: The Investigation model with chapters, showing when each part is handled in the thesis.

2 Methodology

Initially, the study's research approach, with methodology and method, is decided to be an exploratory case study. More specifically, a single case and a multiple case is chosen, and the research design with case selection and case protocol creation is presented. Next, the study's data collection is described, and research quality perspectives are handled. Lastly, research ethics are included, and the section is then summarized in the Research Outline Figure.

Section 1.5 *Purpose and Research Questions of the Study* above presents the three research questions and sub-questions of the study, visualized in Figure 1.5. This methodology section aims to describe the method used to answer these questions. This will be done in five steps:

- i. **Research approach** determines the overall approach on how the study will fulfill its purpose and identifies what type of research method will be used.
- ii. **Research design** further details how the chosen method will be carried out explicitly.
- iii. **Data collection** presents what type of data will be included in the method, how it is collected and analyzed.
- iv. **Quality of a case study** describes important aspects to consider ensuring a good quality of the case study.
- v. **Research ethics** identifies key aspects of research ethic and outlines how the authors intend to deal with these.

2.1 Research Approach

To capture all aspects of the problem in a structured way, an exploratory single and multiple case study will be performed. The phenomenon that is to be investigated is stickering as a concept at IKEA and in the industry, while the unit of analysis is the stickering process at IKEA's DC in Helsingborg. The idea is to describe and explore the phenomenon through the unit of analysis, in a way that enlightens the reader on the subject and creates conclusions generalizable beyond the immediate study.

2.1.1 Research Methodology

Firstly, the overall approach of how the purpose will be fulfilled needs to be decided upon. There are four main methodologies to choose from, compiled from Yin (2014, p. 238) and Höst *et al.* (2006, p. 29):

Descriptive studies are used when the phenomenon is described in its real-world setting, to show how something is performed or functions.

Exploratory studies are used to deep dive into an unknown subject, to understand how a phenomenon works and/or is performed. Exploratory case studies can be used to find and define research questions for future studies.

Problem solving studies are performed to find one or multiple solutions to a problem that is identified as the unit of analysis.

Explanatory studies seek to explain how or why something came to be, where the causality between events or processes and results is in focus.

Circling back to the purpose of the study, “*Increase the knowledge of stickering of food items at IKEA’s DC Helsingborg, as well as propose recommendations to improve the stickering process*”. To fulfil this purpose, an *exploratory* approach was found to be the most fitting methodology for this thesis. This as:

- i The exploratory methodology is well suited for subjects where not much is known before the study begins.
- ii Other projects will follow this thesis, and an exploratory approach is well suited for making way for futures studies or projects.

It is worth to remark, that the purpose is not only to prepare the way for future research, but to come to conclusions that stand on their own within the borders of delimitations chosen. As the exploratory methodology is chosen and defined, the choice of method can be further explained and cemented.

2.1.2 Research Method

A case study as the research method of choice is argued for based on three arguments:

- i. Ellram’s (1996) and Fisher’s (1997) emphasis on what type of method the study’s purpose aligns well with.
- ii. Yin’s (2014) identification of types of research questions appropriate for a case study.
- iii. Fisher’s (1997) theory on research goal and interaction type.

Firstly, Ellram (1996, p. 115) identifies case studies as a great choice of method when conducting research intended to build theory and describe best practices within a field. As previously presented, this aligns well with the purpose of this study, [...] *to increase the knowledge of stickering of food items* [...]. Fisher (2007, p. 379) comes to the same conclusion as he presents case studies as a recommended starting point when conducting research to increase understanding of the topic, to improve future research questions.

Secondly, Yin (2014, p. 9) identifies types of research questions appropriate for case studies to be questions asking *how* and *why*. Two out of three research questions presented in section *1.5 Purpose and Research Questions of the Study* are of the first character, suggesting that a case study is a good method to answer them.

Thirdly, the choice of case study as the study’s method is lastly validated through Fisher’s (1997, p. 370) matrix on empirical research based on level of structure and formality in data collection and the study’s goal, presented in Figure 2.1. As a result of being an exploratory study, the goal is to be descriptive rather than prescriptive. This, in combination with a lower degree of structure in interactions during data collection, places this study in the bottom right corner of Fisher’s matrix as an appropriate choice for a case study. Further details on the data collection are presented in section *2.4 Data collection*.

		Goals of the research	
		Prescriptive	Descriptive
Interaction with the world	Highly structured: Data and algorithms	Engineering Software implementation of algorithm deployed in a company and run daily	Operations management econometrics Statistical analysis of large data sets to discover drivers of success in operations
	Less structured: Interviews and observations	Principles Ohno Invents Toyota Production System, inspired by the principles of U.S. supermarkets	Case studies Interviews and observe managers Research cases

Figure 2.1: Empirical research in Operations Management matrix, based on (Fisher, 2007 p. 370).

2.1.3 A Single and a Multiple Case

Having argued for using a case study method for this study, the next step is to conclude what type of case study is to be used. Within case studies two alternative approaches are possible, single, or multiple case studies (Yin, 2014 p. 50).

To answer the research questions, two case studies will be conducted. A single case study of IKEA individually, to answer RQI (How is stickering performed at DC Helsingborg today and what are the challenges?) and RQIII (How can the stickering process at IKEA be improved?). As for RQII (What can be learnt from academia and industry cases?), a multiple case study was chosen to include three types of sub-cases, each covering a different aspect. Both cases, as well as the multiple case's sub-cases are presented in Table 2.1.

Table 2.1: The single and multiple case of the study, with the multiple case's three sub-cases and their description.

Case	Sub-cases	Description	Reason for including
Single case		IKEA's current sticking process at DC Helsingborg.	
Multiple case	Similar Players	Companies that, through being a consumer food company, might have to make their products compliant on multiple markets.	To investigate how other companies in a similar position tackle the challenge of varying market requirements.
	Third party logistics (3PL)	Companies that serve as logistics partners to other companies, handling their logistics operations.	To understand how 3PL work with stickering activities.
	Technical Solution Providers	Companies that can act as experts within technical solutions for stickering.	To investigate the possibilities and restrictions of current stickering technology.

2.1.4 Unit of Analysis

The unit of analysis in the single case is *IKEA's operational stickering process at DC Helsingborg*, starting with the customer order reaching IKEA to that of the goods being packed into a container to leave DC Helsingborg. As for the multiple case, the unit of analysis is the individual companies' stickering process in *Similar Players* and *3PL*. In *Technical Solution Providers* the unit of analysis is automated solutions for stickering.

2.2 Research Design

Having settled on the method of choice, the next step was to establish a research design. This was done using the Yin (2014, p. 60) Multiple-Case study Procedure. The research design is described in Figure 2.2.

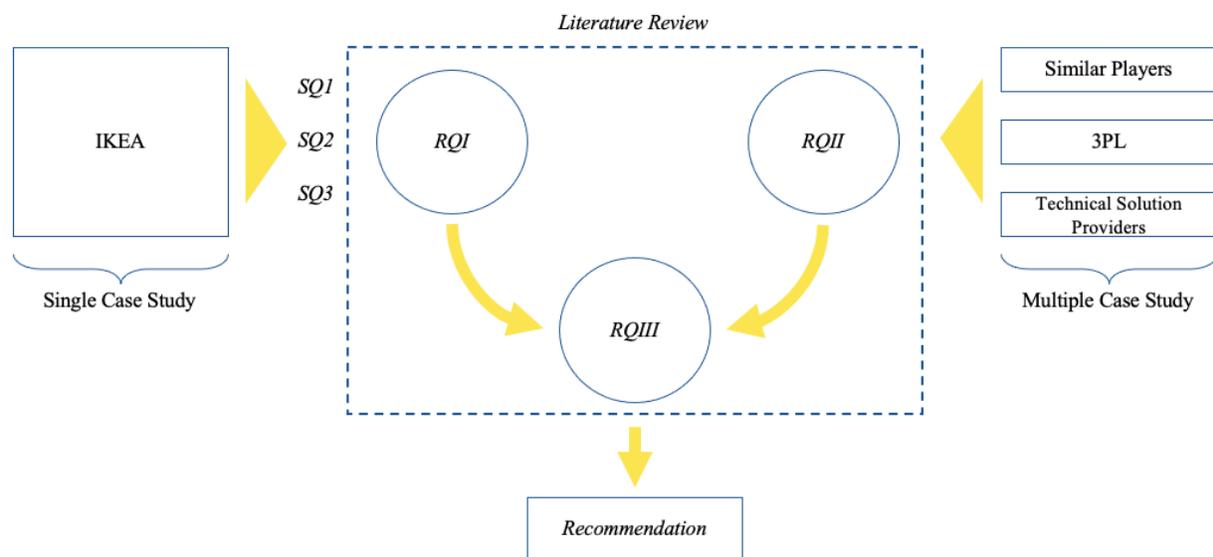


Figure 2.2: Research design, describing how the study's RQI was answered by a single case, RQII answered by a multiple case study and how these two feeds into answering RQIII.

After having settled on a research design, two main activities followed (Yin, 2014 p. 60):

- i. Selecting cases to include
- ii. Designing data collection protocol

As presented in Table 2.1, the single case of the study was focused on IKEA, while the multiple case had three sub-cases. Table 2.2 outlines chosen cases within each sub-case group of the multiple case. As for the multiple case, a total of nine companies were approached in the Similar Players sub-case, four 3PL and three Technical Solution Providers.

Table 2.2: The included companies within the three sub-case groups of the multiple case. Food Retailer has been anonymized on their request.

Sub-case	Company	Description
Similar Companies	Lantmännen Cerealia	Lantmännen Cerealia, as a part of the food sector at Lantmännen, develops, produces, and sells food products made from grains.
	Food Retailer	Food Retailer is the largest food retailer in Europe.
	Orkla	Orkla is a branded consumer goods company that sells many brands, active mostly in the Nordics and Baltic area.
	Gray's American Stores	Food company importing American food articles to European markets.
3PL	PostNord TPL	PostNord TPL is a third-party logistician with a focus on warehousing, which is their main offer which is included in all customer deal.
Technical Solution Providers	Ettiketto	Ettiketto is a company supplying both stickers and stickering system solutions.

A data collection protocol was designed in accordance with Yin (2014, p. 84-95) and is presented in *Appendix A – Data Collection Protocol*. It includes overview of both case studies, data collection procedures, data collection questions and lastly a guide for the case study reports. A single protocol was designed, with differences between the single and multiple cases clearly highlighted.

To validate the results and anchor the recommendations at IKEA, a workshop with a few selected employees was held three weeks before the final presentation. The purpose of the workshop was to get IKEA employees' point of view on identified challenges, brainstorm solutions for the challenges as well as identify first steps in adopting solutions. The slides used for the workshop are presented in Appendix D – Workshop slides from Tuesday May 12th 2021.

2.3 Literature Review Approach

When searching for literature, a structured search for specific keywords was performed. Google Scholar, Web of Science and LUBSearch were used to find the papers. Search words such as "*Stickering, Food, Supply chain*", "*Labelling, Food, Sticker*", "*Labelling, Food, Supply chain*", "*labelling, food, labelling postponement*" and "*labelling, compliance, food*" were used to find articles. The articles were first reviewed according to their titles. Ones that were promising were screened further, and abstracts were read. Those that were believed to contain research related to the subject had their introductions and conclusions read to confirm their relevance.

In the end, only nine articles were found to be relevant to the subject of stickering, indicating that there is very limited research performed on specifically stickering. This is further reinforced through an interview with Henrik Pålsson, a leading researcher within the packaging field. Pålsson confirmed that there are few researchers actively researching the subject. Though, stickering can be described in other ways, e.g., as labelling postponement. The result of the review of the relevant literature is presented below, after a general introduction of food labelling.

2.4 Data collection

A vast majority of the data collected and analyzed within the study is qualitative, in the shape of interviews. The limited quantitative data that was used were in the shape of archival data from IKEA within the single case. Following, are details on the interviews regarding how they were held and with whom, the limited observations done, the archival analysis and lastly a description of how the qualitative data is to be analyzed.

2.4.1 Interviews

In the study, most data is gathered through expert interviews with different parties, with diverse backgrounds and views. To bolster the reliability of the study, a case protocol from Yin (2014) will be used. The case protocol will contain specific questions to be answered by all parties interviewed, adapted to fit their specific position. With the help of the case protocol, unstructured and semi-structured interviews will be held and summarized into an interview report.

Due to the Covid-19 pandemic, most or all interviews will be held digitally, affecting how nuances and tones can be interpreted, leading to that the authors must be extra careful in creating a welcoming and secure environment for the interviewees.

Figure 2.3 presents the interviewees in the single case, from IKEA and Bring, as well as the interviewees of the multiple case's three sub-cases. Appendix Table 1 in *Appendix B - Interviewees* presents further details on interviewees, regarding role, type, date, and length of interview.

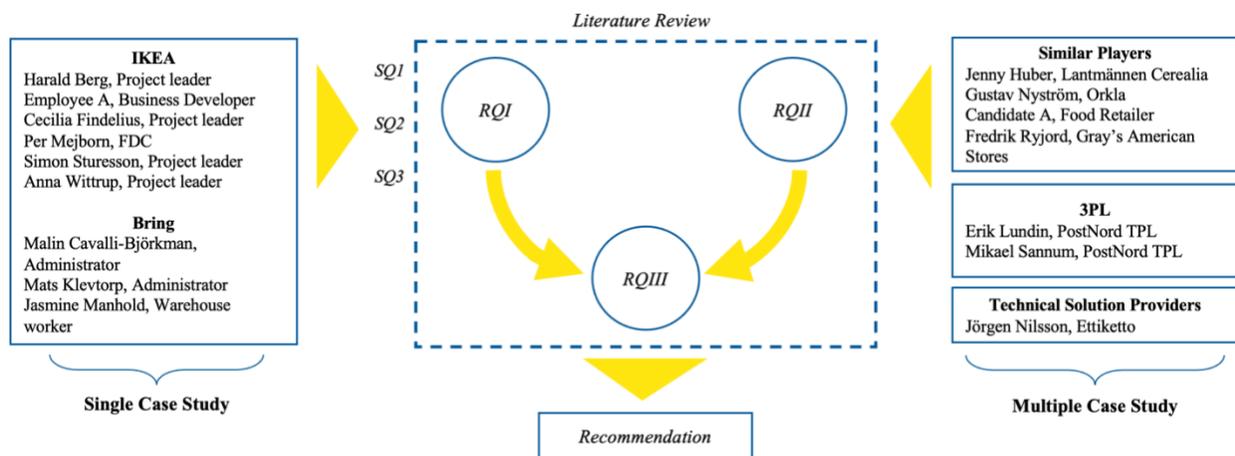


Figure 2.3: The interviewees in the single case and multiple case's sub-cases. FDC: Food Demand Coordinator.

In addition to the interviewees presented in Figure 2.3, additional contributors are Henrik Pålsson at Packaging Logistics at LTH and Anna Karlsson at Inter IKEA. They served as supporting sources rather than main contributors.

2.4.2 Observations

Observations that would be performed will be affected by the pandemic as well. Through collaboration with enthusiastic partners, it is possible to perform digital observations through videos and follow-up interviews with involved parties.

2.4.3 Archival Analysis

To understand the problem and the as-is situation, archival analysis is performed in collaboration with the company, for which the thesis is written. Qualitative data in the form of a pre-study and processes descriptions will be used.

2.4.4 Analyzing Qualitative Data

Nowell *et al.* (2017, p. 1) states that to create meaningful results in qualitative research, the methods used need to be methodical and rigorous. In addition, they highlight the risen attention to the description of how these methods are used in qualitative studies. I.e., to keep a high trustworthiness of a qualitative study, the need to explain how the qualitative data has been analyzed is emphasized (Nowell *et al.*, 2017 p. 2). The authors intend to meet this highlighted area of improvement and thereby increase the trustworthiness of the study. Following is therefore a description of how the qualitative data is to be analyzed by protocol analysis, presented by Höst *et al.* (2006, p. 115). They argue that this type of method is especially suitable for studies including observations, which aligns with this study.

Protocol analysis is conducted by creating a coding scheme (i.e., a protocol), against which collected data is mapped into. Explicitly, this means that interview data is placed within a protocol with pre-decided themes (Höst *et al.*, 2006 p. 115). The protocols used in the different cases (and sub-cases) are presented in *Appendix A – Data Collection Protocol*.

2.5 Quality of a Case Study

An important, if not the most important, part of conducting research is to ensure validity and reliability. To judge the quality of a case study, four logical tests can be performed, as described by Yin (2014, p. 45-49):

- i. Construct validity
- ii. Internal validity
- iii. External validity
- iv. Reliability

Construct validity one of the most challenging tests in quality control for case studies. This is due to the tendency to collect data in line with preconceived notions. To reach robust construct validity it is important that two steps are followed:

- i. The phenomenon is to be defined by using specific concepts, relating them back to the purpose of the study.
- ii. Identify operational measures that match the concepts, such as using frameworks from previously published studies within the area.

An example of a challenge with construct validity was the fact that the protocol used in the protocol analysis was constructed beforehand. This could result in bias results, as some insightful data might be

excluded if it does not fit into the original protocol. To hedge against this risk, the protocol was piloted in nonessential initial interviews and redesigned to better fit the purpose of the study.

Internal validity is used to verify descriptive and explanatory case studies, and not used as a test for exploratory ones. Therefore, this quality test will not be carried out.

External validity is a test to make sure that the results are generalizable beyond the specific context of the study. Constructing research questions in a way that facilitate analytical generalization to begin with can aid in arriving at high external validity.

Reliability of the study refers to the replicability of the study. A clear structure should be present in every aspect of the case study to guarantee that future researchers can apply the same methodology and arrive at comparable results. Documentation is a key enabler for this, and the Case Study Protocol is a powerful tool to ensure reliability of the case study. Developing a case study database is another way to deal with the documentation issue.

2.6 Research Ethics

When working with the thesis, two aspects of research ethics are to be considered by the authors; avoiding bias and protecting the integrity of the parties involved.

Yin (2014, p. 76-77) points out that researchers conducting case studies must work actively with avoiding bias, as they must fully understand the issues regarding the subject before starting the case study, making researchers more prone to be biased. To stay alert and avoid bias all throughout the study, measures such as continuous external critical review in all stages of the project can be employed. This is applied through continuous meetings with the supervisors both at the institution and company, where they get to review and critique the results found.

The second part, protecting the integrity of parties involved, is secured according to Yin (2014, p. 78) in three ways:

- i. Gaining **informed consent** from the participating parties, that they want to be included in the research.
- ii. Protecting the **privacy and confidentiality** of the participating parties, in line with the desired levels of discretion voiced by the participants.
- iii. Avoiding any and all **deception and subterfuge** from the authors, especially when collecting data.

Both parts will be considered and evaluated continuously throughout the study.

2.7 Summary

Table 2.3 summarizes the research approach, data collection and analysis method chosen for the study, as well as the main arguments of this. In addition, Figure 2.4 visualizes the research design and how the single and multiple case intends to answer the research questions and sub-questions.

Table 2.3: Summary of research approach, method, data collection and analysis method of the study, presented and argued for in this section.

Aspects		Motivation
Research approach	Exploratory	Appropriate for studies with the purpose of understanding how something works. In addition, the exploratory approach is well aligned with the limited theoretical coverage of the area, as it serves as a good tool for defining research questions for future studies.
Research method	Case study	Motivated by the method's alignment with the study's purpose, how the research questions are phrased and lastly the goal of being descriptive and having a less structured interaction with the world.
Data collection	Interviews, observations, and archival analysis	To understand and describe the issue, the three data collection methods will form a complete picture of the subject, setting up for the analysis.
Analysis method	Protocol analysis	A good method for studies including observations and is conducted by creating a coding scheme (i.e., a protocol) against which collected data is mapped into.

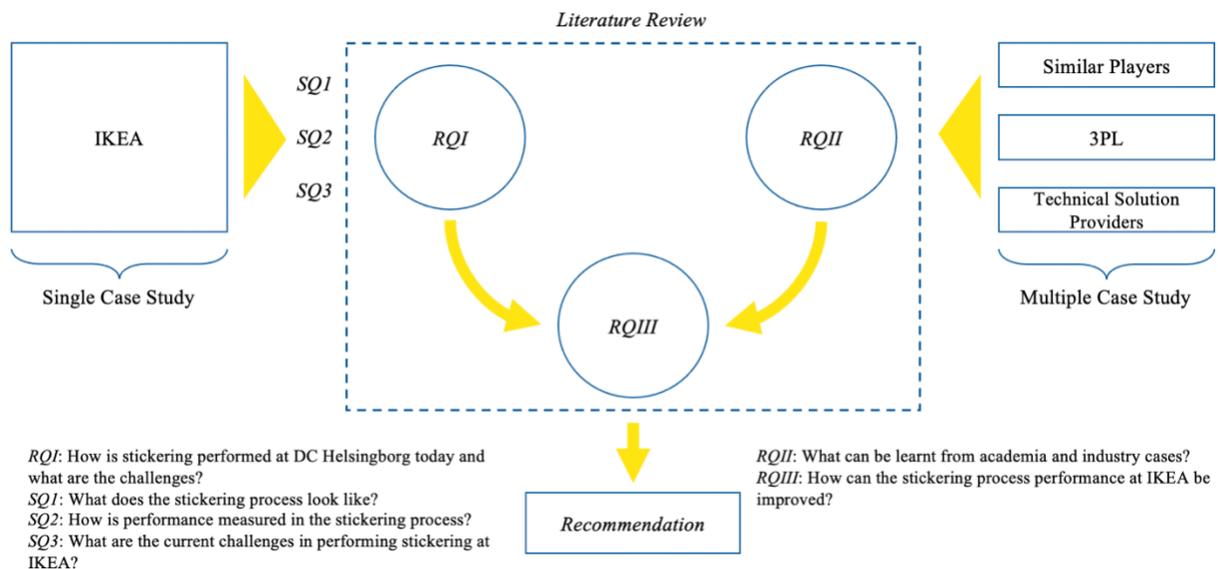


Figure 2.4: Research design, displaying how the single and multiple case intends to aid answer research questions and sub-questions.

3 Literature Review

After presenting previous research on stickering, the literature review's main part will originate from the three research questions and sub-questions of the study. Lastly the authors' original investigation framework is presented.

3.1 Food labelling in Theory

Labels on food products are used to inform the customer, in a quick and accessible way about nutrition, allergens and other aspects considering the nature and composition of the product. Labelling can also aid to selling the products, in a marketing sense. Labels contribute to customers' possibilities of making an "informed choice" when it comes to health, diets, or other aspects regarding food stuffs. (Cheftel, 2005)

Labels can also provide other types of information, such as carbon-footprints, the presence of genetically modified (GM) ingredients, airfreight miles and many more (Brenton *et al* (2009); Zaino (2008); Oh & Ezezika (2014)). The sheer number of possibilities regarding information required on the product on different markets leads to the need of several types of packaging for the same products. To avoid the design and manufacturing of an excessive number of packaging, generic packaging solutions can be produced and modified later to fit the intended market's requirements.

One way of conducting this packaging adaption is through stickering, by applying a sticker to a packaging and thereby alter the information on it. This is an example of a postponement strategy in supply chain, more specifically a labelling postponement strategy (Zinn & Bowersox, 1988 p. 119).

3.2 Stickering in Theory

Stickering as an activity has not been covered well in current supply chain or operations literature, when defined as the operational act of putting a sticker or label on a product. In a logistic perspective, the closest related area that has been identified is labelling postponement, which is covered in the sections below.

Initially, the literature review approach is presented to describe how the literature review was conducted. Secondly, postponement in the supply chain is presented and lastly some alternatives to stickering to alter product information.

3.2.1 Postponement in the Supply Chain

The concept of postponement in manufacturing has been researched since the middle of the 1900's and is today well-known and established and can be applied to all parts of the supply chain (Prataviera *et al*, 2020, p. 94). Postponement is based on the idea that decisions in the supply chain, e.g., in logistics or manufacturing, are postponed until more information is available or when customer needs are diverse. This to enable the early stages of the supply chain to become more efficient, e.g., through lowered needs for safety stocks and improved distribution efficiency through bulk transportation (Pålsson, 2018 p. 23-24).

Postponement in manufacturing is a combination of three characteristics: *form, time, and place*
postponement: Form postponement refers to the postponement of final manufacturing steps, time postponement refers to the delay of forward movement of goods until a customer order has been placed and place postponement refers to the act of placing inventories upstream in the supply chain to delay forward movement downstream in the supply chain (van Hoek, 1997 p. 63).

One can also describe postponement in relation to different activities instead of characteristics as above. Zinn & Bowersox (1988, p. 119) describe four types of activity postponement in the supply chain:

- i. Labelling Postponement
- ii. Packaging Postponement
- iii. Assembly Postponement
- iv. Manufacturing Postponement

Labelling postponement refers to delaying labelling in the supply chain, combining form, place, and time postponement. How appropriate it is to use postponement is related to the product, market, manufacturing, or logistics factors (Twede, 2000, p. 109).

Prataviera *et al.* (2020, p. 94) describes how the concept of postponement has been given much previous academic attention, with most focus on a time-perspective of when operations are done. They present their own contribution to the subject, by adding a spatial aspect to the long-studied temporal one (Prataviera *et al.*, 2020 p. 98-101). This results in a matrix of “what” activity is performed and “where” the activity takes place geographically, presented in Figure 3.1.

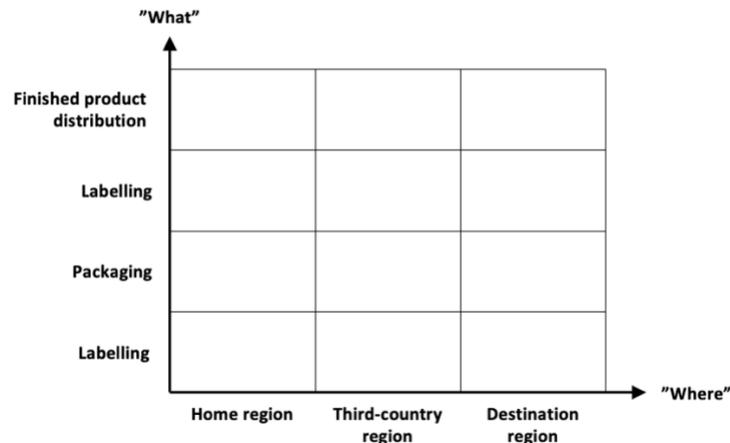


Figure 3.1: Conceptual framework for postponement strategies in global downstream supply chains, based on Prataviera *et al.* (2020, p. 101).

