Customer Integrated Transport – Evaluating a New Transport Solution at Tetra Pak Korea

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Master Thesis, Technology Management - Nr 247/2013
ISSN 1651-0100
ISRN LUTVDG/TVTM--13/5247--/SE
Printed in Sweden
Tryckeriet i E-huset, at Lund University
Lund 2013

Abstract

Title: Customer Integrated Transport
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Issue of study: Globalization increases competition between companies and competitive advantage is becoming more and more important. Global trends such as international trade, overseas production and increased consumption have led to that freight transport volumes have grown strongly over the past decades. As the global warming debate intensifies, increased costs and stricter regulations on CO_2 emissions are introduced in the transport sector. These trends make companies increasingly interested in finding innovative ways of making their transport solutions more efficient - both from a financial and an environmental point of view and thereby become more competitive. Customer Integrated Transport (CIT) is a concept in which two companies integrate their transport used in distribution. The concept is believed to eliminate unnecessary routes driven by the truck, and hence reduce costs and CO_2 emissions. This concept is unexplored and there is little proof for that it is of commercial and environmental interest. Further, the challenges associated to an implementation of the concept, are unknown. Case studies in which the concept is studied in relation to a real situation are therefor needed.

Purpose: The purpose of this master´s thesis is to increase knowledge about the concept Customer Integrated Transport.

Method: The master´s thesis includes literature studies and empirical research. The literature review focused on areas considered relevant in able to understand an integrated transport solution. The knowledge gained guided in the empirical study. The research design was a case study, which was performed at Tetra Pak Korea (TPK). Transport processes were studied for the case company and three of their customers. The research strategy was mainly qualitative and formal and informal interviews were held. The interviews had several aims such as to understand current transport processes and to identify benefits and challenges associated with CIT. The findings were analysed with a theoretical framework, which resulted in that new knowledge of this unexplored concept was brought forward.

Conclusions: The study showed that CIT could save money and that it has strategic benefits. It also indicated that companies consider environmental aspects when choosing transport solution, only if these are related to financial savings. The study identified several practical obstacles that need to be overcome when integrating two transport processes in such a way as CIT suggests. It was concluded that these are manageable, however related costs should be evaluated in future studies. It was further concluded that obstacles of more management character require good customer relationship management and trust building, to be overcome. The financial savings, challenges and attitudes proved to be different for the three studied customers. Therefor, it was concluded that it is necessary to evaluate CIT in the specific context of each individual situation, to determine whether it would gain from implementing CIT or not. As more case studies are performed, a generic description of CIT can be developed and all associated benefits and challenges can be settled.

Keywords: Customer Integrated Transport, supply chain integration, information sharing, business integration, transport, logistics, green logistics, third party logistics, road freight transport, CO_2 emissions, Tetra Pak Korea, value creation

Acknowledgements

Time pass quickly when you have fun and when you are occupied with tasks you find interesting and challenging. The time has come to hand in this master´s thesis on Customer Integrated Transport at Tetra Pak Korea. Three intensive and developing months at Tetra Pak Koreas market office in Seoul as well as two months in Lund have taught us a lot about supply chain integration, transport, Tetra Pak as well as Korean culture and every day life. We met many generous and helpful people during this journey and we want to take the possibility of showing our gratitude to those individuals who supported us during the writing of this thesis.

First and foremost, we would like to thank all employees at Tetra Pak Korea, with special gratitude to those working in the supply chain department, environmental department and administrative department. Your including and open-minded attitude and your support with everything from teaching us Korean table manners to giving us important input during interviews, made us feel welcome and important during our time in your office.

To Jesper Bringström, our tutor at Tetra Pak Korea, who has supported us and challenged us all along the way. Thank you for giving us the great opportunity to come to Korea and for giving us of your time and energy and sharing your knowledge and creative ideas.

To Christopher Kenneally, managing director at Tetra Pak Korea, for you warmly welcoming us to Tetra Pak Korea and honestly showing interest in our work.

To Tetra Pak Korea´s third party logistic operator, for generous support and for organizing an interesting field trip to Koreas largest port. Also, thank you for your constantly smiling face, it made us feel comfortable to ask you all types of questions.

To our tutors at Lund University, Stein Kleppestø and Henrik Pålsson, for guiding us during the whole process of writing this thesis. Your support and input, on academic aspects as well as on how to handle unexpected challenges and obstacles, have helped a lot.

Finally, we would like to thank each other for a great cooperation. Throughout the process of writing this thesis we have challenged and motivated each other. This has made us see things from new perspectives, which had not been possible if writing alone. Together, we keep great memories from three exciting months in Korea.

Lund, 2012-05-15

Melissa Denbaum and *Petter Lindström*

GLOSSARY

Backhauling Refers to goods transported on a vehicle as it returns to its point of origin**.**

CIT Customer Integrated Transport is when a company offers its customer(s) the possibility to integrate its distribution process with the distribution process of the supplier by using the same truck for both (the customer's) inbound and outbound transports.

CSI Supply Chain Integration (SCI) in this study refers to the integration of two companies operating in the same supply chain.

CSR The Customer Service Representative (CSR) is the link between the market company Tetra Pak Korea and their customers. A CSR handles the daily contact with customers.

Inbound Transport The movement of materials from suppliers and vendors into production processes.

KAM The Key Account manager (KAM) is responsible for the long-term relationship with the customers at Tetra Pak Korea. One of the KAM´s main roles is to be a sales representative towards customers.

Outbound Transport The process related to the movement and storage of products from the end of the production line to the end user.

PM Packaging Material (PM) is one of Tetra Pak´s key products. In this study all transport processes referred to consider transport of PM.

TPK Tetra Pak Korea (TPK) refers to Tetra Pak Market Company in Korea.

Transport Flow The continuous movement forward, from one geographical location to the next, performed by a vehicle. In this paper the vehicle referred to will in most cases be a truck.

3PL A third party logistics firm (3PL) provides logistics and/or supply chain management services and operations for other companies.

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1 Introduction

In the introduction a background to why the area studied in this master´s thesis is interesting is given. The problem discussion relates the topics brought up in the background to the object of study in this master´s thesis. The definition of Customer Integrated Transport, used in this study, is established and thereafter the purpose and the research questions are presented. Lastly, delimitations in are accounted for.

1.1 Background

Globalization exposes many firms - multinational corporations as well as local players, to increased competition. Consequently, it is becoming more and more important for firms to reassess their competitive strategy and to consciously create and renew their competitive advantage. (Ma, 2004)

Based on a thorough review of literature performed within international management and strategy, Ma (2004) developed an integrative framework on the determinants of competitive advantage in global competition. The determinants are organized around four keywords. One of the criteria for selecting these keywords was that empirical evidence attesting to their relevance to competitive advantage is extensive. One of these four keywords is cooperation, which Ma defines as follows "the initiation and participation in collaborative arrangements with other players in a firm's environment." (Ma, 2004, s. 916)

Trends such as increasing global trade, outsourcing of production to low-cost labour countries and increasing consumption has led to that freight transport volumes have grown strongly over the past decades (van Essen, 2008). These trends, resulting in more long-range transports, make it interesting for companies to consider transport from an efficiency point of view. New trends offer possibilities for new business models, argues for example Stalk (2009). He further states that the trends of increasing transport bring opportunities for companies such as creating a competitive advantage through handling logistics and transport with a strategic mind-set.

The trends of increasing transport also affect the environment. The burning of fossil fuels emits CO_2, one of the greenhouse gases that contribute to global warming. In

his report for the OECD[1]/ITF[2] Global Forum on Transport and Environment in a Globalising World, van Essen (2008) states that while greenhouse gas emissions of most other sectors have stabilized or decreased over the past decades, the CO_2 emissions of the transport sector keep on growing. Road transport is the transport mode holding the highest share of these emissions and freight transport is growing more rapidly compared to passenger transport and is believed to continue to do so.