Three options are presented on the x axis (Prataviera *et al.*, 2020 p. 99-100):

- i. **Home region** – The location of the main production
- ii. **Third- country region** – A third location separated from the home region and the customer’s location, e.g., a warehouse destined to serve more than one customer region
- iii. **Destination region** – The customer’s location, where the final delivery is performed

As for the y axis, Prataviera *et al.* (2020, p. 100) presets activities carried out in the downstream supply chain.

3.2.2 Alternatives to Stickers

Stickers is one way of altering a packaging’s information. Disregarding the reason why a packaging needs to be altered, the action of altering packaging can be studied in a broader scope. Stothers (2007) presents different types of repackaging activities, specifically relating to intellectual property rights in the

European Union. The authors argue that these activities can be translated beyond Stothers' specific context, as the actions are disconnected from the reasoning being the need of packaging alteration.

Stothers (2007) group the different ways of repackaging a product into four categories (p. 74-75), where Figure 3.2 presents the ten activities within these categories.

- i. **Debranding** - removing a brand for the packaging
- ii. **Cobranding** - adding a brand to the packaging
- iii. **Relabelling** - replacing existing labels on the packaging
- iv. **Overstickering** - adding additional stickers on the packaging
 - 1. Replace outer packaging with a box similar to that used by the manufacturer in the importing Member State
 - 2. Replace outer packaging with a plain box where the inner packaging's trade mark is visible
 - 3. Replace outer packaging with a plain box which does not use the trade mark
 - 4. Replacing outer packaging with a box that incorporates the importer's own branding
 - 5. Increasing or decreasing the pack size
 - 6. Replacing existing labels
 - 7. Sticking a label on the existing packaging, leaving existing information visible
 - 8. Sticking a label on the existing packaging, covering existing information
 - 9. Changing, adding or removing instruction leaflets
 - 10. Changing, adding or removing accompanying products

Figure 3.2: Stothers' (2007, p. 74-75) ten ways of repackaging products, based on Follin (2011, p. 16).

3.2.3 Research Gap in Existing Research

It was found that current literature covers the phenomenon of stickering only up until the point of describing that it exists as a postponement strategy and theoretical alternatives to repackaging. A research gap on the stickering activity operationally has thereby been identified. Current research lacks insights on how a stickering process can be conducted, by whom and in what situation.

3.3 Literature Review to Sharpen Research Questions

The following three research questions (RQ) and three sub-questions (SQ) have been formulated and presented in section 1.5 *Purpose and Research Questions of the Study*. Figure 3.3 outlines the areas in need of research to deepen the understanding of and question formulation for each research question. This

outlines the following literature review.

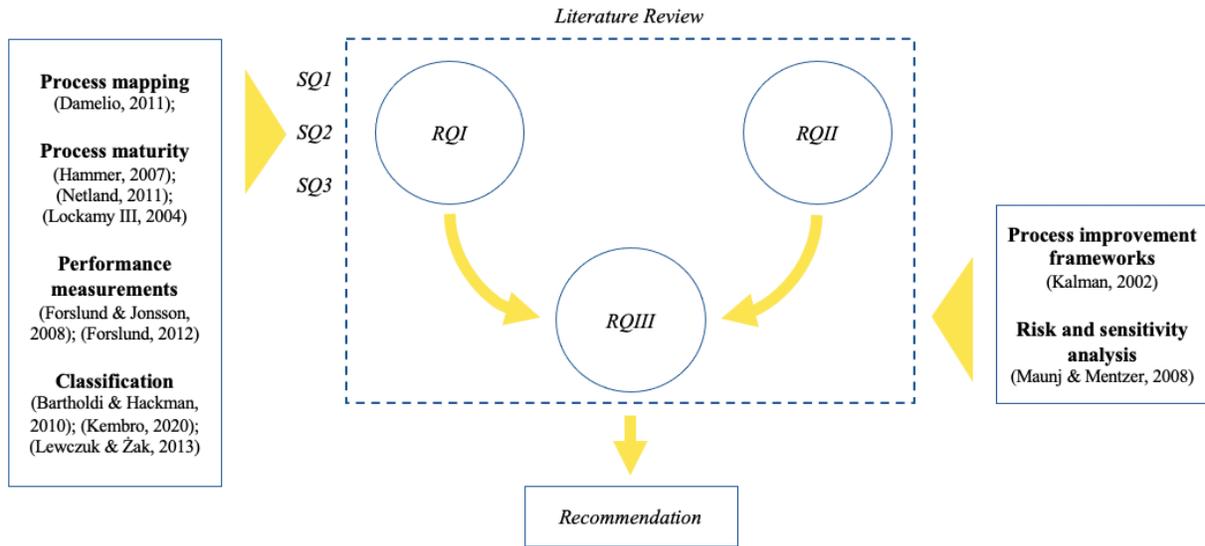


Figure 3.3: Research areas in need of investigation to enable answering of research questions, with main sources. Some areas are relevant for more than one research question, but only presented for the most relevant research questions.

3.3.1 Process Mapping

Damelio's (2011, p. 4-8) presentation of three different types of process maps are well in line with the context and focus of the three research questions. The types, the high-level relationship maps, the entity focusing cross-functional process maps and the detailed flowcharts, their different features and how they align well with the research questions is presented in Table 3.1.

Table 3.1: Type of process maps based on Damelio (2011), its features and how it type relates to the three research questions.

Type of process map	Features
Relationship maps	<p>Focuses on an organizational level; where parts of the studied company, its internal or external supplier(s) and customer(s) are included (p. 4, 39).</p> <p>Displays the resource inputs and outputs of an organization, how the included organizational parts contribute to the overall output as well as how work is passed through the organization during value creation (pp. 38-41).</p> <p>Answers questions such as (p. 67-68):</p> <ul style="list-style-type: none"> ● Who are the customers for this business unit, and what outputs are received from it? ● Who are the suppliers for this business unit, and what inputs are received to it? ● How does the business unit contribute to the rest of the organization, is it a subset or part of the main business of the organization? ● What are the critical interfaces between the business unit and the rest of the organization?
Cross-functional process maps (CFPM)/swimlane diagrams	<p>Focus is on the inside of an organization, displaying how the workflow of interrelated activities and resources and where in the organization it takes place, with an emphasis on the workflow boundaries (p. 6).</p> <p>Displays the work that is conducted in the studied part of an organization (p. 73), with boundaries, customer touch points and organizational handoffs and illustrates patterns in the workflow (p. 75).</p> <p>Answers questions such as (p. 88):</p> <ul style="list-style-type: none"> ● What are the workflow boundaries, i.e., where does it start and end? ● How is the workflow triggered? ● What activities carried out, in what order, by whom and with what inputs and outputs? ● What interfaces exist between the different entities?
Flowcharts	<p>Focuses on the actual activities performed to achieve a single specific output (p. 8).</p> <p>Displays on the most detailed level, how activities are conducted, defining value-creating and non-value-creating activities and identifies different types of waste (p. 95).</p> <p>Answers questions such as (p. 103):</p> <ul style="list-style-type: none"> ● What are the boundaries of the activity? ● What type of work is conducted, value or non-value-creating? ● Is there any waste created, and of what kind?

The authors refer to Kalman (2002) for extensive guides on map creation.

3.3.2 Process Maturity

For businesses to perform better over time, processes need to mature. Process maturity enables processes within a company to deliver higher performance over time (Hammer, 2007). To develop a coherent operations strategy that include customers and suppliers, companies need to assess the maturity of their supply chain processes. Through assessing process maturity and fully understanding the state of its processes, the company set the field to pursue, find and implement best-practice solutions which suit them best (Netland, 2011). As process maturity increases, the company can move from an internally focused perspective, to an externally focused one. This allows the company to assess and plan the process with a system view, decreasing the risk of sub-optimization. (Lockamy III, 2004).

There are many different models that can be used to assess process maturity. They often build on process capabilities and are used to score a process' maturity. Three of which are presented in Netland (2011), Lockamy III (2004) and in Hammer (2007). For this study, the Hammer model, Process Enterprise Maturity Model (PEMM) was chosen to structure the authors' findings due to its focus on the process in a several perspectives. In addition, PEMM includes overall enterprise capabilities that can be further researched.

To evaluate the maturity of a process, as well as the receptiveness of the organization of process change, Hammer (2007, p. 4) suggests that companies should study two different characteristics, process capabilities and enterprise capabilities, in the Process and Enterprise Maturity Model. Process capabilities are connected to the specific process in question, and they give a process the potential to deliver high performance in the short term. Enterprise capabilities on the other hand have a long-term perspective, with the aim to create a supportive environment where high-performing processes can thrive long term. Hammer (2007, p. 10) highlights that enterprise capabilities are often taken for granted.

Five process capabilities:

- i. **Design**, the process needs to have a clear design for people involved to know what to do and when.
 - a. Purpose, which relates to the purpose of the process in relation to performance, customers and suppliers.
 - b. Context, the process's inputs, outputs and relevant suppliers and customers.
 - c. Documentation of the process.
- ii. **Performers**, the people that execute the process must have the correct and sufficient skills and knowledge.
 - a. Knowledge, the performers' ability to e.g., describe overall flow and metrics used.
 - b. Skills, in terms of non-process specific skills such as teamwork and problem-solving.
 - c. Behavior, relating to how performers follow process design and work in ways that enable other performers to succeed too.
- iii. **Owner**, there needs to exist a senior executive that has responsibility and authority to ensure that the process is executed in the best possible way.
 - a. Identity, in terms of who the process owner is.
 - b. Activities, as in what the owner does in the role.

- c. Authority, in relation to what power the owner has to influence decisions regarding the process.
- iv. **Infrastructure**, internal infrastructure (IT, HR systems) must be aligned to not impede process performance.
 - a. Information Systems
 - b. Human Resource Systems
- v. **Metrics**, the correct metrics must be developed to ensure that the process delivers the correct results and is evaluated in the right way.
 - a. Definition, focusing on what metrics are defined and how.
 - b. Uses, relating to how these metrics are then used and reviewed.

Four enterprise capabilities:

- v. **Leadership**, senior executives are needed, that support the creation of processes.
- vi. **Culture**, values such as customer focus, teamwork, and willingness to change.
- vii. **Expertise**, that the skills and methodology required for process redesign are available.
- viii. **Governance**, mechanisms for managing complex projects and change projects must be available.

Hammer proposes the usage of a five-level scale when evaluating a process or an enterprise, ranging from a low maturity on level 0 to high maturity on level 4. He suggests grading the process or enterprise based on each level as “largely true” (at least 80% correct), “somewhat true” (between 20% and 80%) and lastly largely untrue (less than 20% correct). Hammer (2007, p. 6) provides an overview of a process’s different levels:

Level 0 - a process that works erratically

Level 1 - a process is stable, i.e., reliable, and predictable

Level 2 - a process that relieves superior results by being end-to-end within the organization

Level 3 - a process that delivers optimal performance through integration with other internal processes

Level 4 - a “best in class” process crossing organizational boundaries both up-stream and down-stream in the supply chain

The authors refer to Hammer (2007) for extensive description of criteria for specific levels.

Note how the unit of analysis of this thesis is the operational stickering process, meaning that only the proceeds capabilities will be treated. Authors therefore suggest further research to focus on enterprise capabilities at IKEA.

3.3.3 Performance Measurements

Performance management is described as a five-step process: selecting performance variables, defining metrics, setting targets, measuring, and analyzing (Forslund & Jonsson, 2008 p. 77). Forslund (2012, p. 297) describes how several previous studies have reached the conclusion that including LSP in performance measurement studies of supply chains has been unusual, resulting in their perspective not being well covered in studies.

Instead, the LSPs' customers' perspective has been focused upon. Forslund (p. 298) describes how differences in metrics between logistics service providers and their customers as well as IT-related obstacles have been lifted in previous studies that focused on the customers' perspective.

Forslund (2012, pp. 307-308) has addressed this gap and has found three main obstacles that LSPs have experiences in supply chain performance management, relating to the five steps of performance management:

Firstly, a lack of understanding and knowledge in supply chain performance management, explicitly the need to have employees understand the definitions of performance metrics as well as the importance of conducting measurements in the intended way. Designing processes that are easily understood by employees, in addition to employee education, are ways identified to handle this challenge. This relates to defining metrics and measuring.

Secondly, a challenge with adapting performance metric definitions was identified, relating again to defining metrics. It was concluded that LSPs had difficulties re-defining metrics.

Thirdly, LSPs experience challenges with report-making and communication, despite good technical enablers.

No obstacles were found specifically connected to the step of selecting performance variables or target setting.

3.3.4 Classification

One part of understanding the process is to find out what the inputs of the process are. The first step can be activity profiling, the measurement and statistical analysis of the relevant warehouse activities. This serves as an important tool to understand the operations of the warehouse in terms of e.g., sizes of flows, types of products and handling methods.

Kembro (2020a, p. 4), Lewczuk and Źak (2013, p. 37) and Bartholdi and Hackman (2010, p. 217-218) all highlight three perspectives, among others, to include in activity profiling as well as examples of specific questions to answer:

i. Understanding the business

- a. Who the customers are, what their service requirements are and what handling is needed to meet this
- b. What drives the activities, i.e., what customers' orders look like with order mixes of assortment and volume
- c. Demand patterns of products

ii. Process and operations

- a. Where activities are carried out
- b. How operations are performed, with regards to e.g., equipment and level of automation

iii. Characteristics of products handled

- a. What unit the warehouse handles (pieces, cases, pallets)
- b. Average number of lines picked and shipped per day
- c. Average number of units per pick-line

Zooming in on the third perspective, ABC analyses is recommended as a tool to categorize products. Criteria such as total value of products shipped, number of picks per product and total quantity of each shipped product are exemplified by Bartholdi and Hackman (2010, p. 218).

Kembro (2020b, p. 6) also highlights classification as a key thing to learn, in relation to the level of automation in the warehouse. The level of standardization of products and processes are main factors that affect the level of automation, Kembro explains.

3.3.5 Process Improvement Frameworks

Kalman (2002, pp. 62-67) introduces a process mapping approach consisting of seven steps. His approach is presented in Table 3.2, and forms the basis on which the authors design the Investigation Model.

Table 3.2: Process mapping approach based on Kalman (2002, p. 62-67).

Step	Name of step	Step description
0	Premapping	An issue or problem is identified. Process owner is appointed, and a mapping team assembled, with a measurable goal.
1	Construct a macro-process map	The main components of the process are mapped. Could be done in multiple interdependent maps, which is consolidated into one final macro-map.
2	Identify bottlenecks and problems in the existing process	The current process is analyzed with the goal of finding current bottlenecks and hotspots.
3	Prioritize the bottlenecks and problems in existing process	Bottlenecks are categorized as occasional or chronic and prioritized, e.g., on “How well if currently function” and “[Business] importance” or “Likelihood of error” and “consequence of error”
4	Construct a micro-map of selected subprocesses and identify the root cause(s) of the problem	Prioritized subprocesses are mapped on a micro, detailed level to understand the root cause(s) of the issue or problem.
5	Rebuild the map	The process is redesigned in an iterative way to increase the refinement of the redesign, e.g., through the elimination of unnecessary steps and non-value adding activities.
6	Develop action plans for management approval	The rebuild process is presented to management for discussion, approval, and support. Key that the action plan includes a set of metrics that can be utilized to evaluate process improvement.
7	Implement the plan	Implement the approved plan.

3.3.6 Risk Analysis

Manuj and Mentzer (2008) identifies risk as a well-studied area in research and describe how different academia areas have different definitions of it. Common, Manuj and Mentzer (2008, p.135) highlights, are three components of risk:

- i. **The potential losses** – If the risk is realized, what will be the losses?
- ii. **The likelihood of losses** – What is the probability of an event that leads to realization of the risk?
- iii. **Consequences of losses** – What is significance of the losses?

Further, Manuj and Mentzer (2008, pp. 136-143) present a five-step process for global supply chain risk management and mitigation:

1. **Risk Identification** – Identify and classify risks, determine e.g., if it is a quantitative risk that could affect sales through stockouts or qualitative risks that could damage the brands reputation with customers or suppliers.
2. **Risk Assessment and Evaluation** – Determine the potential losses if the risk occurs, the probability of occurrence and consequences of these losses. Through this the most critical risks are identified.
3. **Selection of Appropriate Risk Management** – Select what strategy to adopt to manage the risks.
4. **Implementation of Supply Chain Risk Management Strategy(s)** – Implement the chosen strategy.
5. **Mitigation of Supply Chain Risks** – Establish a decision-making process for how to deal with unexpected risks.

By adopting this five-step process, a company can map possible risks that could affect them, identify which to focus their actions on and lastly establish a way of working to deal with unexpected events. Although the five-step process is designed in a global supply chain setting, the authors argue that the approach is generic enough to still be appropriate for an operational setting as the only change will be what type of risks are identified.

3.4 Investigation Model

Figure 3.4 presents the Investigation Model developed by the authors to improve an internal process through studying the as-is and utilize insights from theory and industry. The model has been created based on the literature study and the steps are described in Table 3.3.

The model's main characteristics are:

- i. The model starts at the top level and ends on the bottom level. Each level of the model has a distinctive focus (understanding, exploring, and applying).
- ii. On the top level, the three activities of *Classification*, *Process Mapping* and *Performance Measurements* all act as inputs to *Identify Challenges* within the studied process. Classification and Performance Measurements can act as supporting activities to Process Mapping, hence the arrow shapes in the model.
- iii. On the middle level, learnings from theory are done as a first step. Using theory as a base, insights from the industry are collected.

iv. On the bottom level, process improvement is conducted with insights from both the top and middle level.

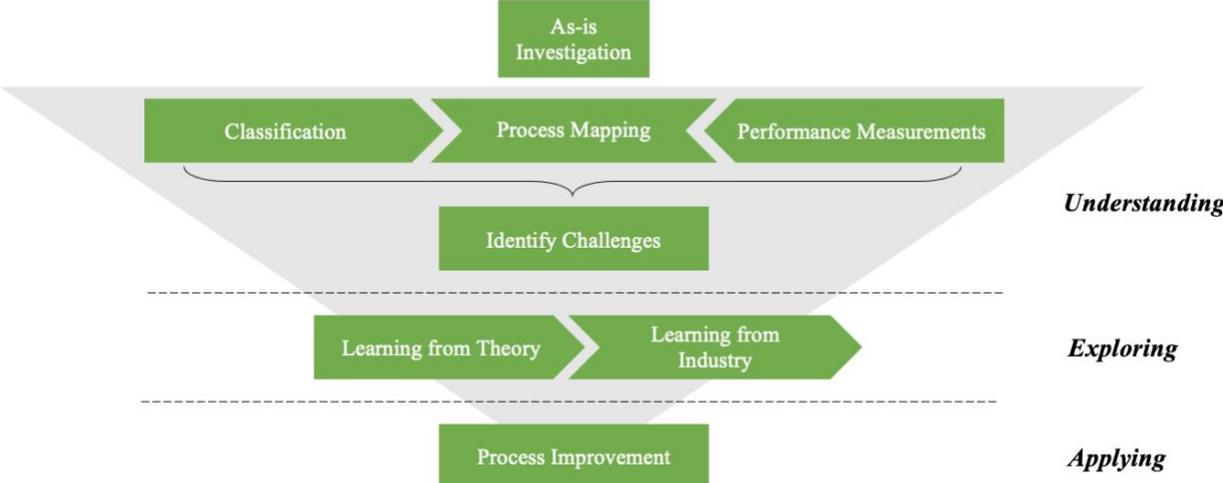


Figure 3.4: Investigation Model, created by authors as a tool to incorporate out-of-organization learnings in process improvement.

Table 3.3: Description of Investigation Model's steps and outputs of each step.

Name of step	Step description	Step output
<i>Understanding</i>		
As-is Investigation	Gather data from relevant parties in the current process, as well as potential other insightful people in the organization, to get an as-is understanding of the process, e.g., the maturity of the process.	As-is analysis
Classification	Learn the dimensions of the process's inputs, e.g., what type of products are handled in the process, in what volumes etc.	Classifications of process's input
Process Mapping	Map the current process in its as-is state. Place it in an organizational context in the supply chain, determine how the work is conducted within the organizational boundaries and finally map how the actual activities are carried out.	Process description and maps of the as-is state.
Performance Measurement	Find how the process is currently evaluated, i.e., what performance measurements are used, how these are evaluated and what the targets are for these measures.	Targets, metrics, and follow-up routines
Identify Challenges	Identify the challenges with the current process design. These challenges will later serve as opportunities for process improvements.	List of challenges
<i>Exploring</i>		
Learning from Theory	Study academia related to the process to get a theoretical understanding of it and gather insights by learning e.g., established best practice.	Synthesized learnings from theory
Learning from Industry	Study how other organizations in industry handle or conduct the process and analyze what learnings can be extracted.	Synthesized learnings from industry
<i>Applying</i>		
Process Improvement	First a cross case analysis is conducted, where the findings from <i>Understanding</i> and <i>Exploring</i> are compared. Then, potential process improvement opportunities are identified from the result. Conduct risk and sensitivity analysis on recommendation.	Cross Case Analysis, recommendation of process improvement possibilities, risk, and sensitivity analysis.

In this specific study, the Investigation model will be applied according to Figure 3.5, showing how the study's research questions and sub-questions connect to the model.

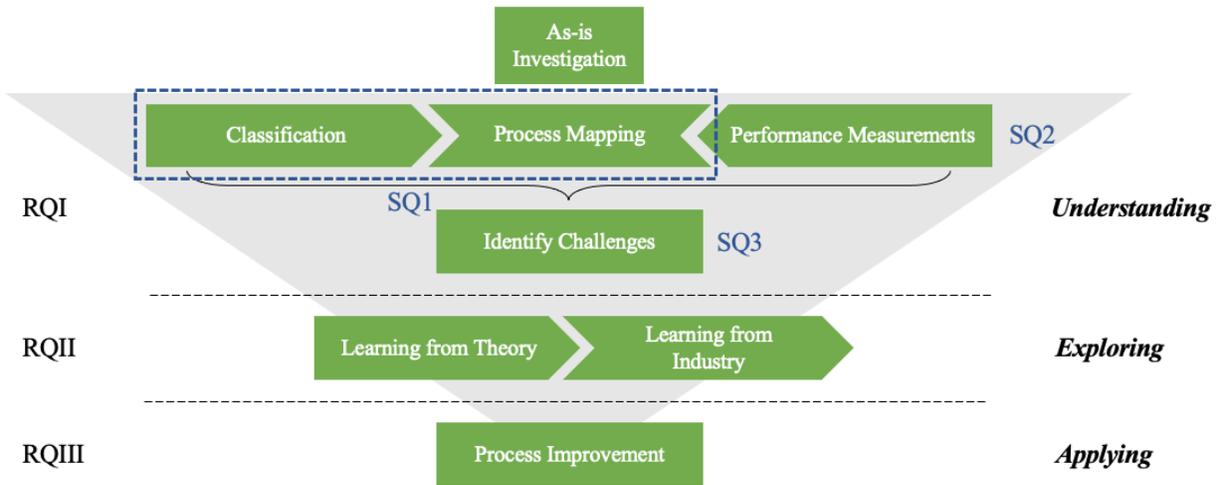


Figure 3.5: Investigation Model, with research questions placed in the model.

4 Empirical Data - Single Case

The section presents the empirical data collected within the single case, through the pre-study of stickering, interviews within IKEA and digital observation of DC Helsingborg. Lastly a table summarizing the result is presented. The analysis of the transcripts presented will be conducted in Chapter 6.

Figure 4.1 highlights how the following section will cover the part of *As-is Investigation* from the Investigation Model. The as-is investigation has been conducted in three ways. Firstly, studying the pre-study on stickering at IKEA presented in section 2.4.3 *Archival Analysis* referenced as (Inter IKEA Group, 2020b). Secondly, interviews within IKEA have been held and lastly a digital observation at DC Helsingborg through an interview with Bring employees.

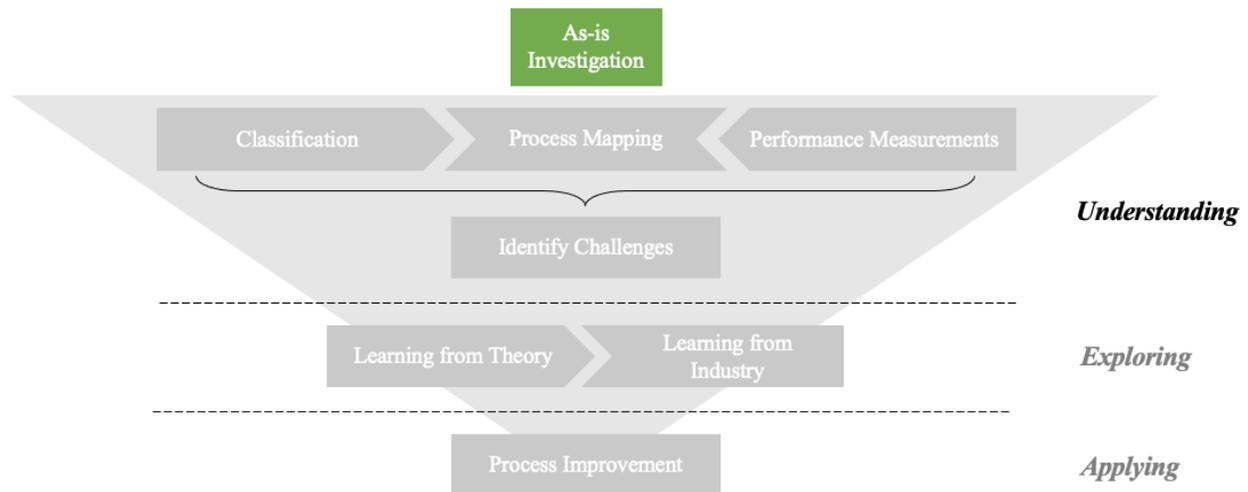


Figure 4.1: Theme of the chapter (*As-is Investigation*) highlighted in the Investigation Model.

4.1 Pre-study on Stickers

The pre-study presents the current sticker situation for all markets, while the scope of this study focuses on stickering conducted at DC Helsingborg. These include Saudi Arabia, Qatar, Jordan, Egypt, Bahrain, and Kuwait. Table 4.1 presents data on each market. For these markets, there are three different franchisee takers active on two markets each. Al-Sulaiman operates in Bahrain and Saudi Arabia, Al-Futtaim in Egypt, and Qatar and lastly Al-Homaizi in Jordan and Kuwait.

Table 4.1: Markets stickered at DC Helsingborg during 2019. CPG: Consumer packaged goods, articles sold not in the retailers' restaurants.

Markets	Stickers CPG's primary packaging	Stickers CPG's secondary packaging	Quantity primary packaging CPG stickered	% stickered of total sold CPG	Average stickering cost per unit (EUR)	Total cost of stickering 2019 (EUR)
Bahrain	Yes	No	172,269	97%	0.17	29,830
Egypt	Yes	Yes	9669	100%	0.15	1,555
Jordan	Yes	No	143,694	97%	0.20	28,414
Kuwait	Yes	Yes	326,570	93%	0.16	56,075
Saudi Arabia	Yes	No	1,199,514	95%	0.16	19,641
Qatar	Yes	No	187,119	92%	0.19	34,915
Total			2,038,835	Total		346,430

Additional take-aways from the stickering conducted at DC Helsingborg were as follows:

- i. BA Food is generally not included for label translation, creation, or validation on any of these markets. Only Saudi Arabia and Bahrain stated that they include BA Food if needed. This is currently done by a mixture of managers at the franchisee-taker, consultants and import and compliance managers. According to the pre-study, the wished position is that BA Food is to be responsible for the creation, translation, and validation of the stickers.
- ii. Studying all locations where stickering is done, DC Helsingborg has the highest average stickering cost per unit of 0.169 EUR. The other DC where IKEA conducts stickering (DC Taiwan) has an average cost of 0.092 EUR per sticker.
- iii. Digitalization is a key activity to make stickering more standardized, easier to communicate and more efficient.

4.2 Interview Transcripts

Table 4.2 presents the interviewees that make up the single case's data collection, in addition to showing the focus of each interviewee.

Table 4.2: Interviewees within the single case, presenting the interviews' different focus.

Interviewee	Company, role	Focus of the interview(s)	Contributes to Investigation Model
Cecilia Findelius	Project leader, SCO	An interview conducted at an early stage with the purpose of understanding the setting and narrowing down the scope of the study.	As-is Investigation
Simon Sturesson	Project leader, SCO	Continuous interviews as Sturesson serves as the IKEA supervisor to the project, providing historical background and setting the scope of the report.	As-is Investigation
Anna Wittrup	Project Leader, Project Management Office Food IoS	Anna Wittrup was the project leader of a pre-study on the current stickering situation, and she provided her main insights and reflections from the pre-study.	As-is Investigation
Per Mejborn	Food Demand Coordinator (FDC) Team East	Per Mejborn is the most actively involved IKEA personnel in the stickering process at DC Helsingborg and described the current process at IKEA.	Process Mapping
Malin Cavalli-Björkman, Mats Klevtorp, Jasmine Manhold	Bring, Administrator, administrator, warehouse worker working with stickering	Malin Cavalli-Björkman, Mats Klevtorp and Jasmine Manhold described the current stickering process from the warehouse's perspective, with current operations and challenges in focus.	Process Mapping
Harald Berg	Project Management Office Food IoS	Harald Berg described the stickering on new markets.	As-is investigation
Employee A	Business Developer, IKEA	Employee A provided insights on the contract with Bring, with KPIs and follow-ups.	Performance Measurements

Cecilia Findelius - Project leader, Supply Chain Operations

Cecilia Findelius' interview was conducted at an early stage, with the purpose of understanding the setting and narrowing down the scope of the study. Findelius especially explained how new directions from IFSAG affect the current way of stickering in the supply chain.

Findelius works as a project leader within SCO, with a specialty in process mapping and process development. Findelius explained that an important direction from IFSAG, the wholesaler of IKEA, is that products sold to retailer must be compliant when handed over to the retailer. This will probably require changed way of handling stickering in relation to the retailers, and most likely mean increased

stickering “in-house”. Exactly how and when this will affect the current operation are to be investigated further, Findelius explained.

Simon Sturesson - Project leader, Supply Chain Operations

Interviews with Simon Sturesson have been held continuously throughout the project, as Sturesson acts as the project’s supervisor from IKEA. Sturesson introduced the subject at hand, presented the combined history of IKEA and Bring and lastly introduced the new project One Supply Chain which will increase the stickering need in the future.

Simon Sturesson described how the food supply chain administration was outsourced to Bring up until 2017, when IKEA purchased this part of the company. Sturesson explained how this was the second company acquisition IKEA had done at that point.

Sturesson went on to describe the different concepts for selling food at the IKEA stores: the restaurants, the Swedish Food Market, the bistro, and lastly smaller new initiatives. Further, Sturesson explained how the legal regulations dictating required information can be different between consumer goods and packaging destined for the restaurant but expressed that this is not his area of expertise.

Increasing need of stickering

Sturesson presented one aspect of why the stickering need might increase in the future, because of an internal project known as *One Supply Chain*. This is an initiative to take over many product flows from the largest franchisee-taker Ingka, who currently partly purchase food from the same suppliers as IKEA. To increase the total bargaining power, IFSAG is planned to take over parts of the main flow to increase the economies of scale in purchasing. As a result of this project, the total volumes of flows going through DC Helsingborg will increase greatly, Sturesson estimated it will increase threefold, which will increase the stickering need.

Anna Wittrup – Project Leader, Project Management Office Food IoS

Anna Wittrup was the project leader of a pre-study conducted on the current stickering situation in all of IKEA. Wittrup expressed her personal reflections resulting from work with the pre-study.

Anna Wittrup presented her personal reflections on the subject, formed from her work with the pre-study:

- i. The transparency into DC operations make it easier to understand what happened there compared to at the retailers’ stores.
- ii. The aesthetic aspect of stickering has not gotten much attention in the past. Wittrup suggested studying how stickering affects the marketing aspect of a product, with suggestions on using colored stickers to decrease the aesthetic change of the packaging if legal requirements allow it.

Wittrup stated that, to her knowledge, no further work had been done based on the outcome of the pre-study.

Per Mejborn - Inter IKEA, Food Demand Coordinator (FDC) Team East PLAN

Per Mejborn is the most actively involved IKEA personnel in the stickering process at DC Helsingborg, as the administrator for all the markets that are currently being stickered at DC Helsingborg. Mejborn described the process of handling the retailer’s customer order and sending all required data to DC

Helsingborg as time-consuming and manual. Lastly, Mejborn expressed a need to clearly define the responsibilities internally at IKEA regarding the stickering process, in relation to BA Food especially.

Per Mejborn is very involved in the operational stickering process at DC Helsingborg. Mejborn receives, handles, and plans retail orders from the Middle East, Africa, and Israel, i.e., the markets that are currently stickered at DC Helsingborg. Almost all articles destined for these markets are stickered.

The current stickering process

Mejborn described that the current routine stickering process was developed ad hoc, with a lot of verbal communication directly with the warehouse personnel and with little planning for the future. The process is specifically carried out by Mejborn and is not representative for other FDC's ways of handling stickering. The current stickering process, from Mejborn's perspective at IKEA, consists of the following steps:

1. The retailer (IKEA store) places an order in e-shop.
2. The customer order enters the ERP-system M3.
3. The FDC controls the order:
 - a. What articles are ordered
 - b. If there are production dates on the packaging. Mejborn stated that this is present at most products. Only Egypt requires production dates to be marked on the products for a limited product range of 10-15 products. If required, it is added onto the label in communications with the retailer.
4. The retailer provides the artwork (formats) of the stickers, including all required information, through the shared web portal Project Place.
5. The FDC shares the sticker formats with a Bring Employee at DC Helsingborg through Project Place.
6. The FDC calculates the quantity of each sticker needed for the order using Excel.
7. The FDC sends a notifying email to the Bring Employee informing that
 - a. A new order is coming
 - b. A new folder is placed in Project Place, including the sticker artworks and the required quantity for each sticker
8. Bring Employee checks the order with regards to what best-before dates can be offered to the customer
9. The FDC decides if the BBDs are acceptable, should be changed (if possible) or if the order line should be removed from the order. This is done either after communicating with the retailer or through an individual decision.
10. The stickers are printed at DC Helsingborg.
11. The stickering is conducted at DC Helsingborg.

Regarding the time the current process requires, Mejborn stated the following:

Step 1-4: If "order-initiated purchase" (the process of ordering products from the food producer) is included, Mejborn stated it takes 4-5 weeks in total.

Step 5-9: 1-2 days.

Step 10-11: 1-2 weeks depending on the number of stickers needed.

Mejborn informed that no formal or informal targets or agreements have been made with Bring on process performance, suggesting that a cost per stickered article could be appropriate.

Mejborn's data handling during the process

Zooming in on step 6, Mejborn calculates the required number of stickers needed for each order line. Mejborn stated that the current process is time-consuming, as it involves several data handling steps:

6. The FDC calculates the quantity of each sticker needed for the order using Excel.
 - a. Using the order number, the customer order is found in M3 and copied into an empty Excel sheet.
 - b. Irrelevant data columns are deleted and a column displaying the required number of stickers per order line is added.
 - c. For the order lines containing multipacks, the FDC extracts from M3 how many primary packaging each multipack contains.
 - d. Multiplying number of multipacks and number of primary packaging within each multipack, the total number of stickers for multipack order lines are calculated.
 - e. The non-multipack order lines' ordered quantity is translated directly to several required stickers.
 - f. When all order lines' required quantity of stickers is calculated, the Excel sheet is uploaded to Project Place, from where Bring Employee excesses it.

Process at DC Helsingborg

About two full-time employees are conducting full-time stickering at DC Helsingborg, Mejborn informed. Mejborn expresses that he believes the process's largest cost decrease can now be found in the way the process is conducted, rather than the price of the actual stickers. This since the stickers started to be printed at the warehouse by Bring themselves, instead of being ordered from a third-party printer. Brother printers, a company that sells industrial grade printers, are used at DC Helsingborg, an operating one and a back-up printer.

Mejborn stated that the stickering capacity needs to increase at DC Helsingborg, and specified space and workforce as bottlenecks in the current process.

For the stickering activity, Bring charges a price of 400 SEK/hour Mejborn informed. This cost is later billed to the retailer, Mejborn expressed how this pricing model creates little incentives for Bring to increase efficiency and productivity. Mejborn went on to inform that he calculates a stickering cost per article for each order, and that this cost is usually between 0.8-1.2 SEK per article. If this cost is above 1.2 SEK, Mejborn stated that he asks the warehouse to recalculate. According to Mejborn, Bring's most common reasons for a more expensive stickering are that specific articles are more demanding to sticker or that new personnel have performed the stickering.

Mejborn explained how he is currently only communicating with the administrative personnel at Bring, and not with the Bring employees planning and leading the actual stickering operations. Earlier this was the same person at Bring that did the administration and lead operations in the warehouse. Mejborn expressed that his insight into capacity has decreased in the new way of communicating with only the

administrative part and stated that his job would be eased if he communicated with a Bring counterpart with overview of the entire process. Explicitly, Mejborn exemplified that the communication regarding capacity and what future orders he can send to the warehouse was better in the former setup.

Defining responsibilities

Mejborn went on to emphasize the need to establish who is responsible for what in the stickering process, and mentions BA Food, the retailer, SCO (Supply Chain Operations) and suppliers as examples of relevant parties. Specifically, Mejborn suggests:

- i. Efforts should be put at making information and decisions centralized at BA Food regarding how stickering should be conducted strategically.
- ii. A database with saved sticker artworks should be established and handed by BA Food, to make sure that all stickers are compliant and accessible for all players in the supply chain.
- iii. It should be investigated what products should be part of what cluster and make the rules regarding this clearer than now.
- iv. An alternative is to move the stickering process upstream to the supplier, letting them sticker.

Finishing, Mejborn expresses that it all comes down to prioritizations, where stickering has been moved down the prioritization list as more urgent things have risen. He states that stickering has been viewed as something that will decrease as markets and sales grow, but that there in fact are reasons why the need for stickering will continue.

Mejborn described how the number of CASY reports, IKEA's internal reporting system for incidents, connected to stickering is very low. Only one CASY report connected to stickering has been reported during the financial year 2019-2021.

Areas of improvements from IKEA's perspective

Lastly Mejborn finally expressed wishes on how the process could be improved from his point of view:

- i. Establish an overall IKEA strategy regarding how stickering should be handled, making decisions centralized.
- ii. Increase the documentation of the process, both in the contract with Bring as well as overall process description and market specific instructions how stickering should be performed.
- iii. Improve the system support for the stickering process, decreasing the manual data handling required today.
- iv. Alter the pricing model to create incentives for Bring to improve the process.
- v. Increase the discussion of labelling in forums between IKEA and Bring that discuss operational performance

Malin Cavalli-Björkman, Mats Klevtorp and Jasmine Manhold - Bring, administrator, administrator, warehouse worker working with stickering

Malin Cavalli-Björkman and Mats Klevtorp, as administrators, and Jasmin Manhold as stickerer described the current stickering process at DC Helsingborg, how the stickering is conducted, by whom and how the current process is measured and documented. In addition, the routines of how stickerer are introduced is covered and lastly some challenges identified by Cavalli-Björkman, Klevtorp and Manhold.

[The interview with the Bring team replaced a physical observation that was not possible to conduct due to the Covid-19 situation. Before the interview, a short video was shared presenting the administrative steps of printing picking lists and stickers, as well as visualizations of how three different products were stickered.]

The current stickering process at DC Helsingborg

Malin Cavalli-Björkman described Bring's internal steps in the stickering process:

1. The FDC (responsible for handling customer orders for stickering markets at IKEA) notifies a Bring Employee through an email that a new order is coming, including information that artwork for each product's sticker is placed in the common channel Project Place, together with the required number of each sticker.
2. The Bring Employee returns to the FDC what best-before dates (BBDs) are available for each order line.
3. The FDC, after either communicating with the retailer or through an individual decision, determines if the BBDs are acceptable, should be changed (if possible) or if that order line is to be removed from the order.
4. The Bring Employee makes the required alterations to the order (changes BBD or removes order lines) and reserves the goods in DC Helsingborg's WMS
5. The Bring Employee informs the team leaders of the warehouse what orders and specific articles is to be stickered
6. The Bring Employee prints the excel list displaying quantity of needed stickers and then prints the stickers at DC Helsingborg
7. Warehouse workers picks the articles that is to be stickered and places it in a stickering area
8. Stickering is conducted by Bring staff
9. The stickered goods are stored separate from non-stickered goods
 - a. Frozen goods are stored in a freezer, although separate from non-stickered goods
 - b. Chilled and ambient goods is stored in a chilled area, separate from non-stickered goods
10. When the container destined to the order's market arrives, the goods are packed and shipped.

Who conducts the stickering

Cavalli-Björkman described how some employees work only with stickering, while some rotate between stickering and other warehouse tasks. It was highlighted that not everyone working in the warehouse is successful in the stickering process, as it requires a quite high level of "sleight of hand" to do it quickly.

When new employees are introduced to the stickering activity, they are trained by "shadowing" an experienced employee skilled at stickering. No documentation of the process exists or is part of the training currently, Cavalli-Björkman stated.

How the process is carried out

The actual stickering is done manually and is identified by Jasmin Manhold as the most time-consuming part of the stickering. The unpacking and repacking are not considered an issue. She described tiredness

during the process that comes from standing, and in the shoulders of the stickerer. In addition, Manhold described that some heavy lifting is involved as well.

No products are delivered with shrink wrap that needs to be removed, Manhold described.

The picking of goods is done the same way as other types of goods and not viewed as an issue or bottleneck today, Cavalli-Björkman stated.

Level of automation

Tools for higher level of automated stickering have been somewhat investigated by previous managers, but Cavalli-Björkman could not recall what types of tools/machines had been studied. The result of this investigation was that it is quicker done by hand.

Manhold highlighted that many of the packaging is too small to use a “stickering gun” for, as it would take more time rather than stickering by hand.

Cavalli-Björkman and Manhold estimated that about 30% of the packaging comes in a jar/bottle/round shape, that could be appropriate for a “spinning automation for bottles”.

KPIs in the process

KPIs are not used specifically for the stickering process internally at Bring, according to Cavalli-Björkman. She stated that the process is complex with many different products and the number of suppliers making it difficult to set KPIs that are comparable between orders.

No commitments or agreements have been formalized between IKEA and Bring regarding stickering performance, Cavalli-Björkman described. In fact, no process documentation exists.

Challenges and issues with the current process, identified by Bring personnel

- i. Cavalli-Björkman said that it would be good if more people could join the stickering, to improve the working environment of the staff.
- ii. The interviewees agree that the stickering process would be made more efficient if the stickering areas, i.e., the physical space devoted to stickering activities, were increased.

Harald Berg - Project Leader, Supply Chain Operations

Harald Berg works as a project leader for new market entries at Supply Chain Operations. Currently he is working with the new DC in Hungary that opened in the fall of 2020. Berg participated in two interviews, the first one was very early and helped in determining the context of stickering at IKEA, while the second one served to confirm and discuss data previously gathered. He described how the logistics service provider (LSP) works with stickering in the new DC and new markets, and then shared his insights on how the Bring-IKEA relationship looks like at DC Helsingborg.

DC Hungary

Berg described how the DC in Hungary differs from DC Helsingborg when it comes to stickering:

First, the stickers that are used in Hungary are developed by BA Food, whereas the stickers used on the middle eastern markets are developed by the retailers themselves. This adds complexity as stickers can be of varying sizes and designs. Berg stated that Supply Chain Operations are further apart from the development of the stickers when BA Food is responsible for the design, as compared to DC Helsingborg and the middle eastern markets.

Second, the logistics service provider in Hungary is responsible for printing stickers and to keep an inventory of stickers. Berg explained that the retailers themselves create a forecast of how many goods that will be stickered, on which the logistics service provider prints the stickers. The logistics service provider then stickers goods according to the orders placed by the retailers.

Third, Berg stated that they (Inter IKEA), gave the logistics service providers an additional two days of lead-time on the entire assortment, this to make time for stickering to take place. By adding two days, the retailers would not have to place separate orders for stickered goods and non-stickered goods.

Berg highlighted some issues related to this:

- i. There is no easy way to see in their system (M3) if a product requires stickering
- ii. There is no good way of transferring this information between IKEA's system and the logistics service providers system

New market entries and stickering

Berg answered questions regarding stickering used in new markets entries, with a few examples of countries where stickering was used to enable market entry:

- i. In Slovenia, about 50% of the products are stickered. This is due to how language clusters work. The size of the product packaging affects how many languages can be included in the artwork. A larger size makes it possible to include more languages, and a smaller one limits the number of languages available. Berg explained that there exist "leaps" in how clustering works. This means that sometimes e.g., Slovenian can be included in a five-language cluster, but not in a four-language one, and again in a three-language one.
- ii. In the Philippines, IKEA could use stickering for the first year before they had to make permanent artwork for the market. This is due to local regulation, requiring imported products to contain correct language and information.
- iii. In Estonia, that will be launched in the fall of 2021, have few to no artworks developed for the products. This means that most of the assortment will be stickered to begin with, though in the future the aim is to have artwork for most of the products.

Berg stated that there are no good examples of when stickering has been used initially and artwork has then been developed and implemented for the assortment. He meant that this is due to that stickering is a "new" issue for Inter IKEA to handle, as retailers themselves would deal with making the imported products compliant for the markets they are active in.

Stickering at DC Helsingborg, Bring-IKEA relationship

Berg discussed some points regarding the stickering process in general and the Bring-IKEA relationship at DC Helsingborg. Berg listed a few points that are important to consider when looking at stickering:

- i. The current way of working is not sustainable due to that:
 - o The process is too manual.
 - o Retailers should not be responsible for making compliant stickers.
- ii. BA Food and Supply Chain Operations must work together, making BA Food more involved and to have clear decoupling points described between the two parties.

- iii. There must be processes set in place to ensure that stickers are available when products are sold, to prevent stops and delays when retailers place their orders.

When discussing KPIs, Berg agrees that KPIs have not been used or followed up in the past. Berg further explained that KPIs are not used specifically for stickering. Using KPIs could be one way of making the process more professional and making it a “real” process at IKEA, according to Berg. Berg stated some parameters to consider:

- i. **Costs** should be measured more precisely, as retailers have the right to know and plan for the cost of stickering instead of receiving an invoice for hours spent stickering the products.
- ii. **Quality** is measured in that CASY reports (IKEA’s internal report form for incidents) are tracked and assessed.
- iii. **Lead-time** is another factor that should be tracked more, to see how long it takes to sticker products.

Berg suggested that category specific KPIs is one way of creating KPIs that are comparable between orders. This could be that bottles, cans, boxes, bags etc. get different targets.

About stickering as an issue, Berg stated that it has crept up on IKEA. Focus has been put on stickering, as IFSAG has been clear that they should take responsibility for stickering rather than putting the problem on the retailers as has been done before. Berg also expressed that IKEA has been unclear about their expectations on Bring at DC Helsingborg:

“It is all about being clear [about expectations on the stickering process]. It has worked like this for a while, but it does not work anymore. [Inter IKEA] has to work more professionally with [stickering]. Not only IKEA, but also their LSPs.”

- Harald Berg on the relationship between Bring and IKEA

Berg said that for his part, the Customer-3PL relationship between Bring and IKEA has become clearer since IKEA acquired their department from Bring.

Employee A - Business Developer

As business developer for DC Helsingborg, Employee A has insights into the contracts written with Bring. He described the stickering process as low on the maturity scale. The stickering process is not formalized in the contract, with no KPIs in use or process performance follow-up in place, Employee A stated. Lastly, he emphasized the need to include a flexibility aspect when setting performance targets with Bring.

Employee A, as a Business Developer towards DC Helsingborg, has commercial responsibility for the service provider with regards to e.g., logistics, transportation, and value-adding services. In this role, Employee A is responsible for Inter IKEA’s side of the contract with Bring.

Current process

Employee A described the stickering process, although having been performed for a long time, as immature. It functions but the level of documentation is very low. To his awareness is stickering not mentioned in the contract, that is a standing contract written in 2013/2014. The contract is currently

written in Swedish, which Employee A's knowledge of is too limited to give a definite answer. Employee A described how no KPIs are formalized or used, and no follow-up is done.

IKEA taking strategic decisions

Employee A emphasized the importance of starting a conversation within all of IKEA regarding the strategy of stickering, regardless of service provider. In this focus, Employee A highlighted decisions regarding how the process should be done (regarding manual and automation operations) and whether IKEA should invest in machinery.

Moving forward at DC Helsingborg

Specifically, regarding the stickering process at DC Helsingborg, Employee A raised two important aspects to consider when moving forward. Firstly, the importance of understanding Bring's strategic view on stickering, regarding what they are willing to invest in the process in terms of space and resources. Secondly, what KPIs to use where he presented conformity (having the right sticker on the right product for the right market) and efficiency. In the latter, Employee A emphasized the importance of including a flexibility aspect as well and not only focusing on static capacity.

4.3 Summary of Interviews

Table 4.3 presents a summary of the main points collected from the interviewees.

Table 4.3: Summary of the empirical data collected from each interviewee.

Interviewee	Company, role	Main points
Cecilia Findelius	IKEA, Project leader, SCO	<ul style="list-style-type: none"> • New directions from IFSAG, the acting wholesaler at Inter IKEA, says that all articles sold and delivered to retailers must be compliant when ownership is transferred. This moves all stickering in-house to IKEA and eliminates the possibility of retailers conducting stickering as is currently practiced at some market.
Simon Sturesson	IKEA, Project leader, SCO	<ul style="list-style-type: none"> • An administrative part of Bring was acquired by IKEA in 2017. • The total flow of food products handled at Inter IKEA will increase as parts of the largest franchisee-taker Ingka's flow will be taken over through the project One Supply Chain.
Anna Wittrup	IKEA, Project Management Office Food IoS	<ul style="list-style-type: none"> • Better transparency into DCs' operations than retailers. • Little attention is given to the aesthetic aspects of stickering. • No further actions are taken from the pre-study published in June 2020.
Per Mejborn	IKEA, Food Demand Coordinator (FDC) Team East	<ul style="list-style-type: none"> • Mejborn's process involves time-consuming and repetitive data handling for each customer order. • The sticker formats are created by the retailers and distributed via Mejborn to DC Helsingborg. • Little administration is done by Bring, instead Mejborn takes a lot of responsibility. • Mejborn stated that increased stickering capacity is needed at DC Helsingborg. • Mejborn currently only communicates with the administrative part of Bring, and not with the operational part of the organization. • Mejborn emphasized strategy decisions, improved documentation, system support, altered pricing model and increased discussion about stickering as ways to improve the process.
Malin Cavalli-Björkman, Mats Klevtorp, Jasmine Manhold	Bring, Administrator, administrator, warehouse worker working with stickering	<ul style="list-style-type: none"> • Some warehouse workers work only with stickering, while some rotate between stickering and other warehouse tasks. • Not every worker is successful in stickering, as the process design requires a quite high level of "sleight of hand" to do it quickly. • New workers are introduced through shadowing. • Limited process documentation exists. • The stickering is conducted by hand, where the actual stickering is the most

		<p>time-consuming part and not unpacking or re-packing.</p> <ul style="list-style-type: none"> ● Automation solutions have been studied by previous management, but manual stickering has been deemed the best solution due to speed. ● No formalized KPIs are used, and no contractual agreements regarding the stickering process exist. ● Lowered barriers for warehouse workers to conduct stickering and increased stickering areas are ways to improve the process.
Harald Berg	IKEA, Project Management Office Food IoS	<ul style="list-style-type: none"> ● Stickers applied at DC Hungary are created by BA Food, printed by the warehouse on forecasts and applied based on actual customer orders. ● Stickering is used as a start-up process for new markets. ● Berg emphasized a need for BA Food to take more responsibility. ● KPIs are usually not used specifically for stickering. ● Berg stated that IKEA's expectations towards Bring must be clearer, and the process must be taken more seriously and professionalized.
Employee A	IKEA, Business Developer	<ul style="list-style-type: none"> ● The stickering process is not mentioned in the contracts with Bring. ● No KPIs are formalized, and no follow-up is done. ● Employee A emphasized the need for strategic decisions to be made regarding stickering at IKEA, as well as considering Bring's strategic view of the process. ● Employee A exemplified conformity and efficiency as appropriate KPIs and stressed the importance of including flexibility in the efficiency concept.