In their article Competitive Advantage on a Warming Planet, Lash and Wellington (2007) mean that all businesses are affected by global warming on some way. Risks faced include tough emission-reduction legislation and higher demand from environmentally concerned customers. They simultaneously argue that these risks of climate change also offer sources of competitive advantage. They have developed a four-step method for how corporations could seize these opportunities. The core of the process is to assess carbon-related risks and opportunities, adapt the business and to do so better and earlier than competitors.

In other words, freight transport is increasing. This means increased transport management for companies and as environmental concerns grow, transport-related costs and increased customer demands might follow. Goldsby and Martichenko (2005) mean that due to this, companies become increasingly interested in finding innovative ways of improving their transport solutions, both from a financial and environmental point of view. Considering the interest of finding new transport solutions and the status of cooperation for competitive advantage brought forward by Ma (2004), solutions were collaborative arrangements of companies transport might be of interest. If a supplier could offer their customers integrated transport solution, this could perhaps increase both efficiency and improve the suppliers value proposition to their customers, and hence their competitive advantage.

A Supply Chain (SC) is the chain of suppliers, extending from actors handling raw material to those handling the finished products. Transport solutions provide the link between the companies in the SC (CSCMP, 2010). There is often a group of companies that cooperate within the SC of one single product. Christopher and Towill (2002) claim that as companies become more intertwined in SCs, competition have changed from being between single companies to being between the groups of companies cooperating within a SC. This means, that to find innovative ways to

[1] Organization for Economic Co-operation and Development

[2] International Transport Forum

improve transport solutions, several companies operating in the SC might need to be involved. They further argue that to be successful in the competition against other SCs, the relationship and communication with customers, suppliers and other parties in the SC must be well functioning. Simatupang and Sridharan (2002) support this thinking and highlight the importance of an open and transparent relationship between companies for successful cooperation within the SC.

Despite proven benefits of openness, many companies have a conservative view on information sharing due to associated risks of sharing internal information to another company (Lee & Whang, 2000). Considering these views, one important aspect seems to be that the gains of both parties involved in the integration, is clear. The company initiating the integrated transport solution should be convinced that the proposed solution is attractive for the customers, as to give the initiator the wished competitive advantage. Similarly, the advantages such as reduced operational work, reduced costs or an improved environmental profile must be stated clearly for the party approached with the offer.

Lean is a philosophy that focuses on managing resources as efficiently as possible. Applying lean in a SC context means to focus on the end customers and eliminate all activities that do not create value for them. (Christopher & Towill, 2002) (Goldsby & Martichenko, 2005). Concerning transport, features creating value for a customer include to receive the product on time and at the lowest possible cost. Hence, from a lean perspective, transport should be handled as efficiently as possible. One way in which companies try to make their transport as lean as possible is by using a third party logistics firm (3PL). The business idea of a 3PL is to coordinate the freight transport flow of different companies, in aim to make it as efficient as possible. (Jonsson & Mattsson, 2011) However McKinnon and Ge (2006) mean that it is impossible to reach 100 % payload of the truck at all times, even when a 3PL is used and that several risks follows from involving a third company in the SC. These imperfections create a window of opportunity for improvement of transport solutions.

A study performed by Ulaga (2003), determined eight value drivers in manufacturer-supplier relationships. One of these was personal interaction, which more specifically include features such as good communication, problem solving and mutual goals. Combining the notions of competition being between SC´s, the window of opportunity of improvement of transport solutions and personal relationships creating value; integrated transport solutions in a supplier-customer relationship becomes interesting.

Sprung from the will to improve their value proposition to, and relation with, their customers, to reduce transport costs and to improve their environmental profile, the Supply Chain Integration & Logistic department at Tetra Pak Korea (TPK) came up

with the idea of coordinating the delivery of their packaging material to customers, with the customers further distribution. The SC integration manager called the concept *Customer Integrated Transport*. The concept was received with various responses, positive as well as sceptical (Bringström, 2013). It soon became clear that whether or nor this transport solution would be beneficial for TPK and its customer, needed further investigation. Challenges associated with the concept and the customers' interest in cooperating with TPK to create a common transport solution, were also unknown. TPK´s curiosity about this unexplored concept was the starting point of this master´s thesis.

1.2 Problem Discussion

As described in the background, increased global competition and increasing freight transport make companies more and more interested in finding competitive and efficient transport solutions. For example, the rise of third party logistics (3PL) companies and an increased cooperation and integration between companies within a supply chain (SC), are seen as responses to the desire of increasing efficiency of transport.

The concept Customer Integrated Transport (CIT) might be another example of such an innovative solution. This concept arose as an idea from a creative supply chain manager at Tetra Pak Korea (TPK). His hopes with CIT becomes clear in the following quote.

"*Tetra Pak Korea constantly seeks opportunities to improve the business. Customer Integrated Transport is an idea that came up within the Supply Chain Integration department, and it is believed to hold great potential*." (Bringström, 2013)

Figure 1 shows CIT as TPK thinks of the concept. The core idea is to integrate the distribution processes of two companies by using the same truck for both processes.

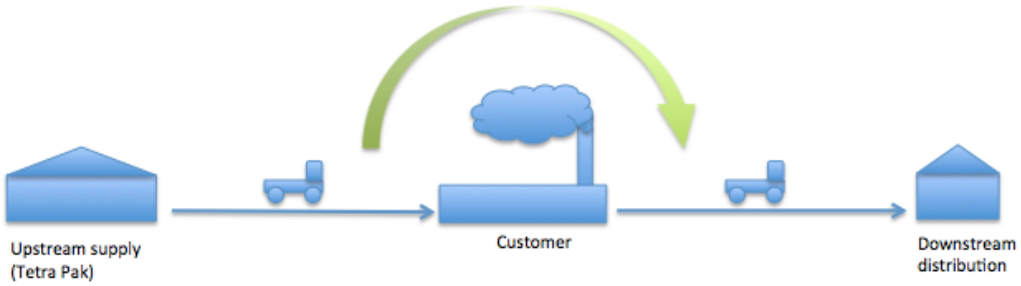

Figure 1 Core idea of Customer Integrated Transport.

As seen, the core idea is simple. In case the supplier and the customer would have used the same third party logistic (3PL) partner and all practical circumstances would have allowed, the same truck would probably have been used for both companies distribution. However, whiles a 3PL company strives to perform transport as efficient as possible from prevailing circumstances, companies have the possibility to modify circumstances as to allow more efficient transport. If the initiative of integrating the transport originates from the companies themselves, they can adapt their distribution as to make the integration possible.

To understand if CIT could improve efficiency, and which the adaptations necessary for making CIT possible would be, CIT was compared to the current transport flow of TPK and three of their current customers. Figure 2 illustrates the generic transport flow of TPK and their customers today.

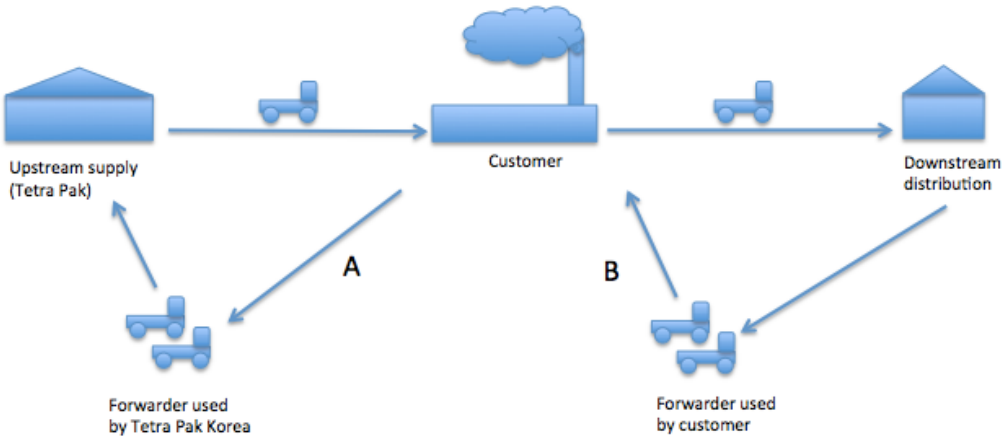

Figure 2 The generic transport flow of Tetra Pak Korea and their customers today.

Route A and B (Figure 2) are believed to be eliminated by using CIT. The imagined future transport flow is illustrated in Figure 3.

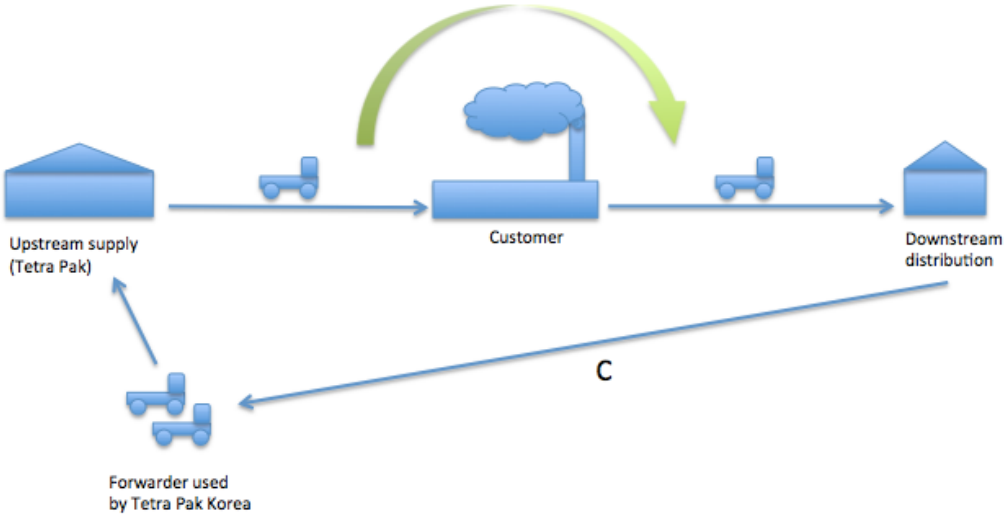

Figure 3 Imagined transport flow if with Customer Integrated Transport.

TPK´s expectation is that CIT will increase the integration between companies within the SC, leading to a more agile and lean SC. It would also improve TPK´s value proposition to their customers and thereby improve their competitive advantage. As mentioned, adaptations of the two distribution processes are required. Transport flows are not generic, but rather designed to fit each individual situation. Therefore, the amount and complexity of adaptations will vary between cases. Obstacles identified in one case can however be used as guidelines in other cases, as to give an initial idea of whether CIT is a possible options in a certain situation, or not. Successful integration requires a good relationship between the companies. This is another factor that could vary between cases. By studying one specific case, challenges related to communication and relationship building will be understood.

Investigating CIT by studying a specific case will result in improved understanding of the concept itself, its associated benefits and challenges and in which contexts it is a good option. Studying the concept from angles that are of high priority within the transport sector today, such as creating more efficient processes, reducing costs and minimizing CO_2 emissions help to evaluate the value of CIT.

1.3 Definition of Customer Integrated Transport

Since Customer Integrated Transport (CIT) not is a well-established concept, but rather a new idea, CIT had to be defined by the authors. The following definition is the one used when referring to CIT throughout this paper.

Customer Integrated Transport is when a company offers its customer(s) the possibility to integrate its distribution process with the distribution process of the supplier by using the same truck for both (the customer's) inbound and outbound transports.

1.4 Purpose

The purpose of this master´s thesis is to increase knowledge about the concept Customer Integrated Transport.

1.5 Research Questions

1. How would Customer Integrated Transports be positioned to existing theories within logistics and related fields?

2. Which are the, by Tetra Pak Korea, experienced benefits and challenges with Customer Integrated Transport?

3. What approach should Tetra Pak Koreas have towards Customer Integrated Transport?

1.6 Delimitations

The case study in this thesis has been performed at the Supply Chain Integration & Logistics department at Tetra Pak Korea (TPK). The studied concept is linked to the Supply Chain (SC) operations and logistics processes of both TPK and their customers. Changing operations and processes at one place in the SC, might cause changes at another place in the SC. The in-depth investigation in this study was limited to the distribution processes of TPK and their customers, as well as the link between these processes. Possible changes elsewhere in the SC are neglected.

TPK´s customers are spread out over Korea. In this study the distribution process of three of TPK´s customers are investigated. Focus is on the transport of physical goods, however information flow is briefly touched upon as well. Other aspects of the logistic flow are not considered.

A limitation of this study is that it was performed from a supplier perspective. The information about customers, as well as their perspectives, is second hand data

collected mainly from staff within TPK. These individuals were either in direct contact with the customers and discussed Customer Integrated Transport (CIT) or shared their apprehension of customer views. Trustworthiness of all statements was evaluated and only information considered sufficiently objective was included.

In the assessment of CIT, the financial evaluation was limited to the transport of goods from one point to another. Other financial impacts that could follow from a change of the transport flow are not considered. Regarding the evaluation of CIT from an environmental perspective, only CO_2 emissions were considered. Transport affects the environment in several ways, however CO_2 is closely related both to the debate on climate change, and often exposed to regulations and taxation, and therefor it was considered as the most interesting environmental aspect to study.

2 Method

In this chapter the methodology used in this thesis is presented. First, the literature review and how it led to a theoretical framework is described. Following, how the study was conducted and how the choices of methods are believed to have affected the results is explained. Problems encountered along the way are discussed and linked to the results to evaluate the quality of the study.

Figure 4 illustrates how the research process has preceded during the writing of this thesis. In the white boxes methods used during different phases of the working process, are listed. The blue boxes account for the outcome from each phase (which also served as input to next phase). In reality many of the phases were overlapping.

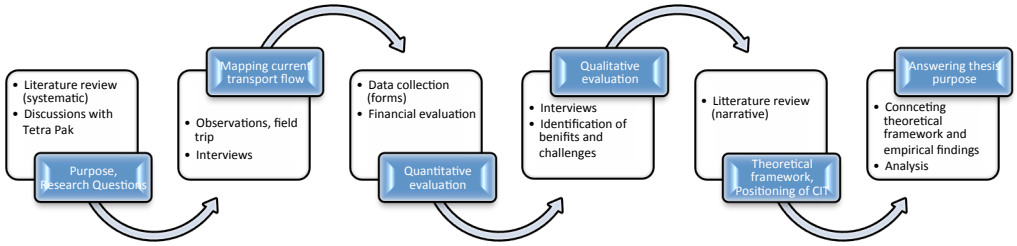

Figure 4 Research process of thesis.

2.1 Literature Review resulting in a Theoretical Framework

According to Bryman and Bell (2011), performing a literature review is an important part of writing a master´s thesis. The knowledge gained from this task justifies the formulated research questions, helps building a research design and support in analysing empirical findings in an informed way. The purpose is further to help the author(s) to avoid studying the same questions as other researchers have previously done (Saunders, Lewis, & Thornhill, 2007).

A literature study can be performed either in a narrative or a systematic way. The narrative approach tends to be less focused and more wide-ranging in scope compared to the systematic approach. This approach is suggested when the aim is to gain an initial impression of the studied area. (Bryman & Bell, 2011) At the initial stage of this master´s thesis the topic was more of a conceptual idea rather than a concrete problem. This made it difficult to determine which the important

theoretical areas were and hence a narrative approach was chosen to learn as much as possible within areas related to the topic.

To learn about central subject fields, such as supply chain, supply chain integration, logistics, transport and information sharing, textbooks and academic articles were advised. A wide literature search was conducted using key words related to these areas. A co-operation with two other master´s thesis students writing their thesis about a closely related subject was set up in order to assure that no important literature was missed. Professors have been asked to confirm the relevance of the chosen theoretical areas and the credibility of the authors cited.