5 Empirical Data - Multiple Case

This section presents the empirical data collected within the multiple case, in the sub-case order of *Similar Players*, *3PL* and lastly *Technical Solution Providers*. Lastly tables summarizing the sub-case's result are presented. The analysis of the transcripts presented will be conducted in Chapter 6.

Figure 5.1 highlights how the following section will cover the part of *Learning from Industry* from the Investigation Model. This will be done by presenting summarizing transcripts of all interviews of the three sub-cases, including introductions to the companies in question.

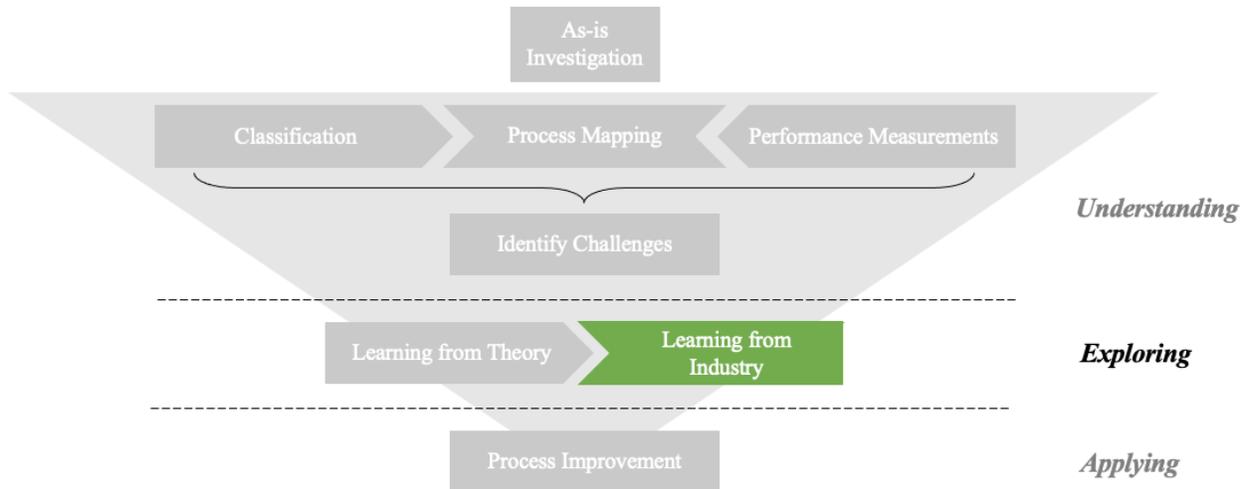


Figure 5.1: Theme of the chapter (*Learning from Industry*) highlighted in the Investigation Model.

5.1 Similar Players

Table 5.1 presents the interviewees that make up the *Similar Players*' sub-case data collection, in addition to showing the focus of each interviewee.

Table 5.1: Interviewees within the *Similar Players* sub-case, presenting the interviews' different focus.

Interviewee	Company, role	Focus of the interview(s)
Jenny Huber	Lantmännen Cerealia, Packaging Lead Innovation	Lantmännen Cerealia's experience with stickering.
Candidate A	Food Retailer, Packaging Manager	Food Retailer's experience with stickering.
Gustav Nyström	Orkla, Operations Project Manager	Orkla's experience with stickering.
Fredrik Ryjord	Gray's American Store, Head of Supply Chain	Gray's American Store's experience with stickering.

Jenny Huber - Lantmännen Cerealia, Packaging Lead Innovation

Jenny Huber, with ten years of experience from the food industry both at Lantmännen Cerealia and Mondelez, is currently strategically responsible for all Lantmännen Cerealia's packaging. She identified stickering to not be part of regular operations at Lantmännen Cerealia, but rather used to correct mistakes. When used, the stickering is often done manually by a third-party. Lastly, Huber elaborated on two ways markets' requirements can differ.

Lantmännen Cerealia, as a part of the food sector at Lantmännen, develops, produces, and sells food products made from grains. It is a cooperative, where the grains are supplied by the 20.000 farmers that own the company.

Lantmännen Cerealia sells to both wholesalers as well as directly to retailers. Although active on more than 30 markets, most of the sales, 87%, are generated in the Nordic area. An example of a product that is exported to a global market (especially China, the US, and Great Britain) is FINN CRISP crispbread and snacks.

Huber described that stickering is not a part of the Lantmännen Cerealia's regular operations. Instead, it can be used as a tool to correct mistakes. This goes in line with Huber's previous experience from the industry, that stickering is used as a temporary solution to an issue rather than part of a permanent solution.

When corrective stickering is conducted, Huber stated that it is mostly commonly done by a third-party company in a manual fashion.

Examples of market specific requirements

Further, Huber elaborated on how markets' requirements can differ in their packaging requirements:

- i. **The legal information that needs to be present** - Lantmännen Cerealia solves this by introducing several stock-keeping units (SKUs) of the same products, where markets' information are combined to create clusters to minimize the total number of SKUs per product.
- ii. **Total height of the pallets used when distributing the product** - To minimize the risk of shipping air to markets that accept larger pallets, Huber describes how Lantmännen Cerealia rather creates new SKUs for markets with specific size requirements rather than attempting cluster optimization. In Huber's experience, this is more cost efficient, with regards to the production set-up time in relation to transporting air if pallets are smaller.

Candidate A - Food Retailer, Packaging Manager

Candidate A has a background at LTH, where she studied Mechanical Engineering with Industrial Design. She has worked with a few different things, but mainly in packaging development focused on packaging material and design, mainly in plastic where they strive to make the packaging smarter. She has been at the Food Retailer for four years.

The Food Retailer is a big actor in Europe, and globally if including other companies within the same group. All stores are run by the Food Retailer themselves, i.e., no franchisees are running the stores. On the Swedish market most of the assortment is private label (Food Retailer's own) and the rest is mainly locally sourced brands that are strong on the local market (e.g., Bregott on the Swedish market).

The Food Retailer seeks to provide the best quality, at the lowest price, through specialized procurement - products are sourced by local procurement teams on the markets that they are strongest (e.g., Italian

produce such as pasta and mozzarella is procured by the team in Italy). This ensures that they get the best possible quality at the lowest possible price. The procuring team is responsible for developing packaging and quality control of the product.

Each individual market decides if they want to launch a product on the market. If so, “translation teams” are employed from the relevant markets. These are experts at both the language and the legal requirements present on the relevant market. This ensures that the products are compliant with the requirements set by every market where the product is launched.

Restraints that are put on the products are mainly in the size of the product. Mozzarella, which has a smaller package, can be clustered on fewer markets than a larger pasta package, where more languages (and therefore a larger cluster) fits on the product packaging.

Stickering that is like that of IKEA’s is not something that is regularly performed at Food Retailer, Candidate A had a hard time remembering when it would have happened at all.

Stickering at the Food Retailer

The only form of stickering that is performed now is done centrally, on single use plastic products, due to a new EU directive where information about the presence of plastic in single-use products (SUP) such as mugs, tampons or diapers must be present on the packaging of the product. It can use stickers within the first year of the directive being active. These types of products are mainly procured centrally to make use of economies of scale and must be compliant as they are shipped to stores on other markets, meaning that they do not perform stickering of the products on local markets.

Gustav Nyström - Orkla, Operations Project Manager

Gustav Nyström, currently an Operations Project Manager at Orkla, has several years of experience from consumer goods from both Orkla and as a consultant at BearingPoint. Nyström described how Orkla’s strategy of selling local brands results in them not experiencing challenges with making products market-specific.

Orkla is a branded consumer goods company that sells many brands, active mostly in the Nordics and Baltic area. Besides these main areas, Orkla is active on other European markets and India in their total four different business areas - Food, Confectionery & Snacks, Care and Food Ingredients.

Despite being active on a wide set of markets, Gustav Nyström explained that Orkla does not experience issues with packaging compliance within different markets. This is since the company’s strategy focuses on brands sold locally, rather than having a generic assortment that needs to be adapted to several markets.

Nyström believes a certain number of markets and levels of generic assortment must be sold for the issue of market-specific packaging to arise. Following this, Nyström described how other larger companies, such as Unilever or Procter & Gamble, might experience the issue.

Fredrik Ryjord - Gray’s American Stores, Head of Supply Chain

Fredrik Ryjord, as Head of Supply Chain at Gray’s American Stores (GAS) described the company’s transition from purchasing a warehouse and stickering service from PostNord TPL to moving the process in-house. GAS has developed automated solutions for their stickering process, and Ryjord highlighted

several differences between purchasing a warehousing and stickering service from a 3PL and doing it themselves.

Gray's American Store (GAS) is an import company selling American food products to the Nordic market. To make American products sellable on Nordic markets, stickering is used to alter the information on the packaging. Ryjord emphasized that the stickering process's quality can be a question of life or death for customers, a statement that exemplified GAS's view on the quality of the stickering process.

Earlier, warehousing activities and stickering was conducted by PostNord TPL, but in 2020 the collaboration ended, and GAS started conducting stickering in-house instead.

The current process at GAS

When GAS in-housed the stickering process, Ryjord started to investigate how to improve the level of automation. This resulted in three types of automation solutions:

- i. One machine for 33 cl cans, with a capacity of 36-48 units per minute
- ii. One machine for larger cans and glass bottles, with a capacity of 30-36 units per minute
- iii. Two machines for rectangular products and bags, with a capacity of 60 units per minute

The first two solutions are machines that were used when PostNord TPL conducted stickering for them, that are used to automate stickering for bottles and cans. The last one is the result of a 14-month long project where six technical service providers were used to create a robot that could sticker products that are flat, square bags or cylindrical products in a tray. Between their three automation solutions, GAS can automate stickering for 95% of their incoming goods. The remaining 5% of the goods are stickered by GAS's supplier.

Ryjord highlighted the importance of keeping stickered and non-stickered goods separate, due to the extreme health risk of selling products with e.g., insufficient information about allergens. This risk makes process control extremely important, Ryjord stated. GAS's warehouse is divided in three areas: the incoming warehouse, the stickering area, and the warehouse for finished goods. By keeping the incoming warehouse and the finished goods warehouse separate, this risk is minimized.

In addition to the safety concern, Ryjord stressed the importance of applying stickers correctly in a salability aspect to keep the products' attractiveness to the final customer. Ryjord stated that for GAS, it is very important to keep quality top-notch. They measure quality through error reports they get from customers externally and try to minimize this through involving their staff and keeping them motivated to "pull the rope" to stop production if anything seems wrong.

Ryjord explained that they use KPIs to evaluate their performance. The most important KPI is quality, which is measured in two ways:

- Internal quality during the stickering process at the warehouse
- Customer complaints

He pointed out that "pulling the rope" and stopping production was encouraged, as one stop can prevent several customer complaints in the future. Employees are encouraged to look for faults and to step in if something seems amiss. For customer complaints, Ryjord stated that it is very important to keep these at a minimum to protect the brand of Gray's American Stores.

Another KPI is efficiency, in the number of stickers applied in a day. Ryjord explained that they prioritize quality over efficiency, as they never want to compromise their high quality.

Process documentation and on-boarding new staff

Through rigorous work during GAS's reorganization, they conducted thorough process documentation on most processes that they perform, from procurement to out-bound logistics. This documentation is used to ensure that all information that is needed to operate their business is accessible to all employees and used to on-board new ones.

"[It is important that] all employees should be able to point to where all information they need is stored"

Process documentation is kept in Microsoft Teams and Dropbox folders online, that all employees have access to on workstation computers. In Teams, instructions on how to turn on machines and such are stored, and stickers and the instruction on how to apply said stickers can be found in Dropbox. Ryjord described it in that you could find the "Hows and Whys" in Teams, and the "Whats" in Dropbox.

Process documentation is used when new employees start at the company. GAS has a structured introduction program, that employees work through at their own pace and capacity. They combine theory and practice in that every new employee gets a mentor which they shadow for a time, as well as them studying the available process documentation that exists. The goal is to always push for development, at each employee's ability. Weekly meetings are held to evaluate and follow-up improvement for each employee.

Differences between using a 3PL and doing the stickering in-house

Ryjord expressed three main differences between having the stickering conducted by a 3PL compared to performing it in-house:

- i. The level of control of the actual process
- ii. The employees' feeling of responsibility
- iii. The focus of the organization

The first difference is in line with the importance of control of the process as a safety concern. By operating the stickering themselves, Ryjord now experienced more control of the process, explicitly with the power to stop the process. He described how this is done much more easily now that the process is done in-house, compared to when it was conducted by PostNord TPL when Ryjord did not have a direct contact way to the production but had to go through several persons at PostNord TPL.

Secondly, Ryjord expressed the advantage of having GAS's own employees conducting stickering. Both in relation to quality of manual stickering but also to the earlier mentioned production stops. He expressed how important production stops are to keep a high quality, and by involving the employees they feel personally responsible for ensuring that quality is kept high.

Lastly, Ryjord emphasized the importance of viewing the stickering process as a production step, rather than a warehousing activity. Ryjord explained that GAS values quality and control to such a high degree that it made sense for them to in-house the process. He said that they required a higher level of control, to ensure top quality. When partnering with PostNord TPL, GAS's requirements on control and quality were hard to reach, as PostNord TPL's core competence was within warehousing and logistics, rather than in production. Ryjord described how GAS adopted a production perspective to utilize stickering to create more value for themselves.

5.2 3PL

Table 5.2 presents the interviewees that make up the 3PL sub-case data collection, in addition to showing the focus of each interviewee.

Table 5.2: Interviewees within the 3PL sub-case, presenting the interviews' different focus.

Interviewee	Company, role	Focus of the interview(s)
Erik Lundin	PostNord TPL, Logistics and Business Development	Erik Lundin described PostNord TPL's stickering process and the usage of KPIs.
Mikael Sannum	PostNord TPL, Project leader	Mikael Sannum provided insight into the Gray's American Stores case at PostNord TPL and discussed the importance of pricing models.

Erik Lundin - PostNord TPL, Logistics and Business Development

Erik Lundin described how PostNord TPL performs stickering activities on a regular basis as well as an issue-solving strategy. The process is very manual, where low volumes and fast rotation of what products are treated are main challenges for automation. He stated that KPIs are not generally designed specifically for the stickering process, and the importance of including the solution provider when designing automated solutions.

Erik Lundin presented PostNord TPL's as a third-party logistician with a focus on warehousing, which is their main offer which is included in all customer deals. In addition to this, other modules can be included in what PostNord TPL performs on the mission of the customer. These can either be performed by PostNord TPL themselves or purchased from other companies, such as Bring, Lundin described.

Firstly, Lundin described in what situations stickering occurs at PostNord TPL, what the process looked like, how stickers are created and what KPIs are used. Secondly Lundin touched on how they have investigated the stickering process historically, and how their offers are designed.

Lundin identified four situations where stickering is conducted by PostNord TPL as a type of value-adding service, both as a part of "normal operations" and "non-normal operations". "Normal operations" can be viewed as routine processes, while "non-normal" as ad hoc processes that occur outside of routine events to solve issues.

Normal operations:

- i. **Stickering due to low volumes** - when the volume for some reason was deemed not large enough for the production to put it as a batch.
- ii. **Bundling products** - to combine a customer's products in bundles of several products. In this type of stickering activity, Lundin highlighted that it is usually very small volumes, and that the included articles change which makes automatization difficult.
- iii. **Attach "price and store tags" onto fashion products** - either through applying a sticker onto the original sticker, or through using a pistol.

Non-normal operations:

- i. To correct a mistake

The stickering process

Lundin stated that the stickering process is conducted in three steps: unpacking, stickering and repacking. Lundin described the stickering process as very manual, and he stated that low volumes and quick rotation of what articles are handled as reasons why larger automations are difficult to make profitable. Helping tools are used and chosen based on what type of products are handled. Lundin estimated that most tools available for stickering are probably used somehow.

Lundin identified the questions of who performs the actual stickering to be important to address in the conversation with customers. PostNord TPL has a collaboration with Samhall who conducts some of the manual stickering together with PostNord TPL staff, Lundin informed.

How stickers are created

Lundin stated that PostNord TPL does not create the content of stickers but can assist on the layout. As for the printing of stickers, Lundin talked of the case of GAS. In this situation, Lundin did not know who performed the printing, but expressed that he would not be surprised if PostNord TPL performed it.

How PostNord TPL works with KPIs

Lundin stated that PostNord TPL sets KPIs in the contracts, with targets for both the customer and they to fulfill. These are evaluated with different frequency depending on what type of services PostNord TPL perform. Lundin estimated that stickering activities would be evaluated every quarter, compared to daily in e-commerce customer relationships.

Further, Lundin identified KPIs connected to availability to be key for customers, while productivity related KPIs are more important to PostNord TPL. This as PostNord TPL often uses an activity-based pricing, meaning every productivity improvement results in lowered “per unit”-costs, i.e., increased profit for PostNord TPL.

Specifically, for a stickering process, Lundin stated that this process is more difficult to benchmark than other activities. Specific KPIs or targets are in general not present for these services, Lundin described.

How PostNord TPL has investigated stickering process historically

PostNord TPL has studied stickering process improvements, specifically potential automation possibilities. This investigation was conducted in two steps, Lundin described:

- i. **Product classification** - Investigated what type of products are stickered, e.g., what the products look like in terms of dimensions, and where the sticker should be placed. Lundin exemplified jars and bottles (round packaging) as the simplest to automate as they are easy to line up and can spin until the machine finds the location for the stickers.
- ii. **Business case creation** - For each identified product class, a business case for a potential automation solution was created, to see which investments are deemed appropriate.

When designing automations, Lundin highlighted the importance of including the “technical solutions designer” in the process, as there are so many characteristics of the products to consider. For example, Lundin mentioned the ease of lining up the product in a machine, and the ease of finding where on the packaging to place the sticker.

Lastly, Lundin talked of how the standardization that is beneficial when designing automation also creates boundaries on what can be handled in that automation. Again, Lundin highlighted that due to low

volumes and large variation in what products are stickered it is important to have flexibility in an automated solution.

Mikeal Sannum - PostNord TPL, Project leader

Mikael Sannum provided insight into the Gray's American Stores case at PostNord TPL, regarding the level of automation and ownership of machinery. Lastly, he highlighted the importance of having a pricing model that incentivized process improvement for both the customer and PostNord TPL.

Mikael Sannum works as a project leader focusing on IT solutions, with a background as warehouse worker at a small logistics company that was acquired by PostNord (then Posten).

Sannum shared insights into the case with Gray's American Stores (GAS) where PostNord TPL conducted stickering for the import company. The project had ended about six months ago at the time of the interview, Sannum informed.

The stickering process

The stickering process in GAS's case was partly done manually, partly automated, Sannum informed. The automated solution handled round packaging of cans and jars, while the rest was handled manually. Investigations were made on if the automation could be increased, Sannum stated, but the manual sticker was deemed more profitable. During the collaboration GAS had licensed the automated machines from PostNord TPL. When the collaboration ended, GAS purchased the automated machines. Ownership agreements for machines are decided upon in each unique project, Sannum stated.

What KPIs were used?

Sannum articulated the importance of designing KPIs in a way so that the customer can easily determine the value of the service. Explicitly, he stated that capacity is an important KPI. The customer would require a certain number of products stickered in a week for PostNord TPL to match.

Sannum identified KPIs to be beneficial for both the customer and PostNord TPL as it makes them both strive to become better at what they do. Specifically, he described how an hourly wage, instead of the way PostNord TPL charges on an activity bases, affects process improvement incentives:

“If you only get paid hourly, it does not challenge us to do a better job.

5.3 Technical Solution Providers

Table 5.3 presents the interviewees that make up the Technical Solution Providers sub-case data collection, in addition to showing the focus of each interviewee.

Table 5.3: Interviewees within the Technical Solution Providers sub-case, presenting the interviews' different focus.

Interviewee	Company, role	Focus of the interview
Jörgen Nilsson	Ettiketto, Head of Sales	The interview was performed to investigate the possibilities and restrictions that current state-of-the-art labelling technology offers.

Jörgen Nilsson - Ettiketto, Head of Sales

Jörgen Nilsson was found after searching online for technical solution providers and agreed on being interviewed. Nilsson is the head of sales for Ettiketto and the other companies that are in the same group. Having been in the labelling industry for over thirty years, Nilsson is a self-proclaimed labelling nerd.

Ettiketto is a company supplying both labels and labelling system solutions. Jörgen Nilsson started by stating that the labelling industry has been steadily growing, as most products these days have some sort of labels. He points out that labels are a large part of the customers' buying experience.

Current labelling technology

Nilsson began with describing the different levels of complexity the different machines can operate at. Using machines meant for bottles and cans, Nilsson stated that the entry level machines can handle products that are perfectly cylindrical, while the more advanced ones can label bottles and cans that are conical, edgy, or otherwise of almost any shape.

Nilsson pointed out that most packaging of almost any shape is possible to label in an automated machine, and it is the variety of shapes that makes it complex to create a one-fits-all automated solution. In most cases, Nilsson explained, you would have to have a few different machines that can handle products of a certain segment, e.g., one for bottles and cans, and another for flat square products.

An example of an Ettiketto offer Nilsson presented was a label dispenser, where the machine itself is placed above some type of conveyor belt. Products would be placed on the belt, facing the correct orientation, and labeled by the machine. Nilsson explained that the machine itself would never be the bottleneck in such a process, as it is very fast in applying labels. It would instead be the logistics around the machine that would be the limiting factor, e.g., the speed of placing products on the conveyor belt. The machines can take multiple sizes of labels and are easily refilled with new rolls or pre-printed labels.

Creating a labelling solution

Nilsson explained that Ettiketto focuses on the labelling part of the solution, but that they can act as a consultant for the customer and create customized systems that fit the customer's unique needs. They often collaborate with other suppliers to create these system solutions for a customer. Nilsson pointed out that the customer must do some work beforehand in planning the project, and exemplified the following questions the customer needs to answer beforehand:

- i. How many types of products does the solution need to be able to handle?
 - o Many different types of packaging could require more than one machine
- ii. What are the dimensions of the products?
 - o Ettiketto needs to have a detailed form description to start the project.

5.4 Summary of Interviews

Table 5.4, Table 5.5 and Table 5.6 presents a summary of the main points collected from the interviewees within all three sub-cases.

Table 5.4: Summary of interviews with Similar Players.

Interviewee	Company, role	Main points
Gustav Nyström	Orkla, Operations Project Manager	<ul style="list-style-type: none"> • Orkla is active mostly in the Nordics and Baltic areas, as well as other European countries and India. • Orkla's strategy is to focus on brands sold locally rather than having a generic assortment that needs to be adapted to several markets. • Nyström articulated how a certain number of markets and levels of generic assortment must be sold for the issue of market-specific packaging to arise.
Jenny Huber	Lantmännen Cerealia, Packaging Lead Innovation	<ul style="list-style-type: none"> • Lantmännen Cerealia is active on more than 30 markets but with most sales (87%) generated in the Nordics. • FINN CRISP is an example of a product sold on global markets (e.g., China, the US, and the UK). • Stickers are not conducted in regular operations but used to correct mistakes by the help of a third-party. This went in line with Huber's experience from industry. • Legal requirements on the displayed information and the total height of pallets are examples of how markets' requirements can differ.
Candidate A	Food Retailer, Packaging Manager	<ul style="list-style-type: none"> • The Food Retailer has a mixture of private labels (the Food Retailer's own) and other branded products. • Each market has their own purchasing organization that conducts purchasing of products within their expertise. After this, other Food Retailer markets make the decision whether the product is to be included in their market's assortment.
Fredrik Ryjord	Gray's American Stores, Head of Supply Chain	<ul style="list-style-type: none"> • GAS has moved from purchasing warehousing and stickering services from PostNord TPL to doing it in-house. • GAS has developed automated solutions for stickering, where Ryjord stressed the importance of treating stickering as a production process rather than a warehousing process to be successful. • The sense of responsibility among employees and the focus of the organization were three differences GAS experiences when moving the process in-house.

Table 5.5: Summary of interviews with 3PLs.

Interviewee	Company, role	Main points
Erik Lundin	PostNord TPL, Logistics and Business Development	<ul style="list-style-type: none"> ● Stickers are done in “normal operations” (stickering due to low volumes, bundling products and attaching price and store tags to fashion products) and “non-normal operations” (correcting mistakes). ● PostNord TPL collaborates with Samhall for manual stickering. ● KPIs are developed for both PostNord TPL and the customer. Lundin stressed that they use activity-based pricing, to create incentives for increased productivity. ● Lundin stated the importance of including the “technical solutions designer” in the process when adopting automations.
Mikael Sannum	PostNord TPL, Project leader	<ul style="list-style-type: none"> ● Investigations of automation had shown that manual stickering had been more profitable in the GAS project. ● Sannum stressed the importance of designing KPIs that communicate the value of the service to the customer. ● He highlighted the need to create incentives for process improvement through the pricing model.

Table 5.6: Summary of interviews with Technical Solution Providers.

Interviewee	Company, role	Main points
Jörgen Nilsson	Ettiketto, Head of Sales	<ul style="list-style-type: none"> ● Machines can handle varying levels of complex form and number of different forms. ● Often, more than one type of machine is needed if the assortment that needs labelling varies in form. ● Companies that come to Ettiketto need to present detailed blueprints or actual packaging for them to construct and tune machines that suit the customers’ needs.

6 Analysis

In this chapter the Investigation Model is applied to form the analysis and the outputs from each step presented. First, the single case and multiple case will be analyzed separately, followed by a cross-case analysis and lastly a process improvement analysis.

6.1 Single case

Figure 6.1 illustrates the focus of the section: Classification, Process Mapping, Performance Measurements, and Identify Challenges. Combined, the analysis of these areas builds up to answering SQ1-3 and RQ1, i.e., the as-is situation of the stickering process at IKEA.