As the core problem of the thesis became clearer, the researched areas were narrowed off, and moved towards a more systematic, focused, approach. Theory was read during the whole working period as new questions arose along the way. The areas that showed to be most important to understand were Supply Chain Integration and Transport. These constitute the basis of the theoretical framework developed in chapter 3. The theoretical framework guided in the work of defining CIT and helped to determine which aspects to study when evaluating if the concept would create value for Tetra Pak Korea.

2.1.1 Credibility of Literature Sources

The books used are all written by author(s) who are well reputed within the studied area. The articles used have been published in scientific journals considered relevant for the topic. The number of citations has been considered for all articles, and used as a measure to ensure credibility of the sources.

The areas studied in this thesis, supply chain integration and transport; have developed quickly during the last decades. Therefore, the volume of theory related to these areas is massive. Theory was selected based on its relevance to CIT, rather than solely on the most up-to-date articles and much of the literature used was published 10-15 years ago. The risk of having missed some interesting literature, or that more up-to-date versions accounting for the theoretical aspects discussed, cannot be denied.

2.2 Research Approach and Research Design

2.2.1 Systematic Combining

In research, a distinction is often made between inductive approach, which states that theory is an outcome of research, and deductive approach, which states that theory guides research. Inductive approach is often related to qualitative research strategy whiles the deductive approach is related to quantitative research strategy.

(Bryman & Bell, 2011) The nature of this master´s thesis has been to study a new concept and to increase knowledge of associated benefits and challenges. Neither a pure inductive, nor a deductive approach was considered optimal.

When the objective is to discover new things or variables and unknown relationships, Dubois and Gadde (2002) suggest the research approach *systematic combining.* This process is flexible as the theoretical framework, empirical fieldwork, and case analysis evolves simultaneously. The framework is continuously modified as a result of both new empirical findings and new theoretical insight. At the starting point of this project, a need was felt to perfect in theory related to the studied area. Simultaneously, empirical collection was undertaken to understand which theory that was needed. As the purpose of this master´s thesis was to improve the knowledge around an unexplored transport solution, the systematic combining approach was considered appropriate.

2.2.2 Case Study

A case study is a research design that involves thorough analysis of a single case and focus is on this single bounded situation or system (Bryman & Bell, 2011). The main point with using a case study is to test a theory in its specific context and natural environment (Saunders, Lewis, & Thornhill, 2007).

Case studies have not always been recognized as a proper scientific research design and some specialist within research methods argue that case studies provide little basis for scientific generalization. However, the view of using a case study has changed lately, and the apprehension has turned to be that by learning from a particular case (conditioned by the environmental context), the interaction between a phenomenon and its context is best understood. (Dubois & Gadde, 2002)

Stuart et al. (2002) claim that using a case study is preferable for example for research within areas classified as being in a discovery stage. One of the examples of such an areas is the emergence of integrated supply chains. They also emphasize that case studies often are aimed to be exemplary rather than representative. These ideas validate the choice of studying the problem at hand in this thesis, by using a case study.

The Case at Tetra Pak Korea

To study Customer Integrated Transport (CIT), a case study was performed at Tetra Pak Korea (TPK). In-depth studies of the distribution process of TPK and of three of their customers were performed.

The object of the case study was selected based on several factors. The most important of these was that an interest in deploying the possibilities of implementing

CIT was shown internally. The motivation among staff to assist in this project, gave the impression that good support in the empirical collection would be given. Performing the empirical collection on-site in Korea enabled to collect first hand data by observing processes and interviewing people face to face. The choice of going to Korea has had both positive and negative impact on the shaping and results of the thesis. Being on site has allowed collection of all needed data from TPK thanks to generous support internally from the company. The open-minded attitude of the staff has allowed many formal interviews as well as informal conversations, which resulted in that the viewpoints from many people with different positions have been gathered. The data collection from TPK´s customers however turned out to be more challenging than expected. Due to language- and cultural barriers, the empirical collection from customers could not be followed through with as thoroughly as hoped. These shortcomings affect the quality of the study but at the same time drew attention to factors beyond purely logistical, which are of great importance for the success of CIT.

All results and findings in this thesis are closely linked to the case study at TPK, and therefor conditioned by the context present.

2.3 Research Strategy and Research Method

2.3.1 Qualitative Research

In research strategy it is often distinguished between two main methods: quantitative and qualitative. A quantitative method focuses on the collection and processing of quantifiable data whiles in a qualitative method the researcher is located in the context analysed, to register both people´s actions as well as the significance of these. (Nationalencyklopedin, 2013) Using both a qualitative and a quantitative approach when collecting empirical information will according to Saunders et al. (2007) give a wider understanding in a case study. This study has a primarily qualitative character.

2.3.2 Methods for Data Collection

Several methods have been used for the data collection in this thesis. Following, these are described one by one.

Financial Evaluation

The financial evaluation was performed by asking the third party logistics (3PL) firm used by TPK to give price offers for different transport routes. The different routes represented how the truck drives in the current delivery process as well as in the

case of using CIT. The representative from the 3PL company who performed the calculations was given specific criteria, such as for example truck type used and load carried, to take into account. During an interview, the 3PL representative was asked to explain how the calculations had been performed and to comment on the results.

An advantage of using this method is that the prices are very realistic. One drawback of the method is that it only reflects the price offered by one 3PL company.

Interviews

Interviews have been one of the primary methods used for empirical collection in this thesis. In total, approximately 15 individuals were interviewed. These represent different departments of TPK as well as TPK´s 3PL partner. See Appendix 3 for interview schedule.

Most of these interviews have been of semi-unstructured, unstructured and focused nature. In semi-structured interviews, the interviewer has a prepared interview schedule, however the sequence of questions is flexible. Follow up questions, based on the responses of the interviewee are common. In unstructured interviews a list of topics is used rather than fixed questions. The style is informal and phrasing and sequencing of questions can vary between interviews. A focused interview is characterized by open questions. The interviewer asks about a specific situation or event that is relevant to the interviewer and of interest to the researcher. (Bryman & Bell, 2011) The choice to perform less structured interviews was based on that the topic is unexplored and that no theory could guide in exactly which questions to ask. To avoid asking questions that were formulated based on our notion of the concept, interviews of a more open character were chosen. By doing so, the interviewee was allowed to speak freely which opened up for enlightenment of aspects, which might not have been discovered in structured interviewing.

Interviews aiming to create an understanding of how environmental aspects related to transport are viewed and handled in Tetra Pak globally, as well as in Korea, were performed with various people such as individuals responsible for documentation of CO_2 emissions for Tetra Pak globally, the environmental manager at TPK and a representative from TPK´s 3PL partner. Further, input on customers' views on environmental questions related to transport were gained during interviews with the Key Account Managers.

Thanks to the open-minded attitude of TPK´s staff the internal viewpoints on the topic has been easy to collect. Representatives from TPK´s 3PL partner were also cooperative and willing to share their views and knowledge. In contrary, the customers have been difficult to contact and interviewing has only been possible

through help of TPK staff. This might have affected the objectivity of collected information, something that might be reflected in the conclusions made.

Observations

Most of the time writing this thesis has been spent at Tetra Pak´s market company office in Korea, which have enabled observations of business processes and social relationships. Study visits to the harbour where TPK´s imported material is received, as well as to their warehouse, offered opportunities to observe transport processes. The good insight in TPK´s business, and the limited insight in the customers business, might have led to a biased view of the challenges and opportunities related to the studied concept.

2.4 Method for Analysis

The analysis was a continuous process throughout the whole project as new things were discovered and understood to be of importance. Knowledge gained from the theoretical collection concerning supply chain integration and transport processes guided the analysis. When the empirical collection was finalized, the findings were analysed using the theoretical framework as support.