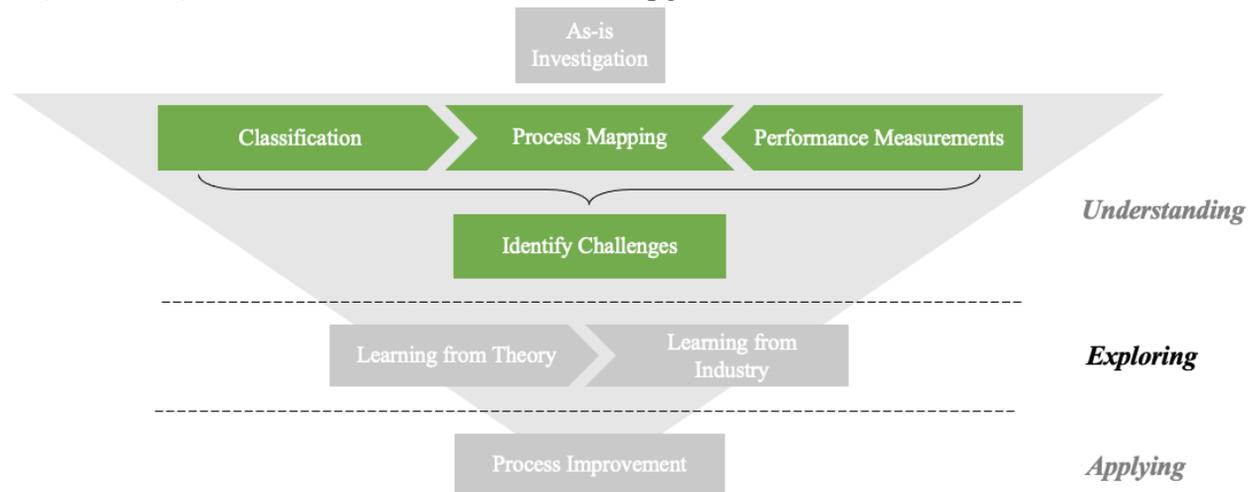


Figure 6.1: Theme of the section (Classification, Process Mapping, Performance Measurements, and Identify Challenges) highlighted in the Investigation Model.

6.1.1 General Learnings from the As-is Investigation

The first challenge that was identified is derived from Employee A, where he stated that he deemed the process to be immature. Hammer (2007) supports this, as the five capabilities of process maturity (Design, Performers, Owner, Infrastructure and Metrics) are found to be lacking in some regard.

Challenge 1: The stickering process is immature, as described by the Process and Enterprise Maturity Model.

A few strategic challenges were identified during the study and are presented below. As the scope of the study was limited to the operational part of the stickering process, these strategic challenges are lifted here in this section, but not acted upon and left as further research.

IKEA does not currently have a uniform stickering strategy that is implemented across all markets where stickering is performed. This needs to be addressed for stickering to be handled according to IFSAGs directions, where retailers no longer should be responsible for stickering. Further, IKEA's strategy for stickering at DC Helsingborg specifically is unclear. Mejborn implied that long-term planning is currently lacking. Employee A expressed that there is little to no formalization in print when it comes to stickering at DC Helsingborg. This leads to the first strategic challenge:

Challenge S1: IKEA's strategy for stickering at DC Helsingborg is unclear.

Employee A also said that IKEA knows little about what Bring's strategy looks like when it comes to stickering, in terms of Bring's interest in process development and future process investments. This results in uncertainties about how futures plans, and investments might align.

Challenge S2: IKEA is uncertain about Bring's view on stickering process improvement at DC Helsingborg.

It was found that the main worry at IKEA is that the current stickering process is lacking in capacity. Especially considering that flows will increase with stricter policies from IFSAG and internalization of INGKA products flows.

Challenge S3: Capacity is lacking to facilitate future flows.

This will be further discussed in an operational setting as the process at Bring is analyzed in section 6.1.4 *Process Mapping*.

6.1.2 Classification

Classification of products in regard to stickering was found to be relevant for different reasons:

- i. One way of establishing KPIs that are comparable between orders is to have product categories KPI's to ensure that orders are evaluated in a fair way, as suggested by Harald Berg. Classification can be used to find relevant product categories.
- ii. To find optimal machines to be used when automating the stickering process, classification of the form of the assortment has to be performed, Jörgen Nilsson, Head of Sales at Ettiketto, stated.

The time restriction of this thesis did not allow for any quantitative classification to be performed. Therefore, this is included in section 7.5 *Ideas for Further Investigations at IKEA*.

6.1.3 Performance Measurements

There are currently no agreements between IKEA and Bring about performance measurements for the stickering process specifically, regarding how the process's performance should be measured, how this is to be evaluated or its targets, Employee A describes. Neither does Bring conduct any internal measurement or evaluation of the process. As a result of this, no performance evaluation is conducted currently, Malin Cavalli Björkman informs. Cavalli Björkman goes on to describe how the process has, internally at Bring, been deemed too irregular to measure with performance measurements. The personnel reaching this conclusion are no longer working at Bring, but Cavalli Björkman recalls their arguments relating to the large number of different products and suppliers involved, making it difficult to set performance measurements that are comparable between different orders.

Challenge 2: There is a lack of understanding in how the process performs.

This concludes that little attention is given to performance specifically, as well as the stickering process generally. No forums where stickering is discussed regularly have been identified either internally at IKEA or in the communication between IKEA and Bring.

Challenge 3: Stickering is given little attention internally at IKEA and in communications with Bring.

6.1.4 Process Mapping

Figure 6.2 illustrates the as-is of the stickering process at DC Helsingborg, including the activities of the retailer, Food Demand Coordinator (FDC) and Bring employees. As the target group of this thesis is

within IKEA, the visualizations present more details in the IKEA employee's activities than other involved parties. Detailed versions of the two sub-process F6 can found in

Appendix C - Process Map.

No updated process description or visualization was present at IKEA or Bring once this project started, and these visualizations and process step descriptions were created by the authors based mostly on insights from Per Mejbörn and Malin Cavalli-Björkman at Bring. The lack of process documentation is a sign of process immaturity in relation to the process capability "design", according to the Process Enterprise Maturity Model.

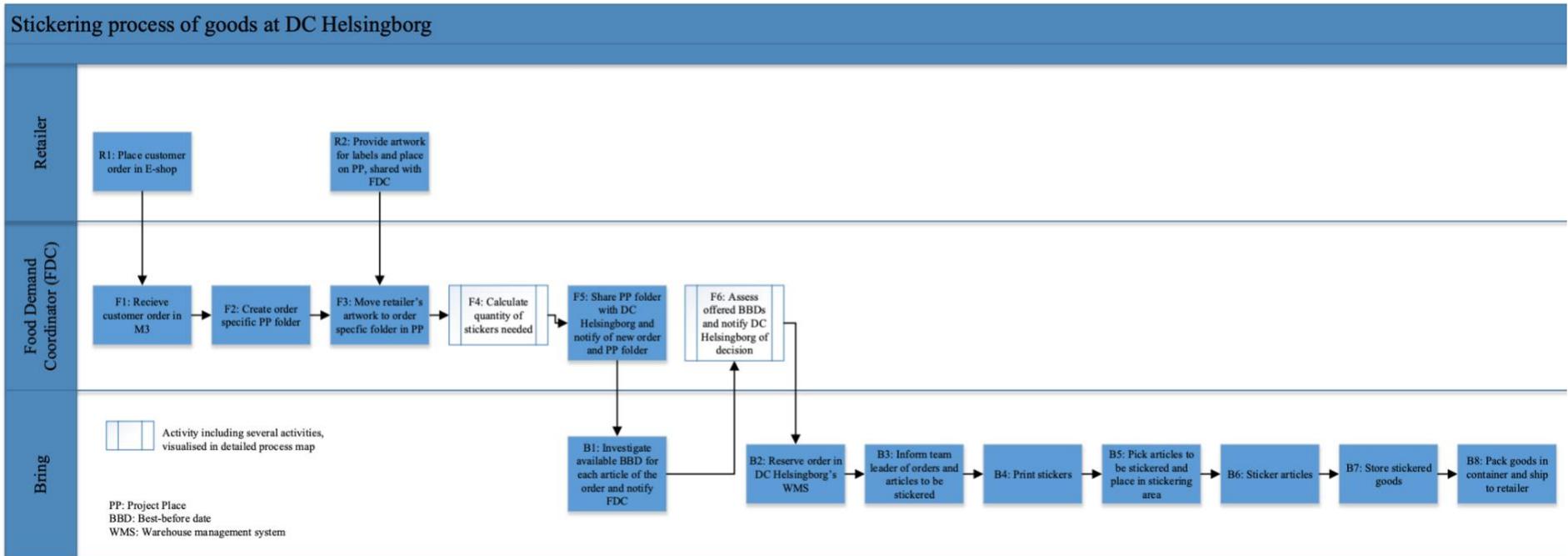


Figure 6.2: Stickers process of goods at DC Helsingborg, including the retailer, Food Demand Coordinator (FDC) at IKEA and Bring.

Starting at the beginning of the process, the first challenge identified in the current process relates to R2 (*Provide artwork for labels [...]*). Figure 6.3 presents how BA Food has the responsibility of stickers being compliant but is currently not involved in the creation of the stickers, or in any confirmation or control of the created stickers used at DC Helsingborg.

	BA Food	Retailers
Responsible for product compliance	<input checked="" type="checkbox"/>	
Currently creates all stickers		<input checked="" type="checkbox"/>

Figure 6.3: Visualization of showing how BA Food is responsible for product compliance, and that retailers are currently creating stickers.

It was identified that BA Food’s involvement in sticker creation varies across the different sticking locations at IKEA. Stickers applied at DC Hungary are created by BA Food, in accordance with BA Food’s compliance responsibility. This again relates to the ownership question of the process, and by extension process maturity.

Challenge 4: The party responsible for product compliance is not involved in sticker creation.

Figure 6.4 highlights the subprocess of F4, where the needed number of stickers are calculated by the FDC. A detailed version that further details the sub-process F6 as well as a description of each activity can be found in

Appendix C - Process Map The sub-activity of F4 is found to have several steps that require repetitive tasks for the FDC, involving manual input into an Excel sheet as well as extracting data from several M3 pages. The lack of system support is another sign of process immaturity according to PEMM.

Challenge 5: Manual preparation of orders is very resource intensive.

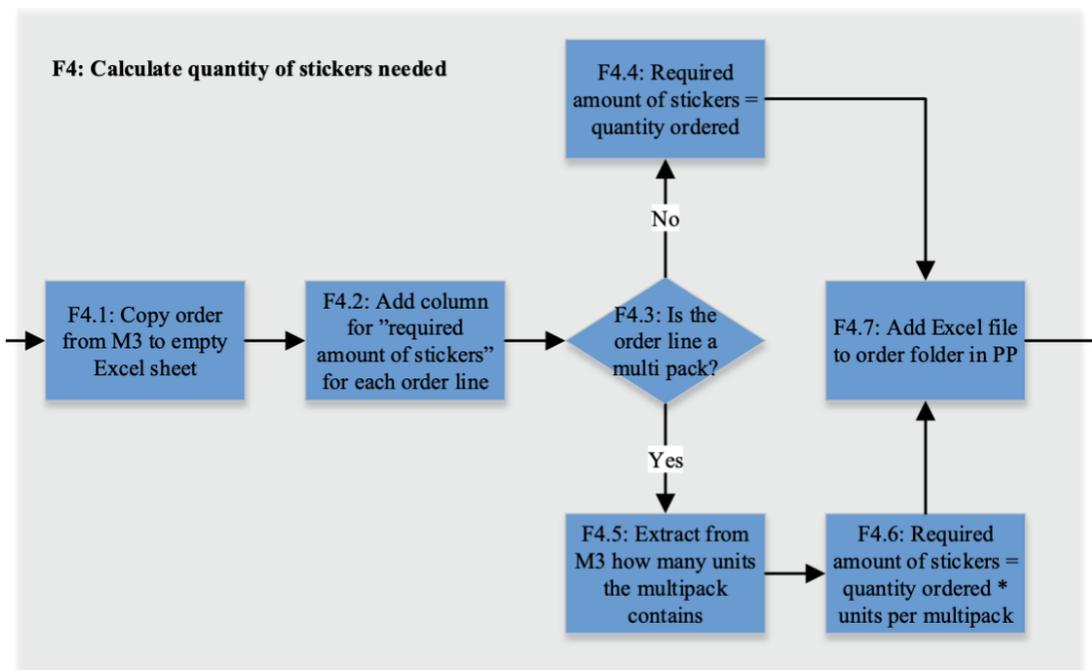


Figure 6.4: A detailed process map of the subprocess F4: Calculate quantity of stickers needed, performed by the FDC.

Having identified challenges in retailers' and FDC's current roles and responsibilities in the stickering process, lastly Bring's participation in the process will be covered. As identified in challenge S3, *Capacity is lacking to facilitate future flows*, several sources have identified the current process design as in need of capacity increase. No definite answer has been reached on what type of capacity is currently lacking, but two potential bottlenecks have arisen during the data collection:

- i. Number of Bring employees capable of performing the stickering process with required speed and quality.
- ii. Physical space in the warehouse dedicated to the stickering activity as well as storage of stickered goods.

In addition, when studying the number of Bring employees capable of performing the stickering process, it became evident that the on-boarding process is currently lacking. New employees are taught how to sticker only by shadowing more experienced colleagues. Additional dimensions of the on-boarding, in terms of written process descriptions or instructions are non-existing.

Challenge 6: It is unknown what type of capacity is currently lacking to facilitate future flows.

6.1.5 Identify Challenges

As highlighted when the challenges were presented, several of the challenges identified connect to the process maturity as defined by Hammer (2007) in section 3.3.2 *Process Maturity*. Therefore, Table 6.1 presents the challenges relating to process maturity.

Table 6.1: Current challenges with the stickering process at DC Helsingborg categorized as process maturity challenges. Sources are interviews, if not stated otherwise. Process capability presented relates to the process maturity model.

#	Current challenges	Source	Process capability
<i>Process maturity challenges</i>			
1	The stickering process is immature, as described by the Process and Enterprise Maturity Model.	Per Mejborn, Malin Cavalli-Björkman, Jasmine Manhold, Employee A, (Hammer, 2007)	
2	There is a lack of understanding in how the process performs.	Per Mejborn, Harald Berg	Metric/Owner
3	Stickering is given little attention internally at IKEA and in communications with Bring.	Per Mejborn	Owner
4	The party responsible for product compliance is not involved in sticker creation.	Per Mejborn, Harald Berg	Owner
5	Manual preparation of orders is very resource intensive.	Per Mejborn	Infrastructure
6	It is unknown what type of capacity is currently lacking to facilitate future flows.	Per Mejborn, Malin Cavalli-Björkman	Unknown

Table 6.2 presents the strategic character challenges found during the study. As the unit of analysis for this thesis is the operational stickering process, these strategic challenges are deemed out of scope. As a result, they have only been identified but not acted upon. I.e., no recommendations will be formulated as to how these challenges should be bridged, instead this will be recommended as an area of further research.

Table 6.2: Current challenges with the stickering process at DC Helsingborg categorized as strategic challenges. Sources are interviews, if not stated otherwise.

<i>Strategic challenges</i>		
S1	IKEA's strategy for stickering is fragmented across markets globally.	Per Mejbörn, Harald Berg, Simon Sturesson
S2	IKEA is uncertain about Bring's view on stickering process improvement at DC Helsingborg.	Employee A, Per Mejbörn
S3	Capacity is lacking to facilitate future flows.	Inter IKEA (2020b, p. 13), Per Mejbörn, Simon Sturesson, Harald Berg, Cecilia Findelius

6.1.6 Process Maturity Evaluation

Using a modified version (The HR systems capability was removed from the model, as no data on the subject was gathered) of the PEM model, presented in section 3.3.2 *Process Maturity*, the current maturity of the stickering process at IKEA can be evaluated. In Table 6.3 process capabilities are scored, and the motivation is based on the criteria found in Hammer (2007). As for Performers, these have been identified as the Bring employees executing the actual stickering.

Table 6.3: Stickering process maturity at IKEA evaluated using PEMM, explanations of the scores and criteria are found in section 3.3. The authors refer to Hammer (2007) for descriptions of each score.

Process Capability	Motivation	Score
<i>Design</i>		
Purpose	The stickering process has been designed to work in an optimized way as it is now but lacks IT system integration.	P2
Context	The process has clear inputs, outputs, suppliers, and customers (the retailers) and the needs of the retailers are somewhat clear and agreed upon. Performance expectations are not agreed upon between the process owner at IKEA and Bring.	P2
Documentation	The documentation that exists at IKEA is very functional and not up to date. There exists no updated end-to-end documentation of the process.	P1

<i>Performers</i>		
Knowledge	Workers at Bring are aware of the overall process flow and how their work affects the customers and the process's performance. It is assumed that they do not consider business concepts at IKEA or how stickering affects other processes at IKEA, as they work for Bring.	P2
Skills	Workers have the required skills to perform stickering efficiently and work well in teams. They are focused on the operational part of stickering and are not involved in higher level business decision making.	P2
Behavior	Workers follow the process design well, enable the efficient work of others and perform stickering correctly and well. As they work for Bring and not IKEA, their incentives to improve the process are limited to the demands that are put on Bring by IKEA.	P2
<i>Owner</i>		
Identity	The process owner is informally charged with improving the process's performance. No formalization of the ownership of the stickering process exists.	P1
Activities	A few projects to improve the process have been conducted, but they have been led by Per Mejborn, a performer in the process.	P0
Authority	As no formal process owner is set, no authority to encourage changes exists with any one person.	P0
<i>Infrastructure</i>		
Information systems	M3 is used with a few functional components that support stickering. The IT system is not integrated or designed with the process in mind.	P2
<i>Metrics</i>		
Definition	The KPIs used are basic cost and quality (CASY reports) metrics. No end-to-end metrics exist that are formulated with customer needs in mind.	P1
Uses	Performer do not use metrics to find root causes of faulty performance and drive some functional improvements. Current metrics are not advanced enough to be used to benchmark the process against others within the industry. Also, no evaluation or follow-up on the metrics' performance is conducted.	P0

6.2 Learning from Theory

Figure 6.5 illustrates the focus of the section, Learning from Theory.

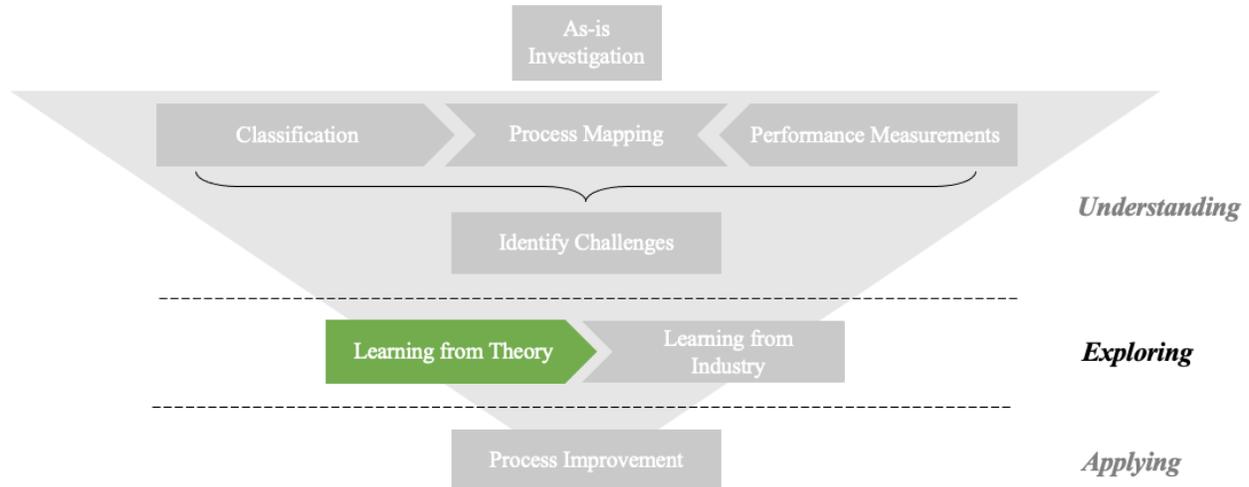


Figure 6.5: Theme of the section (*Learning from Theory*) highlighted in the *Investigation Model*.

As described in section 3.2.3 *Research Gap in Existing Research*, the literature review concluded that there is a research gap regarding the operability of the sticking process. This results in that no insights detailed enough were collected from the literature review, i.e., the *Investigation Model's Learning from Theory* step does not result in any specific insights besides the identification of the research gap.

6.3 Learning from Industry - Multiple case

Figure 6.6 illustrates the focus of the section, Learnings from Industry. Insights have been collected through the multiple case, with the three sub-cases providing a different perspective of industry's approach or conduction of sticking. Following is a within-case analysis divided between the different sub-cases, building up to answer RQII.

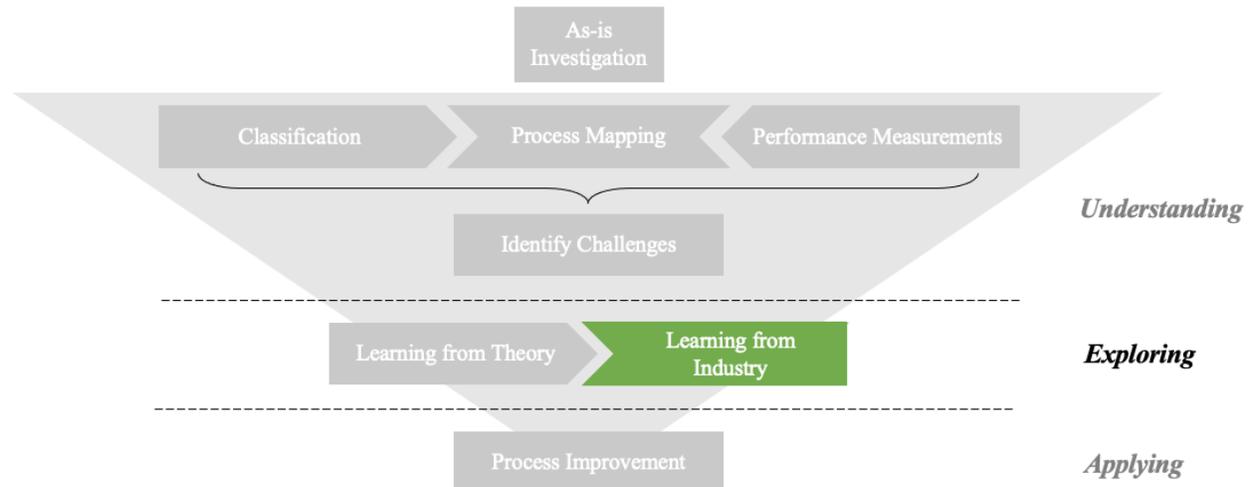


Figure 6.6: Theme of the section (*Learning from Industry*) highlighted in the *Investigation Model*.

6.3.1 Similar Players

Learnings from the Similar Player can be divided into two categories: how to conduct stickering operationally and actions that can be taken to avoid stickering as a part of “normal producers”. In the former, Gray’s American Stores can provide much insight into how to design and operate a stickering process, both in collaboration with a 3PL and as an operator of their own stickering. In the latter, Lantmännen Cerealia, Food Retailer and Orkla provide insights.

Out of the four studied Similar Player cases, Lantmännen Cerealia, Food Retailer, Orkla and Gray’s American Stores, only the latter conducts stickering as a part of their normal operations.

Gray’s American Stores

Gray’s American Stores (GAS) is the only importing company out of the four studied in the Similar Player sub-case, which sets them apart from the other companies. Compared to Lantmännen Cerealia, Food Retailer and Orkla, no part of GAS’s assortment is originally designed for the markets into which GAS import them, making stickering an enabler of GAS’s business model. This explains why stickering is an important part of GAS’s operations. As GAS has experience from both contracting a 3PL to conduct their stickering, and performing the stickering on their own, both types of set-ups can be studied through GAS’s case.

GAS has spent a lot of time creating process documentation. This is then used, in combination with practice, to ease on-boarding of new staff in a structured way. In addition to this, the extensive documentation is readily available to all employees, so that all know where to find the most recent information about all relevant processes.

Learning 1: Process documentation can aid in on-boarding new staff, as well ensuring that all relevant information about the process is available to employees.

When KPIs are considered, Ryjord explained that quality will always be prioritized over efficiency. This, as a lack of quality could potentially mean a safety concern for end customers.

Learning 2: Quality can be prioritized over efficiency, especially when delicate matters such as food safety is concerned.

Comparing between when they collaborated with PostNord TPL and the current situation where GAS performs their own stickering, Fredrik Ryjord identified three main reasons for in-housing the stickering process:

First, GAS found that they would like to have more control over the process itself. Control meant in their case how quick communication channels were, as well as how they would like to improve the process. By in-housing the process, GAS had significantly lowered the time it took to reach the personnel conducting stickering. This meant they could stop the process if needed in case new information became available.

An example of the second point is the level of automation in the process is a major difference between when PostNord TPL conducted the stickering compared to know that GAS does it on their own. The process went from being partly automated (for cylindrical packaging) and manual (for remaining packaging) at PostNord TPL, to a highly automated process when they in-housed their logistics function. By in-housing the process, GAS could freely choose to redesign the process, which was a time-consuming project spanning over 14 months, where GAS combined offers and equipment from several technical solution providers.

Learning 3: By in-housing the stickering process, GAS found that they had more control over the process.

The second reason for in-housing, is that GAS found that they could get more value from viewing the stickering process as a manufacturing step, rather than a logistics activity. This led to a shift where the stickering process from only a requirement to make products compliant, into a value generating activity for GAS. This made them question if outsourcing the process was the right choice for them, as PostNord TPL's core competences lie within warehousing and logistics, rather than within manufacturing. This also includes the willingness to invest in equipment, dedicating space in their warehouse and in developing the process with KPIs and evaluation.

Learning 4: A customer should not expect a 3PL to have a manufacturing company's mindset in terms of process performance, as this is not part of their core competence.

Lastly, the question of who's employees performs the actual stickering is lifted as an important consideration. GAS puts a lot of effort and care into training, developing, and lifting their employees, resulting in them reaping a lot of benefit of having their own employees conduct the stickering in terms of quality, communication, and responsibility.

Learning 5: Having their own staff performing the process is perceived positive for quality, communication, and responsibility.

Lantmännen Cerealia, Food Retailer and Orkla

None of Lantmännen Cerealia, Food Retailer or Orkla depend on stickering to enable their business as GAS does. The reasons as to why Lantmännen Cerealia, Food Retailer and Orkla does not conduct stickering as a part of their normal procedure differ between the companies.