The results from the financial evaluation guided in whether the concept would give value for Tetra Pak Korea in the three investigated cases. By putting the results from the quantitative part in relation to the qualitative results such as the practical feasibility of an implementation for respective customer, a deeper understanding of the feasibility was formed. By further adding the factors impacting the possibility of implementing Customer Integrated Transport (CIT) in respective case, an even deeper understanding of requirements for CIT was established. By analysing the differences and similarities between the cases, deeper understanding in under which context this concept is suitable was gained.

Secondary Analysis

Secondary analysis is the analysis of data collected by someone else than the researcher (Bryman & Bell, 2011). Sources commonly used for secondary data are for example information collected by a company for commercial or business purpose or official statistics collected by government. Advantages with secondary data considered as important in this case were time efficiency and high quality of data.

Information used in this thesis to understand transport processes and current transport flows have been collected from internal documentation within TPK. Also, compilations containing information about their customers have been used. To

assure this data was qualitative enough to use, the person who compiled the information in the first place have been approached and asked to confirm the reliability of the data.

As already mentioned, contact with customers was only possible through help from TPK staff. In other words, questions could not be asked directly to customers. Instead, written forms containing questions were prepared and these questions were then communicated orally to the customers through their Customer Service Representative (CSR) or Key Account Manager (KAM). To assure that the CSR/KAM really understood the questions, individual meetings were set up with them to discuss the form before the customers were approached.

2.5 Reliability and Validity

Reliability address to what extent the study can be repeated by other researchers and whether or not the members of the research team agree upon the findings. Validity concerns the integrity of the conclusions generated from research, in other words if the indicators used to measure the desired concept really does so. Validity is much about questioning the own conclusions by reflecting upon if the chosen methods are worthy, how it has been assured that the concluded relations not are occasional and whether or not the results could be generalized beyond the specific research context. (Bryman & Bell, 2011)

Both authors were present during interviews and study visits. Observations and interviews were always discussed afterwards between the authors to assure a collective perception. Most of the empirical finings heard or observed were confirmed with at least one other person related to that area. The methodology used in this thesis has been described as thoroughly as possible, as to allow for other people to perform a study in a similar way and hence use the findings in this thesis in a comparative manner.

The presence at Tetra Pak Korea (TPK) and the close cooperation with the company supervisor and other staff has helped to assure that observations are correct. However, this presence and close cooperation, together with the limited contact with customers, might have affected the objectivity of the study. Countermeasures taken to mitigate for these shortcomings include interviewing all Key Account Managers within TPK, which are those who have the closest relation with customers, to really understand the customers' opinions. Most of the findings have also been discussed with TPK´s contact person at their third party logistics partner who has daily contact with the customers.

Customer Integrated Transport, as it is described in this thesis, was not encountered in literature. Therefore, the authors own interpretation of the concept and experience within supply chain and transport determined which theoretical areas that were studied. This choice influences the angle from which the findings are analysed and hence influence the conclusions drawn from the study.

3 Theory

This chapter presents the subject fields Supply Chain Integration and Transport. The chapter begins with a motivation of the chosen theory and then follows in-depth reviews of the aspects considered as most relevant for this study, within these two areas. In the end of this chapter, Customer Integrated Transport is analysed and positioned in a theoretical context. In this final section, Research Question 1 is answered.

3.1 Background of Selected Theoretical Areas

Customer Integrated Transport (CIT) is a concept that stretches outside of company boundaries and it is therefore relevant to study ***Supply Chain Integration*** (SCI) theories. Within SCI, integration can be horizontal or vertical and varying levels of involvement is possible. CIT is an unexplored concept and familiarizing with definitions and central aspects related to SCI, will help to position CIT among other transport solutions. Further, SCI theory will help to understand the benefits and challenges related to this concept. This area of study helps the authors to position CIT and to choose which aspects that should be studied carefully when aiming to evaluate the concept.

The core idea of CIT is that two different companies use the same truck for their distribution, without this truck leaving the geographical location at which the supplier delivers goods to the customer. Studying theory related to ***Transport***, help to understand transport processes and associated possibilities, limitations and challenges. This understanding is central when evaluating a transport solution. The main object of CIT: to make transport more efficient, is closely related to the business idea of third party logistics (3PL) companies. Therefore, 3PL operations and tactics were also considered interesting to understand when studying CIT.

3.2 Theoretical Framework

Figure 5 present the theoretical framework developed and used in this master´s thesis. Chapter 3.3 and chapter 3.4 describe the concepts presented in the theoretical framework.

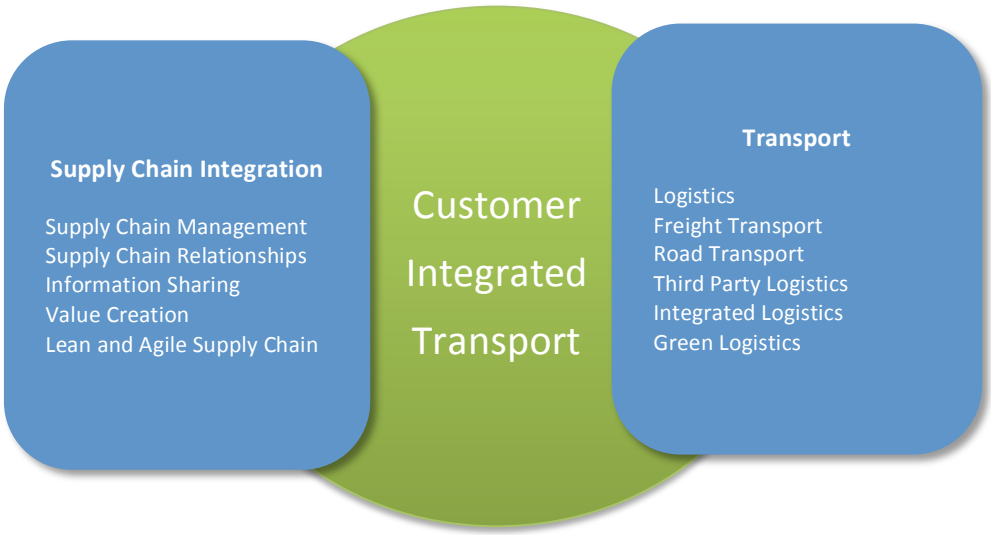

Figure 5 Theoretical framework.

3.3 Supply Chain Integration

3.3.1 Definition of Supply Chain

Supply Chain (SC), is the chain of supply that extends from raw material to the finished product, where each business is a link in the chain and therefore is dependent on the other links to perform its operations (Bowersox, Closs, & Stank, 1999) (CSCMP, 2010). The SC concept is seen as one of the biggest paradigm shift within product flow in modern time (Chen & Paulraj, 2004).

SC can be divided into two different parts: the external SC and the internal SC. The internal SC only involves one company while the external SC reaches outside of the company boundaries, towards customers and suppliers (Figure 6) (Chen & Paulraj, 2004) (Lumsden, 2007). The concept studied in this thesis is found in the external SC. From now on, the external SC is referred to when mentioning SC.

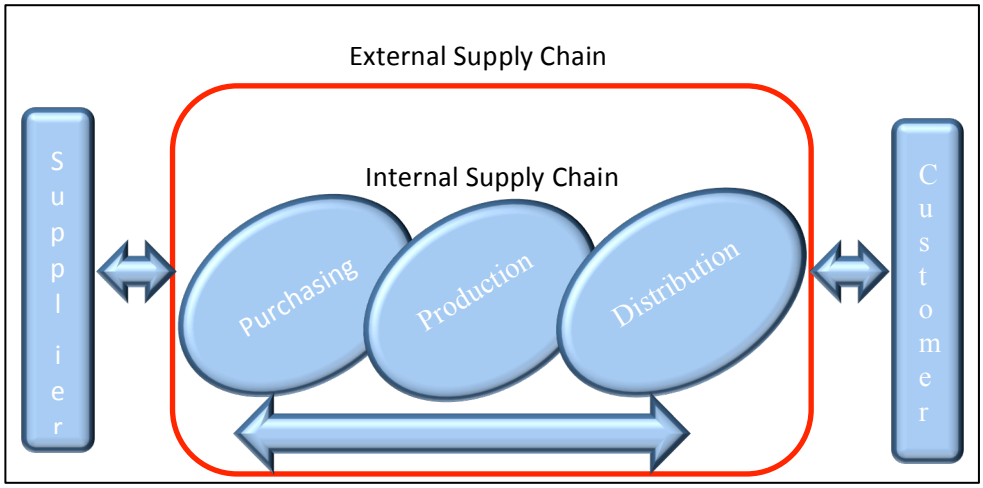

Figure 6 Internal and External Supply Chain (Chen & Paulraj, 2004).