For Orkla, it is a result of their strategy, "Sustainable growth with strong local brands". The company is active on many markets but with a consciously localized assortment. This results in individual products not being sold on many markets, i.e., the need to adapt the packaging to many markets does not exist.

Learning 6: By focusing on local brands on each market, compliance is ensured through local sourcing.

Lantmännen Cerealia and Food Retailer on the other hand do have an assortment available in several markets. In Lantmännen Cerealia's case, the number of products available in many markets is limited, where FINN CRISP is described as an example. In this case, Lantmännen Cerealia describes how language clusters are created centrally that combine several markets' requirements onto one stock-keeping unit. In this way, all markets are covered in an artwork or version of the product, and no stickering is needed. This can be described as a centralized way of enabling product compliance on several markets. It is worth noting that Lantmännen Cerealia is a wholesaler and does not have the same responsibility for ensuring compliant products to the end customer.

Learning 7: Creating compliant products from the start eliminates the need for stickering, by including all markets in language clusters.

Lastly, Food Retailer is an example of a more decentralized approach to reaching product compliance in several markets. This is enabled through Food Retailer's procurement organization structure. Two characteristics ensures compliance of products:

- i. As each individual market has the mandate to choose whether a product is to be introduced in their market, the decision is decentralized.
- ii. Each individual market has a "translation team" that, if the decision is made to introduce a new product to the individual market, has the language and legal capabilities to create a packaging that is compliant with the market's requirements. They provide to the purchasing organization of the

Food Retailer what information and format is necessary on the packaging for their markets, which acts as an input for cluster creation at a central level.

Food Retailer is an example of a company that acts as their own wholesaler, as well as running retail stores. This creates the need of ensuring compliance for products that are to be sold on the different markets where they are active.

Learning 8: Utilizing decentralized procurement in combination with dedicated “translation teams” can ensure that compliance is reached, and therefore prevent the need of stickering.

Having analyzed how Orkla, Lantmännen Cerealia and Food Retailer reach product compliance without the use of stickering, it is worth mentioning that the two latter do express that they use stickering in problem-solving, short-term situations that are not a part of the “normal procedure”. Lantmännen Cerealia performs stickering as an issue-solving tactic to correct mistakes and Food Retailer as a temporary solution to make products compliant in accordance with EU directives.

Learning 9: Stickering is often only used to correct mistakes or other non-normal problems that occur.

6.3.2 3PL

Incentives for process performance and improvement

In terms of process performance in general, PostNord TPL emphasizes the importance of setting KPI targets both internally at PostNord as well as for the customer to adapt to. Erik Lundin expressed a difference in what KPIs were generally focused upon within PostNord TPL and their customers, where the latter valued product availability as a metric while PostNord TPL had a higher emphasis on productivity. This connects to the activity-based pricing model utilized by PostNord TPL, where a productivity increase results in a profit increase. As for the stickering process specifically, PostNord TPL could not exemplify what KPIs were used for that process and stated that this type of process is difficult to benchmark.

Learning 10: PostNord TPL values KPIs in improvement of process performance in general, but states that specific stickering KPIs are not used. The process is deemed difficult to benchmark against other processes.

As for process improvement, a pricing model that incentives improvement was found to be important from PostNord TPL’s perspective. The usage of activity-based pricing gives incentives to improve efficiency, which results in decreased costs and therefore in an increased profit for PostNord TPL.

Learning 11: PostNord TPL argued that an activity-based pricing model increases process improvement incentives compared to hourly pricing.

Ownership of process investments

Lastly, if process investments are made in terms of e.g., tools or automations, the question of ownership arises. In the case of PostNord TPL and Gray’s American Stores (GAS) the former owned the automations used in the stickering processes, and GAS leased it. PostNord TPL described how the question of who owns equipment is agreed upon within each project, depending on e.g., customer’s financial situation. If the customer does not have the financial means of investing, the 3PL can buy the machines and lease them to the customer.

Learning 12: PostNord TPL does not have a standard approach on how process investments are financed, instead it is decided on a case-to-case basis.

The question of ownership of automations could be connected to the customization of the automation. A highly customized automation solution results in a higher level of lock-in. A 3PL's willingness to invest in the solution could therefore increase if it can be used for a wider set of products.

Learning 13: A 3PL's incentives to invest in process improvement could be affected by the customization of the investments.

During the data collection at PostNord TPL maintenance services, in terms of how these were conducted or who paid for it, was not covered.

6.3.3 Technical Solution Providers

Firstly, it is concluded that the largest automation challenge does not lie in designing an automated solution for a specific product, but rather to combine several packaging types to be handled by the same automation. Jörgen Nilsson at Ettiketto pointed out that most packaging of almost any shape is possible to label in an automated machine, but that it is the variety of shapes that makes it complex to create a one-fits-all automated solution for all products. To solve this, Nilsson stated that often several types of automations are combined if the packaging assortment is too wide.

Learning 14: In automation design, a main challenge is to find one solution that fits all, or a large part of the product assortment.

Secondly, Nilsson described two potential bottlenecks when a labelling automation is used: either the speed of the labelling machine itself or the "supporting logistics" placed before or after the machine. Generally, if the labelling machine is included in a larger automation system, Nilsson stated that the speed of the labelling machine sometimes becomes the bottleneck of the stickering process. Compared to if the labelling machine is utilized as a stand-alone automation, the "supporting logistics" creates the bottleneck of the overall process. Nilsson exemplified supporting logistics with e.g., an employee placing products on the conveyor belt before the automation or removing products after the automation.

Learning 15: A labelling process's bottleneck depends on if the automation is connected to production or a stand-alone process.

To optimize the entire stickering process, it is important to include the entire process in the investigation, i.e., not only focus on the physical application of stickers but also include all "supporting logistics" in the scope. Otherwise, there might be a risk of sub-optimization.

Learning 16: It is important to study the entire process when an automation is investigated, to decrease the risk of sub-optimization.

Lastly, there is a need for collaboration between the technical solution provider and the customer when designing the automation solution. Nilsson exemplified that packaging specifications need to be provided, or demonstrations units of the packaging intended to be handled in the automation. This highlights how customized stickering automations often are and relates to the question of investment and ownership discussed in Gray's American Stores case presented in section 6.3.1 Similar Players.

Learning 17: The technical solution provider and the customer needs to collaborate when designing the automation solution, e.g., packaging specification is needed for automation system design.

6.4 Summary of learnings from industry

Table 6.4 summarizes learnings from industry, gathered through the multiple case.

Table 6.4: Summarized learnings from Learning from Industry.

#	Learning	Source
1	Process documentation can aid in on-boarding new staff, as well ensuring that all relevant information about the process is available to employees.	Gray's American Stores
2	Quality can be prioritized over efficiency, especially when delicate matters such as food safety is concerned.	Gray's American Stores
3	By in-housing the stickering process, GAS found that they had more control over the process.	Gray's American Stores
4	A customer should not expect a 3PL to have a manufacturing company's mindset in terms of process performance, as this is not part of their core competence.	Gray's American Stores
5	Having their own staff performing the process is perceived positive for quality, communication, and responsibility.	Gray's American Stores
6	By focusing on local brands on each market, compliance is ensured through local sourcing.	Orkla
7	Creating compliant products from the start eliminates the need for stickering, by including all markets in language clusters.	Lantmännen Cerealia
8	Utilizing decentralized procurement in combination with dedicated "translation teams" can ensure that compliance is reached, and therefore prevent the need of stickering.	Food Retailer
9	Stickering is often only used as a means to correct mistakes or other non-normal problems that occur.	Orkla, Lantmännen Cerealia and Food Retailer
10	PostNord TPL values KPIs in improvement of process performance in general, but states that specific stickering KPIs are not used. The process is deemed difficult to benchmark against other processes.	PostNord TPL
11	PostNord TPL argued that an activity-based pricing model increases process improvement incentives compared to hourly pricing.	PostNord TPL
12	PostNord TPL does not have a standard approach on how process investments are financed, instead it is decided on a case-to-case basis.	PostNord TPL
13	A 3PL's incentives to invest in process improving investments could be affected by the customization of the investments.	PostNord TPL
14	In automation design, a main challenge is to find one solution that fits all, or a large part of the product assortment.	Ettiketto

15	A labelling process's bottleneck depends on if the automation is connected to production or a stand-alone process.	Ettiketto
16	It is important to study the entire process when an automation is investigated, to decrease the risk of sub-optimization.	Ettiketto
17	The technical solution provider and the customer needs to collaborate when designing the automation solution, e.g., packaging specification is needed for automation system design	Ettiketto

6.5 Cross-case Analysis

Using the evaluation of IKEA’s stickering process maturity presented in section 6.1.6 *Evaluation*, learnings from the multiple case study found in section 6.3 *Learning from Industry - Multiple case* can be used to showcase how IKEAs process can become more mature. These are presented in Table 6.5.

Table 6.5: Process maturity evaluation from Hammer (2007), with learnings from the multiple case study added.

Process Capability	Motivation	Score	Learnings from Industry
<i>Design</i>			
Purpose	The stickering process has been designed to work in an optimized way as it is now but lacks IT system integration.	P2	
Context	The process has clear inputs, outputs, suppliers, and customers (the retailers) and the needs of the retailers are somewhat clear and agreed upon. Performance expectations are not agreed upon between the process owner at IKEA and Bring.	P2	
Documentation	The documentation that exists at IKEA is very functional and not up to date. There exists no updated end-to-end documentation of the process.	P1	GAS conducted extensive process documentation when in-housing. This aids in onboarding and general knowledge distribution and retention. (<i>Learning 1</i>)
<i>Performers</i>			
Knowledge	Workers at Bring are aware of the overall process flow and how their work affects the customers and the process’s performance. It is assumed that they do not consider business concepts at IKEA or how stickering affects other processes at IKEA, as they work for Bring.	P2	An on-boarding process supported by both process documentation and practice at GAS makes it easy to introduce new staff. (<i>Learning 1</i>)
Skills	Workers have the required skills to perform stickering efficiently and work well in teams. They are focused on the operational part of stickering and are not involved in higher level business decision making.	P2	Considering that Bring is a 3PL, they lack in equipment, space, and skills to handle stickering as a production step as production is not their core competence. (<i>Learning 4</i>)
Behavior	Workers follow the process design well, enable efficient work of others and perform stickering correctly and well. Working for Bring and not IKEA, their incentives to improve the process are limited to the demands that are put on Bring by IKEA.	P2	GAS found that in-housing the stickering process and employing their own staff resulted in more dedicated and involved workers that actively pursue quality improvements. (<i>Learnings 3 & 5</i>)

<i>Owner</i>			
Identity	The process owner is informally charged with improving the process's performance. No formalization of the ownership of the stickering process exists.	P1	
Activities	A few projects to improve the process have been conducted, but they have been led by Per Mejborn, a performer in the process.	P0	
Authority	As no formal process owner is set, no authority to encourage changes exists with any one person.	P0	
<i>Infrastructure</i>			
Information systems	M3 is used with a few functional components that support stickering. The IT system is not integrated or designed with the process in mind.	P2	
<i>Metrics</i>			
Definition	The KPIs used are basic cost and quality (CASY reports) metrics. No end-to-end metrics exist that are formulated with customer needs in mind.	P1	GAS found that quality is very important, as faulty products could result in severe danger for a consumer. Pricing models that encourage efficiency (e.g., activity-based pricing) could be beneficial, as long as quality is not compromised. (<i>Learnings 2, 10 & 11</i>)
Uses	Performer do not use metrics to find root causes of faulty performance and drive some functional improvements. Current metrics are not advanced enough to benchmark the process against others within the industry. No evaluation or follow-up on the metrics' performance is conducted.	P0	

It was concluded that three out of four companies included in Similar Players did not find themselves in the same situation as IKEA when it comes to stickering due to:

- i. None of the companies researched rely on offering a generic range of products, as with the IKEA Concept.
- ii. They can choose whether to introduce a product to a market or not.

As a result of this, only insights from Gray's American Stores was applied.

6.6 Process Improvement

Figure 6.7 illustrates the focus of the section, Process Improvement, using the challenges identified as the starting point building up to answer RQIII.

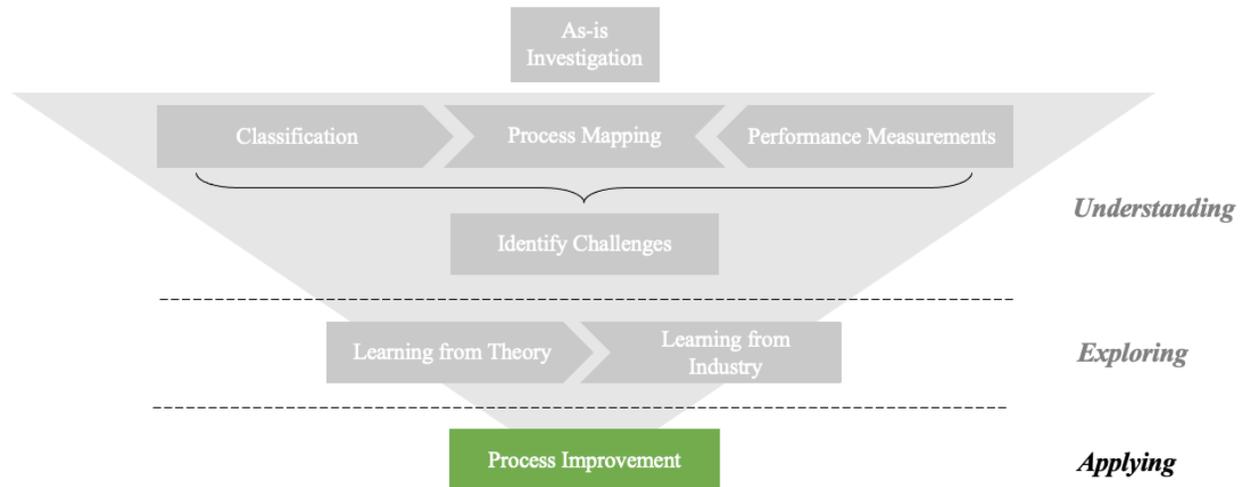


Figure 6.7: Theme of the section (Process Improvement) highlighted in the Investigation Model.

The goal is to increase process maturity through addressing challenges 1-6. This is presented below.

Challenge 1: The stickering process is immature, as described by the Process and Enterprise Maturity Model

As-is: As presented in Table 6.3, the process maturity is low in the current process. Especially the capabilities *Owner* and *Metrics* are immature.

Wished future position: The process should mature on the given points in the PEMM. This aids in securing future performance.

Recommended action: The first challenge can be addressed through working with each point that requires attention in the Process Enterprise Maturity Model (PEMM). Challenges 2,3 and 5, which are presented below, each touch on capacities showcased in the PEMM.

Challenge 2: There is a lack of understanding in how the process performs

As-is: According to the fifth capacity in the PEMM, Metrics, it is currently difficult to determine how the process performs. E.g., no KPIs are used to continuously evaluate process performance or forums where the process performance is discussed exist. CASY, IKEA's report form for incidents, are used as a measurement for quality. CASY reports are used as an indicator, and only one incident was reported during the financial years 2019-2021. Costs are not measured in detail, but only on a per-unit basis of each order.

Wished future position: The process performance is easily understood, targets are set and continuously followed up. E.g., KPIs are utilized, clearly communicable and used be benchmarked and find best-in-class practice for stickering. These KPIs and their targets are regularly reviewed and refreshed to keep them up to date.

Recommended action: Determine what type of process performance should be tracked, and design solutions to capture these parameters. Include sticker in forum(s) where process performance is discussed and followed up, as well as assign the responsibility to a process owner.

An important aspect to keep in mind is the quality and safety of the process. The authors recommend all process improvements in e.g., productivity to be conducted.

Challenge 3: Stickers are given little attention internally at IKEA and in communications with Bring

As-is: Stickers are currently given little attention at internal forums. This results in fewer discussions about how stickers can be included in strategic planning and general process improvement.

Wished future position: Stickers have a clear forum where they can be discussed internally at IKEA, as well as in regular meetings with Bring. A process owner, with formalized authority and responsibility is set, and they work actively to bring stickers forward at said forums.

Recommended action: Establish a forum where stickers are discussed or include stickers in an appropriate existing forum. Formalize how these forums should be utilized, who ought to participate, the frequency of them etc.

Challenge 4: The party responsible for product compliance is not involved in sticker creation.

As-is: BA Food is to be responsible for product information on stickers. Currently, stickers are created by the retailers, which are the three different franchisees Al Futtaim, Al Sulaiman and Al Homaizi, and handled by SCO. BA Food is not involved with, or has any insight into, the sticker format creation.

Wished future position: BA Food's assignment in relation to sticker content is met through their involvement in the process. This is put in practice in DC Hungary, where BA Food creates the stickers that are applied to the products handled in the DC.

Recommended action: Clarify responsibilities with BA Food, to ensure that IFSAG requirements are met. A process owner should be appointed for the process, to clarify communications between BA Food, SCO, and retailers. Keep in mind that there are three retailers involved in the sticker process at DC Helsingborg, as these will affect communications with all parties involved in the sticker process. Further recommendations regarding this, that are focused on BA Food are found in the pre-study conducted by Anna Wittrup (2020).

Challenge 5: Manual preparation of orders is very resource intensive

As-is: Currently an extensive amount of manual work is required by the Food Demand Coordinator to prepare an order for picking at DC Helsingborg. A few modules in M3 exist which supports the sticker process at IKEA, but most of the order handling is done in Excel. Project Place is used as a file sharing platform between the retailers, IKEA and Bring.

Wished future position: IT systems have integrated functions that are tailored to the needs of the sticker process, resulting in minimized manual work required in e.g., Excel.

Recommended action: Create a group of individuals knowledgeable of the sticker process which can brainstorm how M3 can be used to make the handling of orders easier and communications clearer. Evaluate whether Project Place is the best way to communicate between parties and set up clear

instructions for how to use it. Anna Wittrup (2020) also found that digitalization is a big enabler for stickering process improvement on several points, which can be found in the pre-study.

Challenge 6: It is unknown what type of capacity is currently lacking to facilitate future flows

As-is: Currently, it is unclear about what a lack of capacity is caused by. Potential capacity shortage has been identified in a limited number of skilled workers that are sufficiently efficient in relation to Bring's time requirements for stickering. Also, that the physical space is limited at DC Helsingborg which creates bottlenecks.

Wished future position: The type of capacity needed to meet future demand is determined.

Recommended action: Conduct a capacity investigation to determine what type of capacity is lacking. Through this study, the following type of potential capacity shortages have been identified and can be addressed through the following action:

The number of Bring employees capable of performing the stickering process with required speed and quality is lacking

- i. Attempt to lower the barriers of entry of executing the stickering, e.g., include automated solutions. This could lower the speed and quality requirements on stickering by hand, and thereby increase the number of workers able to participate in the process.
- ii. Create process descriptions and instructions. This to ease on-boarding as this is currently done by only shadowing. In addition, this could ease process performance.

Physical space in the warehouse dedicated to the stickering activity as well as storage of stickered goods.

- i. Investigate if the allocated space could be expanded at DC Helsingborg. If not possible, consider if sticker could be conducted on a different location, either by Bring or another party.

7 Recommendation

In the recommendation, learning, insights, and analysis is synthesized and packaged into a recommendation towards IKEA on how to act on the identified challenges. Recommended actions are presented in three streams and following, a broad action plan is presented. Next, the recommendations' improvements on the process maturity are presented, a risk analysis and finally suggested future areas of research.

The following recommendations have been formed based the process improvement conducted by the authors, as well as the workshop held at the end of the project.

7.1 Recommended actions

The recommendations consist of three main streams with an over-arching initial decision, visualized in Figure 7.1. The first thing that IKEA must decide is whether to continue to sticker products at DC Helsingborg. A learning from Gray's American Stores was that expectations must be realistic about what service a logistician can provide when conducting manufacturing, which is not their core competence. They decided to in-house the process, leading to greater value in their case. This was discussed during the workshop held with IKEA and it was found that it does not have to an all-or-nothing decision. For example, only ambient temperature products could be outsourced elsewhere, as they are the easiest to deal with. The main issue raised by management at the workshop was that it could be difficult to find a good partner.

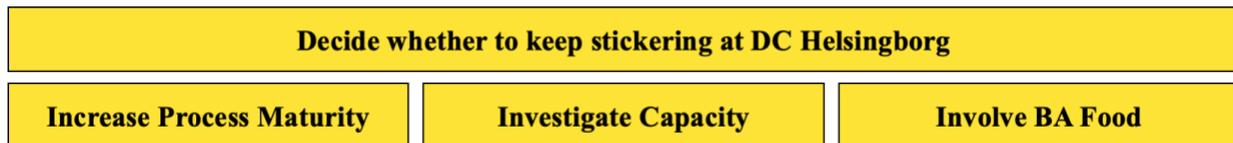


Figure 7.1: Three streams of recommendation with the overarching first decision.

7.1.1 Increase Process Maturity

Recommendation 1: Decide whether to continue stickering at DC Helsingborg or do it somewhere else.

If IKEA decides to continue their partnership with Bring at DC Helsingborg, the following recommendations can be applied. As the scope of this thesis is limited to the process at DC Helsingborg, no recommendations will address if the process is moved elsewhere.

During the workshop it was found that before considering a process owner, a decision on whether stickering should be its own process or treated as supporting process to other core processes should be made. After the process structure has been decided on, a process owner with formalized, clear responsibilities and appropriate authority to change the process should be appointed. They should be responsible for initiating improvement projects, evaluate and follow-up performance and have authority to realize such initiatives.

Recommendation 2: Decide on how the formal process structure should look like and appoint a process owner with formalized responsibility and authority.

Process documentation and instructions should be developed to assist in training of new workers and make certain that information is not lost if roles are changed within the organization. Process documentation should be extensive enough that all activities end-to-end are clear and should be available to all people involved in the process.

Recommendation 3: Develop process documentation.

The IT systems should be developed to integrate functionality specifically tailored to stickering. A project should be initiated which would create and integrate functions in M3 that minimized the need of manual order preparation and handling.

Recommendation 4: Develop the IT infrastructure to minimize manual labor in order preparation.

During the workshop, discussions on how the understanding of process performance could be improved were held. It was suggested that a Needs Definition, defining all the inputs of the process should be performed initially, which would then be used as the basis to find a few relevant KPIs. These KPIs should then be implemented and forums where these are evaluated and followed-up should be established, either as new forums or included in existing once.

Recommendation 5: Improve process performance understanding.

Goals and expectations on performance should be aligned between Bring and IKEA. This would make it clearer what future projects and initiatives could be planned and implemented. Incentive models should be discussed, such as activity-based pricing, minding that quality and safety should always be prioritized.

Recommendation 6: Formalize expectations between Bring and SCO.

7.1.2 Investigate Capacity

As it is unclear what exact capacity is lacking at DC Helsingborg, an investigation to clarify this should be initiated. This would ensure that appropriate actions can be taken to increase capacity to handle future flows.

Recommendation 7: Investigate what exact capacity is lacking at DC Helsingborg.

One bottleneck found is that only a few workers are skilled enough to sticker goods efficiently and with sufficient quality in the current process design and informal requirements on stickering speed set by Bring. An increase in process documentation could aid in training and onboarding of new staff.

Recommendation 8: Attempt to lower onboarding barriers through increased process documentation.

Another way of lowering barriers for workers could be to include automated solutions. This would mean that more staff could work with stickering, while not compromising on either quality or efficiency. Automated solutions could also mean that larger flows of goods can be stickered per hour. During the study, IKEA Intralogistics (IKEA's internal automation consultants) were interviewed. They were opened to discuss and help if an automation solution was investigated.

Recommendation 9: Investigate the possibilities of automation solutions at DC Helsingborg.

The physical space at DC Helsingborg would need to be investigated, to see if additional space can be made available to increase stickering capacity.

Recommendation 10: Investigate whether additional physical space can be made available for stickering at DC Helsingborg to increase capacity.

7.1.3 Involve BA Food

Collaboration with BA Food to increase their involvement with stickering at DC Helsingborg should be initiated, so responsibilities between SCO and BA Food can be aligned. During the workshop, when this topic was discussed, it was expressed that BA Food are fully aware of their responsibility on this subject. The authors still recommend that SCO acts on this point and tries to involve BA Food in stickering at DC Helsingborg, to further escalate the issues found in this study.

Recommendation 11: Initiate BA Food collaboration on stickering at DC Helsingborg.

Responsibilities on stickering between SCO and BA Food should be formalized, to ensure that both parties fulfill the requirements set by IFSAG.

Recommendation 12: Formalize and clarify responsibilities regarding stickering.

The recommendations are grouped into three streams and summarized in Figure 7.2.

Decide whether to keep stickering at DC Helsingborg		
Increase Process Maturity	Investigate Capacity	Involve BA Food
<p>Decide on how the process should be structured and appoint a process owner, which has sufficient authority to make changes, and formalized responsibility.</p> <p>Develop process documentation to lower barriers in onboarding new staff, and ensuring information is not lost if roles are changed in the organization.</p> <p>Develop the IT infrastructure to facilitate stickering activities, lowering the resource intensity of processing orders.</p> <p>Increase understanding of process performance, by performing a Needs Definition, from which a few relevant KPI's can be found.</p> <p>Formalize expectations on process goals and performance between Bring and SCO, to clarify targets and goals.</p>	<p>Investigate what exact capacity is lacking at DC Helsingborg.</p> <p>Attempt to lower on-boarding barriers through extensive process documentation to assist the training of new staff.</p> <p>Investigate the possibilities of automation solutions in the stickering process, to make the process more efficient and lower the required skills needed to work with stickering.</p> <p>Investigate whether additional physical space can be made available for stickering to increase capacity.</p>	<p>Initiate BA Food collaboration, to increase their involvement in stickering at DC Helsingborg.</p> <p>Formalize and clarify responsibilities regarding stickering, so that parties fulfill the requirements set by IFSAG.</p>

Figure 7.2: Summary of recommended actions.

7.2 Action Plan

During the workshop, it was found that the initial step should be to map the process for stickering, in line with how IKEA usually works in a situation like this. This would ensure that all parts of the process are known to IKEA and paves the way for working with the process.

Secondly, they should reach a decision on whether to keep stickering at DC Helsingborg or to perform it somewhere else, in part or completely.

Third, the authors' recommendations can be implemented. The first recommendation to consider would be to find an appropriate process owner, to the process structure they choose. Under a clear leadership, the rest of the recommendations can be implemented. The recommendations are structured in three streams, as presented in Figure 7.2, and can be implemented parallel to each other.

7.3 Increased Process Maturity

If the recommended actions presented in Figure 7.2 are implemented, the process will potentially mature on several capabilities, illustrated in Figure 7.3. As presented in section 3.3.2 *Process Maturity*, the levels P0 to P4 relates to the process maturity level where P0 is the least mature and P4 the most mature process. The authors refer to Hammer (2007) for more detailed descriptions of each capability level.

Design – Documentation: By creating end-to-end process documentation with descriptions of the process's interfaces with other processes and these processes' expectations the maturity rises from P1 to P3.

Owner – Identity: When a process owner is identified and formalized this capability rises from P1 to P2.

Owner – Activities: The capability matures from P0 to P2 as the process owner identifies and documents the process, spreads the documentation to all parties involved as well as sponsor smaller improvement projects. In addition, process's performance goals and targets are determined and ensures that the process design matches what the being done.

Owner – Authority: As the process owner is formalized, this person will have the authority to implement process design changes and have some control over a budget allocated for this. This will result in the process maturity rising from P0 to P2.

Infrastructure – Information systems: The capability matured from P2 to P3 by adopting process specific functions in M3.

Metrics – Definition: By defining end-to-end process metrics, the process matures from P1 to P2.

Metrics – Uses: By utilizing the metrics to, on a regular basis, track process performance and drive functional improvements, the process matures from P0 to P1.

Additional process maturity is possible in all capabilities, as none of them have reached P4.

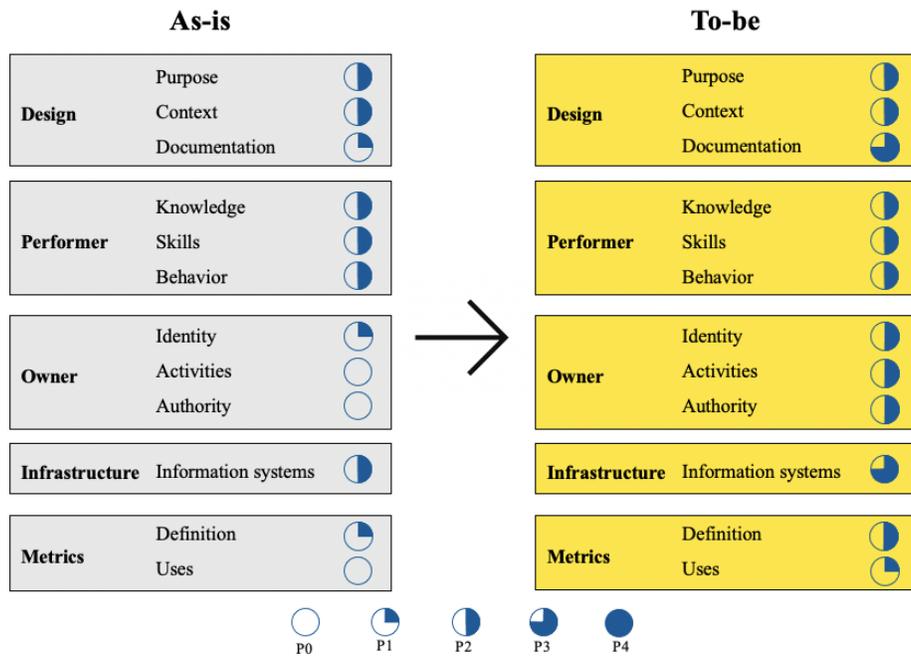


Figure 7.3: Potential process maturity improvements because of recommended actions. Based on Hammer (2007).

7.4 Risk analysis

Several risks have been identified in relation to the as-is situation as well as to the recommendations. The first three steps of Maunj and Mentzer's (2008) five-step process for risk management and mitigation presented in section 3.3.6 *Risk Analysis* have been performed in Table 7.1.

Table 7.1: Identified risks and suggestions on how to mitigate them, adopted from step 1-3 in Maunj and Mentzer's process for risk management and mitigation. Risk Identification identifies the risk, Risk Assessment and Evaluation determines what the potential losses and probability of the risk to occur, and lastly Selection of Appropriate Risk Management suggests actions.

Risk Identification	Risk Assessment and Evaluation	Selection of Appropriate Risk Management
<p>Process quality issues due to changes in the process, e.g., capacity increasing actions.</p> <p>Identified in communications with Anna Karlsson.</p>	<p>As it is food products that are stickered, the quality aspects are of great importance in a health and safety aspect. Quality mistakes could affect the salability of a product both in terms of legal requirements set on the market, as well as cause severe health risks for end-customers.</p> <p>The probability of this risk to occur will increase if capacity increasing actions are taken without keeping quality as a first priority.</p>	<p>When altering the process in any way, e.g., through capacity increasing actions, keep quality as the first priority. Include quality in the continuous evaluation of the process as well as when specific projects or improvement are being evaluated.</p>
<p>Incorrect stickers in terms of information or format at stickered on the products.</p> <p>Identified during workshop.</p>	<p>No control or validation of stickers is done by any part of IKEA for the goods stickered at DC Helsingborg today. This could affect salability on a specific market and cause serious health and safety risks for end-customers. Could lead to costly lead-time increases and damages to the IKEA brand.</p>	<p>BA Food can mitigate this risk by validating the product information, which is put on the stickers, as they are the responsible party within IKEA.</p>
<p>No process owner with the appropriate authority and responsibility can be found.</p>	<p>This could result in difficulties implementing the subsequent recommendations presented in section 7.2 <i>Action Plan</i>, due to lack of incentives and authority to initiate recommendations.</p>	<p>If no single person can be identified, a group of individuals that are knowledgeable of the stickering process can be formed with responsibility shared among the members.</p>
<p>Capacity shortage when future flows increase.</p>	<p>This could increase lead times and waste if best-before dates do not fulfill deals set with retailers. This could affect retailer relationships as well as costs for food waste.</p> <p>The probability of this risk to occur requires forecasting of future demand as well as mapping of the current process to determine current capacity.</p>	<p>Forecast future stickering demand to understand how quickly the stickering need will increase.</p> <p>Evaluate the current process set-up with the aim of increasing capacity in number of workers who can perform stickering, as well as the physical space allocated to stickering. Look into alternative ways of working, e.g., automations, to lower the barrier of workers contributing to the stickering.</p>

7.5 Ideas for Further Investigations at IKEA

Some learnings found during the study were not included in the recommendation as these will be applicable at a later stage. For example:

- i. Perform a classification to prepare for automation design.
- ii. Learnings from Ettiketto and Gray's American Stores are useful if automation solutions are to be investigated.
- iii. Learnings from Similar Players, such as Food Retailer, can be used if future investigations on how to avoid the need for stickering at IKEA are conducted.

In addition, several topics that were deemed out of scope arose during the project, which are recommended to investigate in the future to complement the findings of this study:

- i. This study focused on gaining external learnings from other companies. Learnings ought to be collected internally as well from additional IKEA DCs where stickering is conducted, e.g., the DCs in Taiwan or Hungary. As these are all operated by separate 3PLs and involve different franchise takers, the process could be operated in different ways and additional learnings could be found.
- ii. As the scope of this study is the operational stickering process, the strategic challenges found is left to be addressed. Additionally, as the operational process was in focus, the enterprise capabilities of the PEMM used to evaluate process maturity were not addressed. This is an additional area of future research, to determine the IKEA organization's maturity to create a supportive environment where high-performing processes can thrive long term.
- iii. The allocation of stickering cost should be investigated. Current operations do not fulfill requirements or align with IKEA's overall vision of supplying food at the lowest price possible to "the many people". This topic was discussed during the workshop.
- iv. The ad hoc stickering that is utilized to solve urgent issues or problems needs to be investigated separately. During the workshop it was concluded that in these situations, unique challenges arise that do not occur during routine stickering. Focus should be put to make clear e.g., who has responsibility and authority to prioritize actions on these situations.
- v. Looking into whether automated solutions are feasible to increase capacity would be an interesting future topic. If it is deemed likely that some automation solutions would be beneficial to implement, the authors recommend initiating contact with IKEA Intralogistics, who may have knowledge and experience to aid in such a project.

8 Discussion

This finishing chapter presents the conclusions of the thesis and answers its research and sub-questions as well as a discussion on purpose fulfillment. Next, the method of the thesis is reflected upon, followed by the validity of the results, the thesis's contributions to academia and lastly areas of further research.

8.1 Conclusions

The three research questions and sub-questions presented in section 1.5 *Purpose and Research Questions of the Study* can, because of the thesis, be answered as following:

RQI: How is stickering performed at DC Helsingborg today and what are the challenges?

RQI is answered through the sub questions below:

SQ1: What does the stickering process look like?

The stickering process at DC Helsingborg is well functioning but is run with low system and equipment support. There is no strategy for stickering at IKEA and responsibilities are unclear and shared between stakeholders. There is little to no process documentation and no formalized KPIs or process owner, suggesting that the process is immature.

SQ2: How is performance measured in the stickering process?

Performance is not measured or evaluated in the current set-up.

SQ3: What are the current challenges in performing stickering at IKEA?

Nine challenges have been identified in the current stickering process, six connected to process maturity and three to a more strategic view on stickering. These can be found in Table 6.1 in section 6.1.5 *Identify Challenges*.

RQII: What can be learnt from academia and industry cases?

No academia was found where stickering is researched as a process or activity. Instead stickering appears mostly as an example of packaging postponement, where previous research is not detailed enough to cover how the stickering process is designed or carried out explicitly. I.e., a research gap was discovered, resulting in no insights gathered from academia regarding IKEA's stickering process.

As for learnings from industry cases, these are summarized in Table 6.4 in section 0

Summary of learnings from industry.

RQIII: How can the stickering process performance at IKEA be improved?

The stickering process can be improved through applying learnings from industry as well as internal investigations. The recommended actions to improve the process are found in Figure 7.2, and the impacts on the process are summarized in Figure 7.3.

8.2 Generalization of the Result

In terms of generalization of the result, this can be viewed in three different perspectives: internally at IKEA, externally at other companies and lastly in academia. Internally at IKEA, the insights from the theses can be applied at other DCs where stickering is currently conducted, as well as at locations where stickering might be introduced in the future. Secondly, external companies can gain the similar benefits of the thesis as they can investigate a current stickering process in the search of similar challenges and in that case recommendations. The generalization of the different challenges, and their corresponding recommendations might vary as some challenges are connected to IKEA's organizational structure. Lastly, the generalization towards academia is low, instead the results can be interesting in terms of packaging logistics.

8.3 Purpose Fulfillment

The purpose of the thesis, presented in section *1.5 Purpose and Research Questions of the Study* reads as:

Increase the knowledge of stickering of food items at IKEA's DC Helsingborg, as well as propose recommendations to improve the stickering process.

The first part, in turn has two parts:

- i. Learn the as-is situation of how the process is carried out
- ii. Communicate this knowledge to relevant parties to increase the knowledge of the organization

These two parts, as well as propose solutions that seek to improve the stickering process at IKEA has been fulfilled. Learning the as-is of the process was achieved by doing an as-is mapping of the process, how it was conducted and what the challenges were. The second part of increasing the knowledge was accomplished through the smaller workshop at IKEA as well as through the final presentation of the thesis's results held at IKEA. In addition, the report helps to achieve this.

The last purpose of proposing recommendations that seek to improve the stickering process was achieved in terms of a suggested action plan for IKEA to adopt rather than concrete short-term solutions ready to implement.

8.4 Reflections

The authors identified a few points related to the method that could be done differently, should other researchers seek to further broaden the knowledge on stickering in the industry.

The chosen methodology and method, an exploratory case study, was found to be the correct ones. Though, the result differed from what the authors initially expected, as few academic sources were found, and *Similar Players* were difficult to align to IKEA's position. As no direct translations could be found, the result instead aided in understanding the context of the subject. With more time and resources, further investigations could have been made to find other *Similar Players* whose position is more directly

translatable to IKEA's. It is also worth to mention that the multiple case study was extended to include *3PLs* and *Technical Solution Providers* some time into the study period. This meant that less time could be spent on finding cases within each category.

The authors found that another selection of cases could have led to more findings on the operational part of the stickering process. The authors chose to focus on companies in a similar position to IKEA, i.e., companies that are either food retailers, wholesalers, or both. The authors would recommend that future researchers, if they would have a similar purpose and scope to this study, look more into importing companies, such as Gray's American Stores, as they would be more likely to conduct stickering on a regular basis. If more companies like this, the authors could have gotten further and found more examples of e.g., KPIs and automation solutions.

As it was the first time the authors had conducted a case study, a lot of time was spent on learning the method. This meant that less time could be spent on data collection and literature review. Had the author had more experience, the result could have been more detailed. E.g., more actors in *3PL* and *Technical Solution Providers* would have been included, or other stickering DCs at IKEA could have been included in the data collection.

8.5 Validity of the Result

The validity of the thesis was ensured through the application of the theories presented in section 2.5 *Quality of a Case Study*.

The *construct validity* was upheld mainly through protocol analysis presented in section 2.4.4 *Analyzing Qualitative Data*. The use of data collection protocols when conducting the data collection through interviews ensured that data gathered within the same category was handled in a uniform manner. Additionally, the use of the *Investigation Model* presented in section 3.4 *Investigation Model*, helped to keep the data gathering, analysis and conclusions within the scope of the study and upheld construct validity.

Reliability was ensured through extensive documentation. All interview transcripts can be found within the thesis and the data collection protocol and list of interviewees in Appendix A – Data Collection Protocol and Appendix B - Interviewees. By letting all interviewees validate that their transcripts correctly retell what was said during the interviews, the reliability of these is ensured. Lastly, the workshop held at the end of the project further adds to this by letting the most contributing interviewees with the most expertise in the area discuss the results and recommendations.

Further, some triangulation was performed through looking at different levels of actors related to the subject, namely *Similar Players*, *3PLs* and *Technical Solution Providers*. This confirmed that the phenomenon of stickering is very real and exists within the industry. Due to time restrictions, only one actor within *3PL* and *Technical Solution Providers* could be interviewed, though it was deemed to be enough to arrive at a valid result.

Further emphasizing the validity of the result, the authors found that the results found in this study aligns with what Anna Wittrup found in her pre-study. Even though the pre-study was performed on a higher level (IKEA globally), similar conclusions were reached, and recommendations made.

When it comes to the objectivity of the subject, the authors identified two areas where objectivity could be affected:

- i. Interviews were performed exclusively online due to restrictions set by Covid-19

- ii. In a case study, a certain level of knowledge of the subject is required prior to the case study. This could lead to bias due to the tendency to collect data in line with preconceived notions.

Online interviews tend to make it harder to catch nuances and body language during conversation, leading to the risk of the interviewers interpreting intent and meaning more than usual. This was mitigated through clear agendas and that the authors were conscious about the risk.

A risk with case studies is that the authors had to research the subject before starting the data collection, learning to a risk of bias through the study. This was mitigated again through using data collection protocols and through conscious effort by the authors throughout the study's duration.

8.6 Contributions to Academia

The contributions of this thesis are twofold. Firstly, the identification of the research gap regarding stickering as an activity. Secondly, a first attempt to bridge this gap by presenting IKEA's and the three sub-cases' perspectives.

When bridging the gaps, the main contributions come from studying IKEA and the sub-case *Similar Players*. *Similar Players* contribute with strategies to avoiding stickering as well as a user case where stickering is conducted as a core competence and given the corresponding importance and attention.

The single case of IKEA in combination with *Similar Players* identified three types of approaches to stickering were identified:

- i. Conducting it on a regular basis and viewing it as a core competence
- ii. Conducting it on a regular basis but not viewing it as a core competence
- iii. Avoiding stickering and only using it as a problem-solving action

The results of *Similar Players* showed that most participating companies can be categorized as the third and last approach. Gray's American Stores is an exception, being a part of the first category. Lastly, IKEA can be categorized as the second category.

Furthermore, the sub-cases of *3PL* contributed with the insight how a logistics service provider with core competencies in logistics can handle a stickering process. Lastly, the *Technical Solution Provider* case contributed with formulating possibilities and challenges with automation solution design.

8.7 Further Research

Several areas have been identified as potential areas for further research to improve the theoretical understanding of stickering as an activity, to fill the research gap. Firstly, a deepened research into the stickering process, secondly a broadening of stickering as a concept, e.g., in other industries and lastly expand to other aspects of stickering.

Deepening insights into the stickering process

Firstly, in the situation of a company using stickering as a temporary solution to reach product compliance on a new market. In this case, more research is needed in designing a strategy for determining when to stop stickering in favor of a more permanent solution in terms of costs and resources.

Secondly, in the situation when stickering is to be avoided by the usage of language clusters, research is needed in optimization of these clusters. Aspects such as packaging size as well as language and format requirements of the market are criteria that need to be taken into consideration. In addition, the safety aspects of stickering in relation to allergens is an important aspect. The legislative requirements that drive

the need to alter packaging to fit different markets could be investigated to optimize language cluster creation.

Broadening knowledge of different approaches to stickering

Firstly, more industry cases ought to be studied within the three types of stickering approaches identified in section above. All categories need more industry cases, but the first and second approach especially as only one case has been identified in each in this thesis.

In addition, the cases studied have all been active in the food industry. Therefore, it could be of interest to broaden the research to other industries where the process might occur, such as the pharmaceutical industry, to increase the knowledge of how the packaging alteration activity is viewed in a strategic sense as well as conducted in industry cases.

Expand the perspective on stickering

Lastly, an area in need of research that has arisen during the thesis is the sticker's impact on the marketability and attractiveness of the product, e.g., the color of the sticker in relation to the packaging and where it is applied on the packaging. How the usage of stickers affects the end-customer's impression of the product and how this influences the purchasing behavior are areas in need of research.

8.8 Concluding Remarks

The authors found the subject interesting and would encourage future researchers to further study the phenomenon of stickering. Broadening knowledge on stickering would serve to assist in making processes more efficient as well as aid industry decision makers when faced with a situation where stickering is required. The authors hope that you found this thesis insightful and interesting.

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Appendix

Appendix A – Data Collection Protocol

The following case protocol has been created based on Yin (2014) and serves as instructions how the single and multiple cases will be carried out. It is designed to increase reliability of the case study, as it provides the same basis for all cases (Yin, 2014, p. 84). Table A.1 presents an adaptation of Yin’s ideas and serves as an outline of the entire case protocol.

Table A.1: Overview of the case protocol’s four parts, adapted from on Yin (2014 p. 84-85).

A. Overview of the Case Study <ol style="list-style-type: none">1. Mission reflecting the interest of the case study’s sponsor and audience2. Case study questions3. Theoretical framework for the case study
B. Data Collection Procedures <ol style="list-style-type: none">4. Names of contact persons for doing fieldwork5. Data collection plan6. Expected preparation prior to fieldwork (identifies specific information to be reviewed and issues to be covered, prior to fieldwork)
C. Data Collection Questions <ol style="list-style-type: none">7. The specific questions that the case study researchers must keep in mind in collecting data

A. Overview of the Case Study

1. Mission reflecting the interest of the case study’s sponsor and audience

The mission of this study is to firstly increase the knowledge and understanding of the current stickering process at IKEA’s DC in Helsingborg. Secondly, to improve the process with the help of learnings from academia and similar challenges are solved in industry.

The audience of this report is Inter IKEA’s Supply Chain Operations’ project management team in the lead of Simon Sturesson, as well as the Master Thesis’s supervisor Eva Berg and examiner Jan Olhager at Lunds Tekniska Högskola.

2. Case study questions

The three research questions and sub-questions of the study reads as follows,

RQI: How is stickering performed at DC Helsingborg today and what are the challenges?

SQ1: What does the stickering process look like?

SQ2: How is performance measured in the stickering process?

SQ3: What are the current challenges in performing stickering at IKEA?

RQII: What can be learnt from academia and industry cases?

RQIII: How can the stickering process performance at IKEA be improved?

3. Theoretical framework for the case study

Figure A.1 illustrates the research design and shows how the single and multiple case study intends to answer the research questions and sub-questions. The Investigation Model intended to be used in the

research is presented in Figure 3.4 and described further in Table 3.3. While the Research design is study specific and describes how the research questions connect to each other, the Investigation model outlines a general framework to apply when studying an internal process and including external learnings to improve the process.

B. Data Collection Procedures

4. Names of contact persons for doing fieldwork

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5. Data collection plan (covers the type of evidence to be expected, including the roles of the people to be interviewed, the events to be observed and any other documents to be reviewed when on site)

The following bullet points outline the data collection plan:

- Gaining access to interviewees in relevant organizations, through researcher's own network, with assistance from supervisors at IKEA and Lunds Tekniska Högskola, through industry organizations and lastly through the professional social network LinkedIn.
- Holding an initial interview to determine if the organization experiences the issues resulting in the unit of analysis, i.e., the two first parts of the data collection question.
- If the organization does conduct stickering on a regular basis, planning a second interview where the third part of the data collection questions are covered.

6. Expected preparation prior to fieldwork

No explicit preparation work is to be conducted before interviews within the single case. As for the multiple case, a general web search is conducted to learn if any current events connected to the company that should be taken into consideration have been published.

C. Data Collection Questions

7. The specific questions that the case study researchers must keep in mind in collecting data

Below follows the specific questions for the single case and the three sub-cases of the multiple case.

Single Case

A. Interviewee and IKEA as a company

- a) Who are we interviewing, what is their current role and relevant previous professional roles?
- b) What does IKEA's supply chain look like, and where are they located within it?
- c) What type of products are handled in the supply chain, and in what quantities?

B. What creates the need to sticker products?

- a) In what situation/for what reasons are products stickered today?
- b) Will any new stickering situations occur in the future?
- c) How will present stickering reasons change in the future?
- d) What quantities are stickered today?

C. *How is the stickering performed?*

- a) What does the stickering process look like internally at IKEA?
- b) What does the stickering process look like at Bring?
- c) How is opening, stickering and repacking conducted?
- d) How is the stickering performed, e.g., levels of automation and tools?
- e) Who performs the stickering, do warehouse workers rotate on this task or does a limited number of people perform it?

D. *How is the process measured?*

- a) How is the stickering process formalized in the contract?
- b) What KPIs are used and how is it measured?
- c) What are the targets for these KPIs?
- d) How and when are they evaluated?

E. *What could be improved?*

- a) What areas of improvements are identified from IKEA's perspective?
- b) What areas of improvements are identified from Bring's perspective?

Multiple Case

Similar companies

A. *Who are you and the company?*

- a) Who are we interviewing, what is their current role and relevant previous professional roles?
- d. What is the business idea of the company, and in what industry are they active?
- e. What does the company's supply chain look like, and where are they located within it?
- f. What type of products are handled in the supply chain, and in what quantities?
- g. What markets is the company active on, how is the company's product assortment distributed amongst these markets?

B. *Does the company need to sticker packaging?*

- 1. Is stickering a part of "normal" operations of the company?
- 2. Is it ever conducted, despite not being part of the business-as-usual operations?
- 3. If stickering occurs, what drives the need for it?
- 4. How many and what products are stickered?
- 5. If stickering is not used, how does the company achieve market specific requirements?

C. *How does the company sticker?*

- a) Where in the supply chain does the stickering occur?
- b) Who performs the stickering?
- c) How is the stickering performed, e.g., levels of automation and tools?

D. *How do you measure your stickering process?*

- a) What KPIs are used?
- b) What are your targets for these KPIs?
- c) How/when are they evaluated?

3PL

A. Who are you and the company?

- a) Who are we interviewing, what is their current role and relevant previous professional roles?
- b) What is the business idea of the company, and what industry do they target?
- c) Where in the supply chain is the company located, and what do they offer to their customers?
- d) What type of products are handled in the supply chain, and in what quantities?

B. Does the company need to sticker packaging?

- a) Is stickering a part of “normal” operations of the company?
- b) Is it ever conducted, despite not being part of the business-as-usual operations?
- c) If stickering occurs, what drives the need for it?
- d) How many and what products are stickered?

C. How does the company sticker?

- a) Where in the supply chain does the stickering occur?
- b) Who performs the stickering?
- c) How is the stickering performed, e.g., levels of automation and tools?
- d) What are challenges with the current stickering process?

D. How do you measure your stickering process?

- a) What KPIs are used?
 - b) What are your targets for these KPIs?
 - c) How/when are they evaluated?
-

Technical solution provider

A. Getting to know the company

- a) Who are we interviewing, what is their current role and relevant previous professional roles?
- b) What is the business idea of the company, and what industry do they target?

B. Understanding the possibilities/restrictions with current technology?

- a) What effect does the packaging types (Form, material, temperature, weight etc.) have on the machine's effectiveness?
- b) How flexible are the machines? (How wide is the use-range? How many different packaging types can they cover?)
- c) What does the capacity look like? (Labels/hr.) What determines the speed of stickering? Set-up times?
- d) What skill level is required to operate the machine? What training is required?
- e) How much space is required for the machines to be effective?

C. Main considerations when implementing machines

- a) What are some common issues that users run into?
- b) What do customers need to prepare before looking into buying machines? (Classification, volumes etc.)
- c) How do you usually calculate costs for using the machine?
- d) Where in the process do they enter? Consulting vs straight sales?
- e) Do they have any cost-savings templates ready to use.

Interview Protocol - Single Case

A. Interviewee and IKEA as a company	Answers
Who are we interviewing, what is their current role and relevant previous professional roles?	
What does IKEA's supply chain look like, and where are they located within it?	
What type of products are handled in the supply chain, and in what quantities?	
B. What creates the need to sticker products?	
In what situation/for what reasons are products stickered today?	
Will any new stickering situations occur in the future?	
How will present stickering reasons change in the future?	
What quantities are stickered today?	
C. How is the stickering performed?	
What does the stickering process look like internally at IKEA?	
What does the stickering process look like at Bring?	
How is opening, stickering and repacking conducted?	
How is the stickering performed, e.g., levels of automation and tools?	
Who performs the stickering, do warehouse workers rotate on this task or does a limited number of people perform it?	
D. How is the process measured?	
How is the stickering process formalized in the contract?	
What KPIs are used and how is it measured?	
What are the targets for these KPIs?	
How and when are they evaluated?	
E. What could be improved?	
What areas of improvements are identified from IKEA's perspective?	
What areas of improvements are identified from Bring's perspective?	