Supply Chain Management (SCM) is defined as "the management of relationships across the supply chain" (Lampert, 2008, p. 2). This means that a supply chain manager should be involved in the relationships and networks of the businesses within the SC. Gibson et al. (2005) argue that SCM includes three parts: business processes, management components and SC structure. Fawcett et al. (2007) mean that the success of SCM depends on the manager´s ability to see changes and trends in the business environment and to take action to adapt and optimize the SC in line with these observations.

3.3.2 The Integrated Supply Chain

Supply Chain Integration (SCI) is when different companies, operating within the same SC, integrate with each other. An integrated SC can be created by acquisition, merger or partnership, depending on the level of integration and the long-term strategic agenda (Hensher & Brewer, 2004). Vertical integration is distinguished from horizontal integration based on where in the SC the integration is found. In horizontal integration companies on the same level in the SC integrate whereas vertical integration refers to upstream and downstream integration in the SC. (Cruijssen, Dullaert, & Fleuren, 2007)

Business integration is possible at several levels depending on the aim of the integration and how deep the different parties are involved with each other (Gajda, 2004). Bailey and Koney (2000) categorize integration of organizations in four levels and define the scope at each level as follows:

1. Cooperation – Shared information and mutual support
2. Coordination – Common tasks and compatible goals

3. Collaboration – Integrated strategies and collective purposes
4. Coadunation – Unified structure and combined cultures

Harrison and van Hoek (2011) agree with these levels of integration, but add a level without any integration. They call this level "open market negotiation" and describe it as a price based negotiation with limited relationship between the supplier and the customer. Gajda (2004) states that the vision and goals of the integration should determine what level of integration that should be aimed for.

The Value of Supply Chain Integration

Bowersox et al. (1999) argue that in competitive societies, companies' strategic goals can not be achieved by acting alone. It is necessary to integrate both with customers and suppliers in the SC to succeed in the competition against other companies. Stank et al. (1999) mean that the success of SCI lies in companies' discovery of its advantages such as the possibility to have better control throughout the SC, increased influential possibilities of the SC and benefits such as sharing expertise and experience. Simchi-Levi et al. (1999) argue that the result of SCI should be to minimize system wide costs but at the same time offering a satisfactory service level towards the end customer. Despite many upsides with SCI, some authors highlight the drawbacks. Jayaram et al. (2010) claim that SCI is complex. They relate the complexity to the development during the last couple of years of SCI coming to involve more and more levels and dimensions. The information that has to be shared to succeed with SCI is becoming more and more sensitive and the benefits must often be evaluated in a long-term perspective to be observed, something that many companies find difficult.

The basic behind any company is to generate value to its shareholders, and therefore a way of measuring value is important. Many managers live after the phrase "if you can't measure it you can´t manage it" (Bowersox, Closs, & Stank, 1999, p. 101). Since processes in SCI extend outside of the corporate boundaries, difficulties of measuring improvements arise.

Customer value could increase when integrating downstream in the SC. A measurement of the success of the integration could therefor be customer satisfaction and the number of new customers, improvements that can be connected to revenue and gross margin. (Bowersox, Closs, & Stank, 1999) However, Harrison and van Hoek (2011) highlight that integration across company boundaries are both time- and resource consuming. Therefore, it is of importance to carefully evaluate areas of interest before the implementation phase is initiated. SCI involves two or more parties that all should gain from it. It is important to understand how all parties can attain financial- or other improvements from the integration and to create rules

and commitments that should be followed to assure that the improvements are realized. (Bowersox, Closs, & Stank, 1999)

Supplier and Customer Relationship in Supply Chain Integration

The relationship between supplier and customer is one of the key aspects to make SCI work (Harland, 1996). According to Bowersox et al. (1999), to succeed with SCI, the relationship between a supplier and customer needs to be developed with a long-term strategic goal and sustainability in mind. The focus of a supplier, when integrating with a customer, should therefore be to provide a unique and profitable offer or service. It is important to carefully select how to integrate the SC and towards which customers, in order to increase value. According to Harland (1996) several aspects related to relationships in a SC are important to consider when aiming to attain competitive advantage:

- Selection of collaborative partner.
- Benchmark your network toward other competitors.
- Form the relationship both strategically and tactically.

It is important to create a good Customer Relationship Management (CRM) agenda to reach the full potential of SCI. According to Lampert (2008), CRM is about managing how the customer relationship integration should be developed and structured. He further argues that it is of importance to separate and segment different types of customers in order to manage an efficient and successful relationship with them, from a supplier perspective.

Information Sharing in Supply Chain Integration

Information sharing is a vital part of SCI, since the integration is cross organizational. Managers are often restrictive in sharing information due to the risk of spreading information related to their company´s specific competitive advantage. A great force against information sharing is the fear of losing information since it is seen as a loss of power (Fawcett, Osterhaus, Magnan, Brau, & McCarter, 2007). Therefore, Bowersox et al. (1999) mean that information sharing is much about trust between a supplier and a customer.

According to Seidman and Arun (1998) there are four levels of information sharing, defined by what type on information that is shared (Figure 7). The level of information sharing is connected to the benefits achieved, the higher in the pyramid the larger the benefits.

Figure 7 Four levels of information sharing (Seidman & Sundararajan, 1998).

In a SC perspective it is often the customer that is the owner of the information and therefore has the initial bargaining power. However, it is the supplier that will process this information to create value for both parties. (Seidman & Sundararajan, 1998) The willingness of sharing information will therefore determine how successful information sharing is.

How information should be shared is another aspect. Often, easy and reliable information sharing requires a common IT platform through which information is shared. This might require large financial investments. Fawcett et al. (2007) mean that sharing information requires two things: the willingness to share information and the connectivity between the parties.

Willingness

With a SCI partnership follows responsibilities. One such responsibility is related to the informations sharing, since the companies integrating now have access to information which they not own. Companies often refuse to share information even when a positive gain in return has been proven. An agreement stating rules and regulations on how shared information should be handled is suitable when setting up a partnership. (Lee & Whang, 2000)

Another aspect is that the size of the parties to share information might differ. Narayanan and Raman (2004) mean that if there is a big difference in size between the supplier and the customer, the smaller company might be scared that the bigger company might use the information to push the other into lower financial margins.

Connectivity

An IT tool is a great instrument to use to standadize and make the information flow easier (Caputo & Mininno, 1996) (Bowersox, Closs, & Stank, 1999). However, Harland (1996) highlights the risk of becoming too integrated in the SC when using common

IT tools. Companies might get stuck in expensive and complex IT solutions that are hard to get free from when the surrounding environment is changing. A company might get less flexible. How the investments for the new, shared IT system should be split between the companies might cause obstacles when integrating the SC (Lee & Whang, 2000). When integrating logistic activities, the information sharing activities can be outsourced to a third party logistics (3PL) company to make it more cost effective (Bowersox, Closs, & Stank, 1999).

Streamline the Supply Chain by using Lean- and Agile Methods

Agile SC is a concept that has emerged in relation to the holistic SC view where a whole SC competes against other SCs (Christopher & Towill, 2002). Agility refers to the ease of movement and an agile SC will respond easily and quickly to changes and new conditions. An agile attitude needs to be present in both directions, upstream as well as downstream, in the SC. An agile SC organization must be able to understand and predict on-going changes that will affect their SC, and to be demand- and not forecast driven. (Christopher, 2000)

Lean is a philosophy with the core idea to eliminate waste, i.e. activities not generating value. In a SC context, lean place the end customer in focus and aim to eliminate activities not creating value for them. (Christopher & Towill, 2002) (Goldsby & Martichenko, 2005).

3.4 Transport

The International Warehouse Logistics Association defines Logistics as “the part of the supply chain process that plans, implements and controls the efficient flow and storage of goods, services and related information from the point of origin to the point of consumption, in order to meet customer requirements” (IWLA, 2013). However, there are many different definitions of logistics. Goldsby and Martichenko (2005) claim that even though there are many definitions, one common characteristic for all of these is that logistics concern management of goods and products and therefore includes everything from transport, warehousing and customs.

This study concerns one of the areas within logistics: freight transport. Lumsden (2007, p. 57) describe transport as “the transport of an article from one supplier to one customer”. Goldsby and Martichenko (2005) state that transport is a necessity to be able to produce a product in one place and consume it in another place. Jonsson and Mattsson (2011) define a common characteristic within transport: the movement of freight between two different geographical locations.

There are four main modes of transport (Jonsson & Mattsson, 2011):

- Airfreight – using airplanes.
- Railway freight – using train.
- Road freight – using trucks.
- Sea freight – using ships.

This study focuses on road freight transport, i.e. the transport of goods using trucks.

3.4.1 Distributing Goods with Road Transport

Distribution of goods refers to processes such as storing, loading, delivering and transporting goods (Lowe, 2002). This study comprises the transport part of distribution.

It is not only the product and the market position that create competitiveness within distribution. Value creation towards customer is also important. Distribution value can be created through quality of the distribution, responsiveness, punctuality and time- and cost efficiency. However, providing customer value must go hand in hand with not losing profitability (Persson, 1995)

Coordination of Transport - The Service of a 3PL Company

Operators using trucks are divided into professional operators (also called forwarders) performing transport for money, or nonprofessional operators using the vehicle for their own business. Some forwarders have taken the business one step further by becoming a partner to its customer, offering value added services or total logistics solutions. These are referred to as third party logistic (3PL) companies. (Lumsden, 2007)

A special characteristic of freight transport is that it most often goes in one direction from raw material to supplier and onwards towards the end customer. In the opposite direction, the transport flow does not create any value. This is one of the biggest problems when trying to increase the efficiency of transport solutions (Coyle, Bardi, & Novack, 2000). The emergence of 3PL companies has compensated for this problem to some extent by applying backhauling. McKinnon and Ge (2006) define backhaul as goods going the opposite direction to the direction of the primary goods. Much of the 3PL concept is to coordinate the freight flow to be able to backhaul and combine transports of different goods and therefore make it more efficient. (Jonsson & Mattsson, 2011)

McKinnon and Ge (2006) argue that it is impossible to reach 100 % utilization of the truck and also mention several risks related to backhauling:

- Risk of not getting the truck in time for the next outbound delivery.

- Lack of agility between organizations will miss possibilities for backhauling.
- Lack of communication internally between purchasing and logistic departments, reducing possibility for backhauling.
- Different vehicle requirements for different goods pose a problem when using the same vehicle.

Many of the potential improvements for transport are therefore connected to utilization of the resources (i.e. the vehicles), due to that there is a financial opportunity loss every time a truck stands still or drives empty (Goldsby & Martichenko, 2005). According to McKinnon and Ge (2006) empty truck driving has decreased the last decades and at the same time outsourcing to 3PL companies has increased. However, studies show that 3PL companies are not fully responsible for these improvements; even nonprofessional operators have improved their truck utilization.

Pricing for Transport

According to Lumsden (2007) there are different ways of measuring the work that is done by trucks during road transport. The most common variables used when determining this work are weight per kilometre and volume per kilometre. The variable used should be selected based on which one that is most applicable for the type of goods transported.

The cost of transport can be divided into fixed and variable cost. The fixed cost is in general low and includes administration-, interest- and depreciation cost of the truck. The variable cost is in general a bigger part of the total cost and includes fuel cost, wages and maintenance. (Coyle, Bardi, & Novack, 2000)

Logistic companies use different pricing strategies, when determining the price on the work that has been performed by a truck (Sveriges Åkeriföretag, 2004) (Lumsden, 2007). Lumsden (2007) argues that the most common price method used when it comes to transport is the Rate methods. In the Rate method a fixed price is set to a customer for transporting goods from one location to another. The price is determined based on the weight transported and the distance travelled and for certain bulky goods volume is considered as well. The Rate method quotations often cover the cost in a long-term perspective, however in certain unique cases a transport might cost more than the proposed price. In some cases an agreed freight rate can be used, making the price vary depending on the amount of goods that the logistic company handles. If they receive a larger amount of gods to handle they will be able to lower their price and yet generate the same profit. (Lumsden, 2007) The price also depends on the possibility for a logistic company to backhaul freight after

the first delivery. The fixed costs can in this case be split between different customers. (Hensher & Brewer, 2004)

3.4.2 Integrated Transport

Integrated logistics earlier only referred to integration within the internal supply chain (Figure 6). The development has led towards external integration across corporate boundaries, horizontally as well as vertically. The aim of integrating logistics activities with a customer is to improve efficiency and find synergy effects (Caputo & Mininno, 1996). Lumsden (2007) argues for a more holistic perspective concerning the benefits of integrated logistics. Focus should not be to decrease the cost for each activity in the logistic process, or for the different parties, but rather to decrease the total cost. He means that this is made possible by that integrated logistics mean better coordination of different logistics activities.

Stank et al. (1999) performed a study that shows the benefits of integrated logistics in the food process industry. These include to have gained more efficient order cycles, improved inventory management as well as a better understanding of the firms logistics processes and the customer service processes.

It is not always easy to decide how to split the gains and/or costs when integrating logistics activities between a supplier and a customer. Sometimes the integration only bring financial benefits for the customer whiles the supplier get strategic advantages by providing increased customer value which in turn gives competitive advantage. How the gains and/or costs are to be divided between the parties can be a determining factor for a company when deciding to follow through with the integration or not (Audy & Dámours, 2008).

Audy and Dámours (2008) mean that there exists a transaction cost for all parties when integrating logistics processes. The transaction cost should not be neglected and will generally increase, as more parties are involved in the integration. Caputo and Mininno (1996) states that integrated logistics demand organizational requirements. One example is that it is necessary to emphasize the importance of the logistics manager when integrating companies. He/she should be given increased authority to be able to make long-term strategic decisions and investments.

Lumsden (2007) describes another example of integrated logistics: integration of transport and distribution processes, which aim to increase full loads and decrease the empty transports on return trips. Activities that are of interest to integrate are scheduling and production planning as well as standardizations of distribution processes. This can generate financial-, environmental- and strategic benefits for all parties. McKinnon and Ge (2006) bring up some factors that need to be taken into consideration when integrating transport and using the same truck for different types of goods:

- Location is important in order to achieve any savings at all, where does the truck unload and where does it load the goods.
- Schedule for when the truck can pick up the backhauling goods is also essential to fit loading and unloading routines, at the different destinations.
- Capability of vehicle is important especially in the food industry that sometimes requires special features for transport, but also matched weight and volume needs to be looked into.