Interview Protocol - Similar Players

A. Who are you and the company?	Answers
Who are we interviewing, what is their current role and relevant previous professional roles?	
What is the business idea of the company, and in what industry are they active?	
What does the company's supply chain look like, and where are they located within it?	
What type of products are handled in the supply chain, and in what quantities?	
What markets is the company active on, how is the company's product assortment distributed amongst these markets?	
B. Does the company need to sticker packaging?	
Is stickering a part of "normal" operations of the company?	
Is it ever conducted, despite not being part of the business-as-usual operations?	
If stickering occurs, what drives the need for it?	
How many and what products are stickered?	
If stickering is not used, what strategy is applied to avoid the situation?	
C. How does the company sticker?	
Where in the supply chain does the stickering occur?	
Who performs the stickering?	
How is the stickering performed, e.g., levels of automation and tools?	
F. How do you measure your stickering process?	
What KPIs are used?	
What are your targets for these KPIs?	
How/when are they evaluated?	

Interview Protocol - 3PL Partners

A. Who are you and the company?	Answers
Who are we interviewing, what is their current role and relevant previous professional roles?	
What is the business idea of the company, and what industry do they target?	
Where in the supply chain is the company located, and what do they offer to their customers?	
What type of products are handled in the supply chain, and in what quantities?	
B. Does your company apply stickers in any way?	
Is stickering a part of “normal” operations of the company?	
Is it ever conducted, despite not being part of the business-as-usual operations?	
If stickering occurs, what drives the need for it?	
How many and what products are stickered?	
C. How does the company sticker?	
Where in the supply chain does the stickering occur?	
Who performs the stickering?	
How is the stickering performed, e.g. levels of automation and tools?	
What are challenges with the current stickering process?	
D. How do you measure your stickering process?	
What KPIs are used?	
What are your targets for these KPIs?	
How/when are they evaluated?	

Interview Protocol - Technical Solution Providers

A. Getting to know the company	Answers
Who are we interviewing, what is their current role and relevant previous professional roles?	
What is the business idea of the company, and what industry do they target?	
B. Understanding the possibilities/restrictions with current technology	

What effect does the packaging types (Form, material, temperature, weight etc.) have on the machine's effectiveness?	
How flexible are the machines? (How wide is the use-range? How many different packaging types can they cover?)	
What does the capacity look like? (Labels/hr.) What determines the speed of stickering? Set-up times?	
What skill level is required to operate the machine? What training is required?	
How much space is required for the machines to be effective?	
C. Main considerations when implementing machines	
What are some common issues that users run into?	
What do customers need to prepare before looking into buying machines? (Classification, volumes etc.)	
How do you usually calculate costs for using the machine?	
Where in the process do, they enter? Consulting vs straight sales?	
Do they have any cost-savings templates ready to use?	

Appendix B - Interviewees

Appendix Table 1 presents who has been interviewed within the cases, their role, type, date and length of interviews.

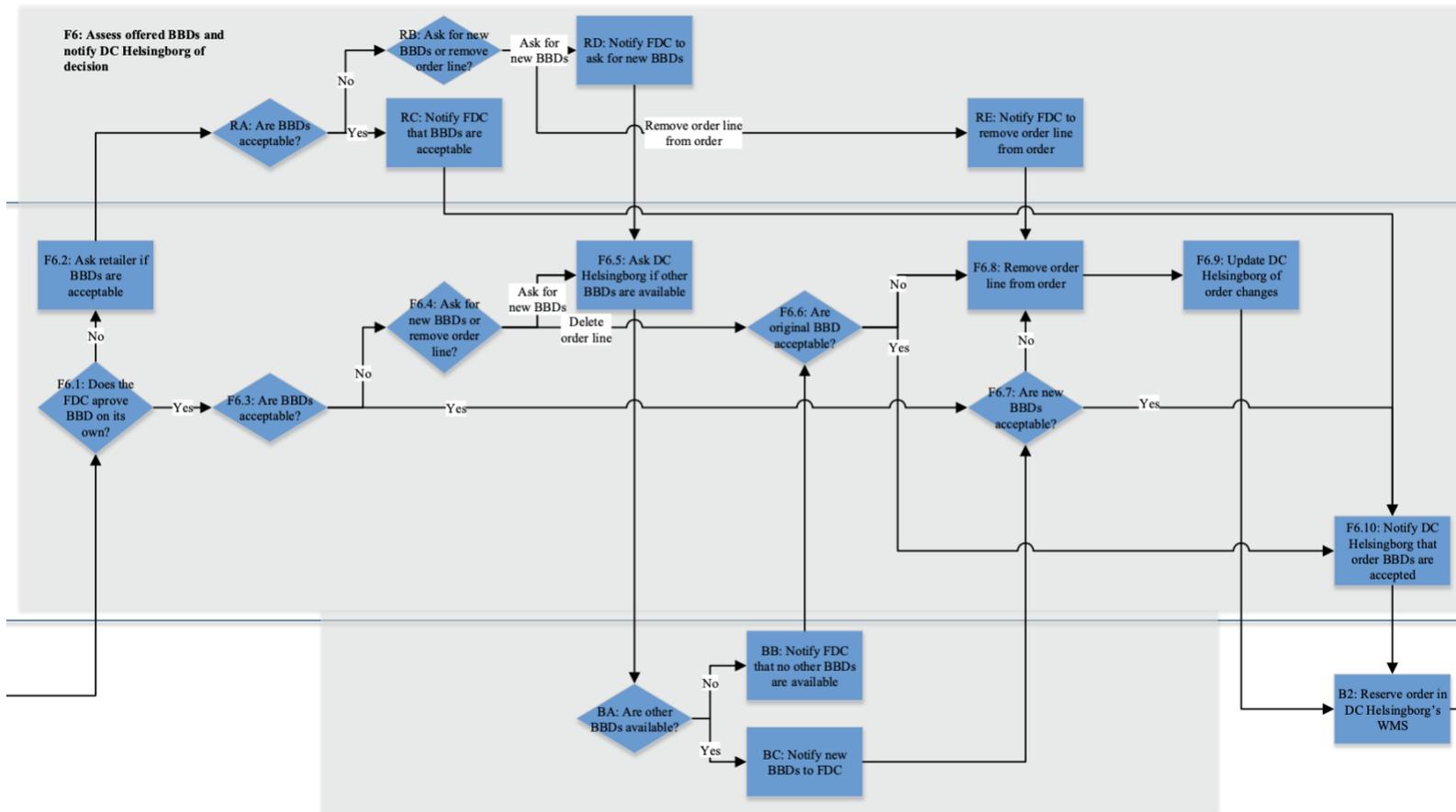
Appendix Table 1: Interviewees in each case their role, date and type of interview.

	Company	Name	Role	Type of interview	Date of interview	Length
Single case						
	IKEA	Simon Stuesson	Project manager, Food Logistics Projects PLAN	Video interview	September 17 th , 2020, February 3 rd and March 3 rd 2021	30 min - 1 hour
	IKEA	Per Mejborn	Food Demand Coordinator	Video interview	November 26 th , 2020, March 9 th and March 23 rd 2021	1 hour each
	IKEA	Anna Wittrup	Project Leader, PMO	Video interview	January 28 th 2021	1 hour
	IKEA	Harald Berg	Project leader, focusing on new markets	Video interview	November 26 th , 2020, March 18 th 2021	1 hour each
	IKEA	Cecilia Findelius	Project leader within supply chain	Video interview	November 26 th 2020	1 hour
	IKEA	Employee A	Business Developer	Video interview	March 22 nd 2021	30 min
	Bring	Malin Cavalli-Björkman, Mats Klevtorp, Jasmine Manhold	Bring, Administrator, administrator, warehouse worker working with stickering	Video interview	March 11 th 2021	1 hour
Multiple case						
Similar Players	Gray's American Stores	Fredrik Ryjord	Head of Supply Chain	Video interview	April 7 th , April 21 st 2021	1 hour each
	Lantmännen Cerealia	Jenny Huber	Packaging Lead Innovation	Video interview	March 4 th 2021	45 min

	Food Retailer	Candidate A	Packaging Manager	Video interview	March 10 th 2021	45 min
	Orkla	Gustav Nyström	Operations Project Manager	Video interview	February 23 rd 2021	1 hour
3PL	PostNord TPL	Erik Lundin	Logistics and Business Development	Video interview	March 9 th 2021	1 hour
		Mikeal Sannum	Project Leader	Video interview	March 16 th 2021	1 hour
Technical Solution Provider	Ettiketto	Jörgen Nilsson	Head of Sales	Video interview	March 24 th 2021	1 hour
Supporting sources						
	Packaging Logistics, LTH	Henrik Pålsson	Professor	Video interview	January 26 th 2021	1 hour
	IKEA	Anna Karlsson	Business Navigator	Video interview	April 13 th 2021	30 min

Appendix C - Process Map

Appendix Figure 1 presents the subprocess of F6 where the FDC and Bring address offender BBDs and notify DC Helsingborg of decisions. In addition, Appendix Figure 2 presents descriptions of each step of the process map in Figure 6.3-4 and Figure C.1.



Appendix Figure 1: A detailed process map of the subprocess F6: Address offender BBDs and notify DC Helsingborg of decisions, performed by the FDC and Bring.

Appendix Table 2: Each activity described in the current stickering process.

Step	Retailer	FDC	Bring
R1	The retailer places an order in the e-Shop system.		
F1		The FDC receives the order in the M3 ERP-system	
F2		The FDC controls the order, checking what articles are ordered as well as checking if production dates are marked on the products when required by the customer.	
R2	The retailer provides artwork that is to be printed on the stickers in a folder on Project Place, that is shared with the FDC.		
F3		The FDC moves the artwork provided by the retailer to an order specific folder on Project Place.	
F4.1		Order is copied from M3 to Excel, in an empty sheet	
F4.2		The order data is cleaned, and a new column is added into the sheet, next to the order lines labeled "required number of stickers".	
F4.3		This node directs the next decisions based on if the order line contains a multipack or primary product or not.	
F4.4		If the order line contains no multipacks, then the number of stickers required = the quantity of the order line	
F4.5		If the order line contains a multipack, the exact number of packages per multipack is extracted from M3 and copied into the Excel-file.	
F4.6		The number of stickers required is calculated to Order line quantity * number of primary packages per multipack	
F4.7		When all sticker quantities are calculated, the complete Excel-file is uploaded into the shared folder on Project Place.	
F5		The FDC shares the order specific folder, complete with artwork and Excel-file with a Bring Employee on Project Place and notify them via email.	
B1			The Bring Employee checks the order and

			notifies the FDC what BBDs can be provided for the different products.
F6.1		First, the FDC decides whether or not to accept the offered BBDs.	
F6.2		If they cannot decide on their own, they ask the retailer whether the BBDs are sufficient.	
RA	They retailer decides whether the BBDs are sufficient for their order.		
RB	If no, they decide whether they would like to remove the order line or ask for a new BBD.		
RD	If they want to ask for new BBDs, they notify the FDC and state the new BBDs asked for.		
RE	If they want to instead remove the order line, they notify the FDC that they would like to remove the order line.		
RC	If the retailer decides that the BBDs are acceptable, they notify the FDC.		
F6.3		If the FDC decides to take the decision on their own, they decide whether the BBDs are acceptable for the order.	
F6.4		If the BBDs are deemed to not be acceptable, they FDC needs to decide whether to ask for new BBDs or remove the order line.	
F6.5		If the FDC decides to ask for new BBDs, they ask Bring at DC Helsingborg if other BBDs are available.	
BA			Bring checks whether other BBDs are available.
BB			If there are no other BBDs available, Bring notifies the FDC.
BC			If there are new BBDs available, Bring notifies the FDC.
F6.6		The FDC decides whether or not the original BBDs are acceptable or not.	
F6.8		If the original BBDs are not acceptable, the order line is removed.	
F6.9		Bring is updated on the order line changes.	
F6.7		The FDC decides whether or not new BBDs are acceptable.	

F6.10		The FDC notifies Bring DC Helsingborg that order BBDs are accepted.	
B2			The Bring Employee makes the required changes to the order and reserves the order in Bring's WMS.
B3			The Bring Employee informs team leaders what orders and products are to be stickered.
B4			All stickers are printed at Bring.
B5			Products are picked and placed at the designated stickering area in the Bring warehouse.
B6			Articles are stickered by Bring warehouse workers.
B7			Stickered goods are stored separately from regular goods, awaiting shipment.
B8			When the container arrives, the order is packed and shipped.

Appendix D – Workshop slides from Tuesday May 12th 2021

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Stickering at IKEA – Workshop

Improving a process through learning
from others

John Nyqvist and Victoria Vernet



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Agenda

1. Introduction to meeting attendees and project (10 minutes)
2. Discussion on Challenges found (60 minutes)
3. Short break (10 minutes)
4. Prioritizing next steps (10 minutes)
5. Round-up (5 minutes)

Purpose of the Workshop

- ✓ Get your point of view on identified challenges
- ✓ Brainstorm solutions for the challenges
- ✓ Identify first steps in adopting solutions

John will act as a time-keeper, as we value yours and our time

If there are any interesting subjects that are out of scope for our workshop, we will "park" them in the parking spot

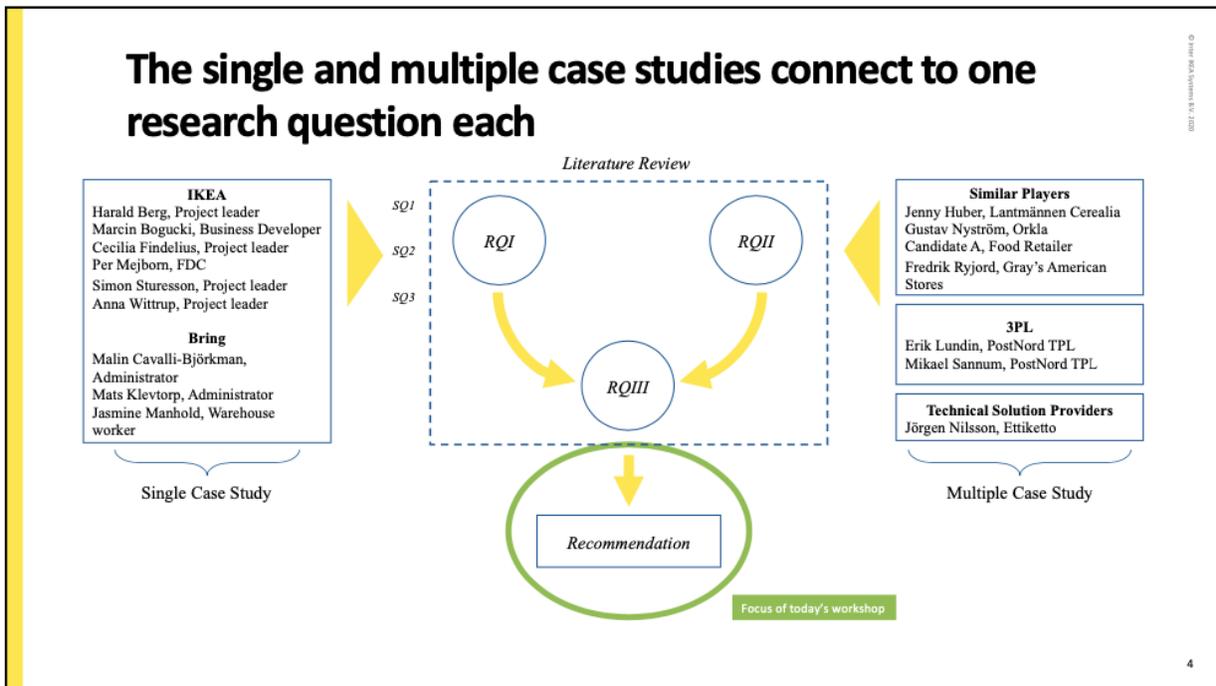
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We have identified challenges in the stickering process at DC Hbg and are now eager to brainstorm solutions with you

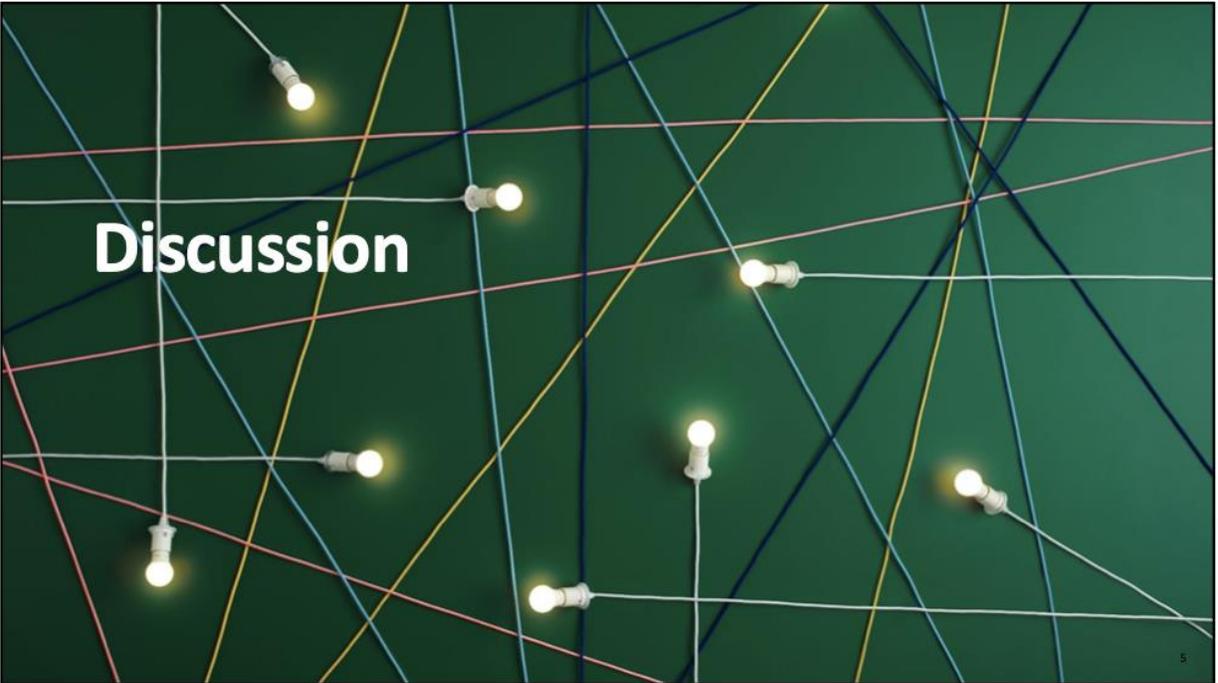


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The single and multiple case studies connect to one research question each



4



5

We have observed that the stickering process is immature

Process Maturity is important in order to secure future performance

The process has been found to be immature on several process capabilities:

- Design
- Ownership
- Metrics
- IT Infrastructure

Discussion points

1. Do you agree with our observations?
2. What can be done to make the process more mature?

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6

Discussion points

1. How could we increase our understanding of process performance?
2. What actions could be taken in order to move forward with these suggestions?

There is a lack of understanding of process performance

As is:

- No formalized goals or metrics to evaluate and follow up process performance
- No forums where stickering is discussed on a regular basis, at either IKEA or Bring

The process lacks a process owner, with formalized responsibilities and authority

As is:

- No formal ownership responsibilities connected to stickering

A process owner should have formal responsibility and the authority to change, improve and drive the process forwards

Discussion points

1. What should be the responsibilities of a process owner?
2. What authority is required in order to act as a process owner?
3. How could a process owner be found?
4. What actions could be taken in order to move forward with these suggestions?

1. How to we determine what type of capacity is the current bottleneck?
2. How to we increase this type of capacity?
3. What actions could be taken in order to move forward with these suggestions?

It is unclear what type of capacity is lacking at DC Helsingborg

As is:

- Although capacity is raised as an issue several times in interviews and the pre-study, not clear of what type of capacity is lacking.
- Two points were raised during the observation:
 - Limited number of workers at Bring skilled enough in current ways of working
 - Limited physical space where stickering can be done

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Stickering creation today does not fulfill future IFSAG requirements

As is:

- Retailers create stickers, with no validation or input from BA Food

Should be:

- IFSAG ought to sell fully compliant products to retailers
- BA Food are responsible for sticker compliance

General Food Assignment	Implication for Stickering
At Point of sales, from Inter IKEA to Retail, the products should be complaint and sellable in the market.	All products should be stickered before sold to retail.
IFSAG delegates the product compliance and the responsibility to make the products sellable to BA food.	BA Food is responsible for the Product Information on stickers

Labeling compliance - stickering, pre-study, Anna Wittrup

1. How can we involve BA Food more in stickering?
2. What actions could be taken in order to move forward with these suggestions?

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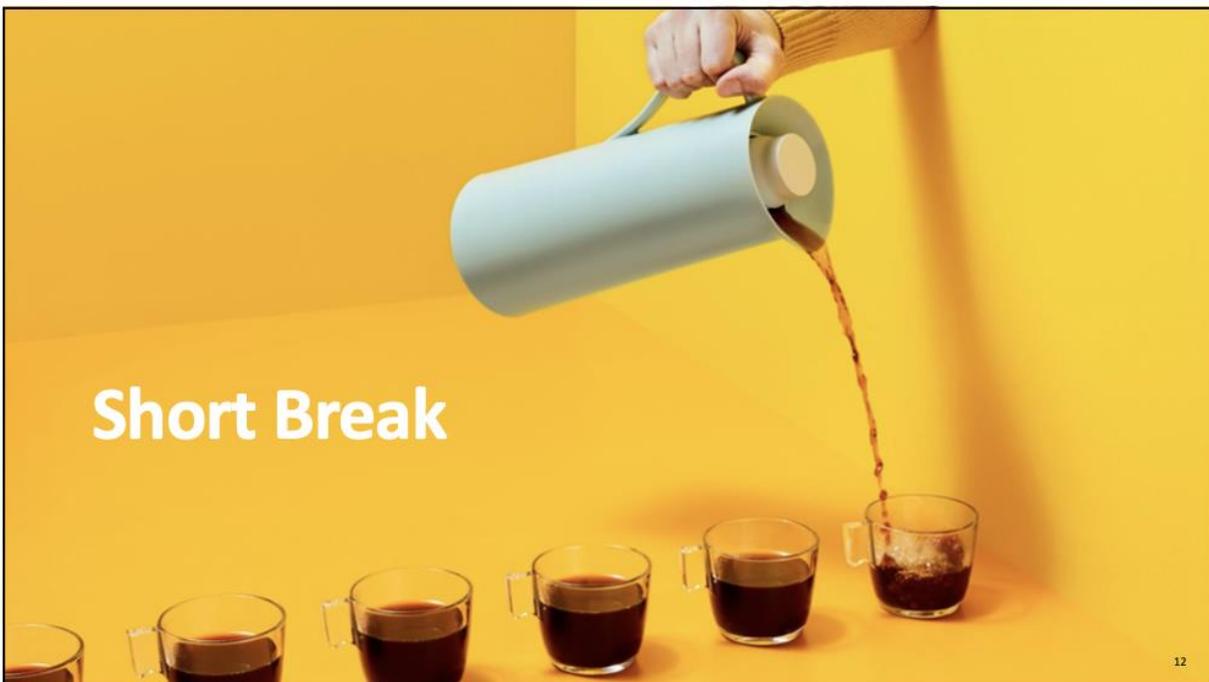
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Open discussion of industry learning:

An LSPs core competence does not include a stickering process. Could a more suitable third party be used, with core competence closer to stickering?

I.e. could someone else than Bring do the stickering?

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Prioritize between different First steps

Workshop outputs

Lack of understanding of process performance

1. Start with a Needs Definition (how many, how much...)
2. Process performance understanding can increase focus and prioritization (internally and towards BA Food)
3. Decide if stickering should be a standalone process or incorporated in core processes.

Lack of official process owner

1. There is no owner
2. How many process owners? Global or local? Team or individual?

Unclear what capacity is lacking

1. Space and number of workers are lacking, and workers are lacking.
2. Needs to further define what capacity is restrained.
3. Needs to be clear what size the stickering flows are.

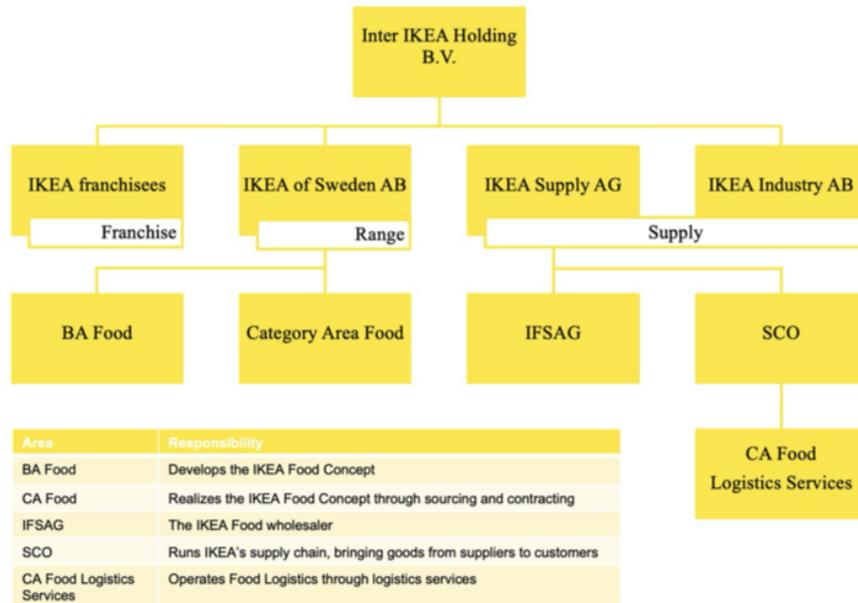
Involving BA Food in stickering validation

1. This is not SCO's responsibility. How do we lift this issue so that BA Food gets involved?
2. If food can get stuck in customers due to stickering information, we are in trouble as we have not done any control of what is said on the stickers.

What do we prioritize moving forward?

Start of by mapping the process, to determine if it should be treated as a stand-alone process or part of an existing process.

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Next steps for us

- Incorporate workshop outputs into final report and recommendation
- Final presentation 1st of June



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Step stool
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Thank you for your time and attention

Victoria Vernet & John Nyqvist



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