Tools for Communication

The development of IT tools has increased the interest for collaborations within the trucking sector. IT tools work as the link between trucking companies, with the purpose to increase payload and optimizing utilization of transports and thereby reducing truck costs. The increased connectivity to the internet has made it possible to use internet pages as the link. (Ergun, Kuyzu, & Savelsbergh, 2007) (Lumsden, 2007)

McKinnon and Ge (2006) describe the method of letting returning vehicles collecting supplies on their way back from a delivery, something that has decreased the amount of empty running trucks. A more agile attitude among companies, together with a higher management focus to improve transport efficiency, is said to be examples of factors that have been pushing this trend. However, not only reduced cost makes companies use this method, increased control of supplies is another positive consequence.

3.4.3 Transport and Environment

The concept green logistics refers to SC strategies and practices, which aim to reduce energy and environmental footprint on freight distribution. One of the main focus areas within green logistics is transport. Several paradoxes exist when trying to link environmental issues to logistics trends. Trends tend to focus on cost, time, reliability, warehousing and information technology and these are often linked to external negative (and sometimes positive) costs for the environment which are not considered when strategic decisions are made. (Rodrigue, Slack, & Comtois, 2013) Rodrigue et al. (2013) mention reverse distribution as one of the most favourable strategies to mitigate for the paradoxical nature of green logistics.

To increase the importance of environmental aspects within logistics and transport, different approaches are used. In top-down approaches “green” choices and solutions are imposed on the industry by government policies and regulation, in a bottom-up approach the industry voluntarily choose environmentally friendly solutions through adaption of best practice, and the compromise approach combines the two mentioned, mainly by using certification schemes. (Rodrigue, Slack, &

Comtois, 2013) One successful example of industry development linked to the bottom-up approach is empty movements were empty trucking backhauls are used for regional freight distribution. Concerning the top-down approach, logistics activities have succeeded to escape trends in policy guidelines attempting to make users pay the full cost of using the infrastructures. Much of the focus on environmental policy is on private cars whiles trucking is less controlled. (Rodrigue, Slack, & Comtois, 2013)

Even though freight transport emissions account for one third of the transport sectors total emissions, most research and initiatives related to transport and climate change focus on passenger and urban transport. Very few studies on the topic of freight transport emissions have been published. (Regmi & Hanaoka, 2010) Furthermore, little work has been done to quantify the potential of reducing CO_2 emissions and the effects on CO_2 emissions related to activities in the transport industry (Leonardi & Baumgartner, 2004). Ambitious international goals of reducing CO_2 emissions have been set up until 2050. In able to reach these, the transport sector must play a significant role. (OECD/IEA, 2009)

Weijers et al. (2012) suggest a couple of actions that can be taken to increase sustainability and to lower CO_2 emissions within the transport sector. Many of these are related to topic supply chain integration, described in chapter 3.3:

- Improve cooperation with SC partners
- Developing new concepts for delivery
- Cooperation's with other stakeholders

According to Leonardi and Baumgarthner (2004) making logistics structures and transport processes more efficient could mitigate negative environmental effects and maintain economic growth simultaneously. They mention measures such as more backhauling and shared user distribution as measures, which could result in economic and environmental benefits. A case study performed by Ubeda et al. (2011) shows that the optimization of logistics operations, such as improved transport planning and the introduction of backhaul to avoid empty-running trucks, improved efficiency both from an economic and an environmental perspective. They further argue that the costs incurred by the operational changes could be up weighed by the competitive advantage that follows with the environmental improvements in case of toughening charging policies related to environmental damage. However, they admit that additional case studies and research projects are necessary to strengthen the reliability of the links observed.

3.5 Analysis: Positioning Customer Integrated Transport in a Theoretical Context

As theory within the subject fields ***Supply Chain Integration*** and ***Transport*** was studied, Customer Integrated Transport (CIT), in the exact form as referred to in this master´s thesis, was not encountered. In able to evaluate benefits and challenges of CIT as transport solution, the concept first had to be understood. As a part of building up this understanding, CIT was positioned in a theoretical context. In this section Research Question 1 is answered, using the theory in chapter 3.3 and 3.4.

CIT is a concept that fits in the external Supply Chain (SC) (Figure 6) since it concerns the transport connection point between two companies: in this study a supplier and a customer. The integration between the supplier and the customer, which is the core of CIT, would be defined as a vertical integration by a partnership. The level of involvement varies when two, or several, companies build an integrated solution. According to the categorization of level of integration by Bailey and Koney (2000), CIT would be placed at the second level – Coordination. This level is defined by that the two companies who integrate share common tasks and have common holistic goals of reducing the total transport cost. The coordination of transport, to be able to use the same truck delivering packaging material and to distribute the filled cartons, is considered as a common task. Just sharing information, as in the cooperation level is not enough. In the level above, collaboration, the parties integrate strategies and share purposes, features that are not required in CIT.

Performing common tasks require communication between the involved companies and might mean that company specific information must be shared. Different degrees of involvement require varying amount of information sharing. According to the definition of levels of information sharing by Seidman et al. (1998), presented in Figure 7, CIT would be positioned at the operational information sharing level. As long as the involved parties agree upon operational aspects related to CIT, information about tactical- or strategic activities do not have to be shared.

Agility- and Lean supply are often discussed in connection to the context of making a whole SC more flexible and efficient (Christopher & Towill, 2002). As CIT make the SC more integrated compared to separate distribution processes, it also make the SC more agile. The increased coordination between the parties would allow them to respond more easily and quickly to changes within the SC. CIT would also correspond to the basic idea within the lean philosophy: reducing activities that do not generate value for the end customer. CIT eliminate routes where the truck drives empty and hence do not create value. The elimination of these routes corresponds to the idea of lean. Many of the characteristics of CIT go in line with aspects related to agility and lean within the SC. The integration between a supplier and a customer, by using

the same truck in their two distribution processes, is therefor considered to be a more efficient transport solution compared to if these distribution processes were managed as two separate processes.

The views of Christopher and Towill (2002) of looking upon competition as being between SC´s, rather than between individual companies, means that methods to create efficient processes and reducing costs must be evaluated from a holistic perspective. In this holistic view, competitive advantage could be created by the use of an innovative transport solution that makes parts of the SC more agile and lean. Considering that CIT would increase the integration in the SC, and hence making it more agile and lean, it can be assumed that this transport solution hold potential to give rise to a competitive advantage.

As mentioned, no studies were found that described or evaluated CIT as it is described in this master´s thesis. However, similar thoughts of integrating logistics operations were found. One of the differences between today's distribution set-ups and CIT is the increased integration between suppliers and customers, something that could solve and coordinate technical transport activities in a more efficient way.

The concept of CIT could also be positioned as a concept within green logistics. Backhauling and reversed distribution share the same basic thoughts as the CIT concept, by increasing the payload of a truck. However, CIT does not solve the problem of backhauling but punches the problem one step further in the distribution chain.

Sceptics of CIT would argue that 3PL companies, with their huge networks, could offer lower prices due to backhauling possibilities and economy of scale. However, McKinnon and Ge (2006) mean that it is impossible to reach 100 % utilization of the trucks. When a truck has unloaded at one point it often need to travel some distance to reach the starting point for backhauling. In a similar way, the truck often has a take-off distance between its starting point and the location where it loads the goods of the first customer. These deviations from 100 % efficiency pose a window of opportunity for new transport solutions, and CIT does not exclude the solutions to work hand-in-hand with each other.

The importance of being able to measure the upsides and improvements of SCI and hence also if applying CIT, is in theory describes as a challenging task. In able to measure improvements, the parties must agree upon a common way of measuring the value. According to Harrison and van Hoek (2011), the process of finding common measurement for CIT would be time- and resource consuming and one could therefore argue that CIT should be implemented in a long-term perspective.

The theoretical positioning of CIT shows that there are several areas within Supply Chain Integration and Transport that need to be covered in able to understand all aspects of CIT and the use of this transport solution.

4 Tetra Pak Korea and Transport Processes

This chapter gives an overview of the company Tetra Pak as well as of their customers. Priority is given to those customers who are more closely studied in the case study. The transport processes currently used by Tetra Pak Korea and by the customers, are explained.

4.1 The Company Tetra Pak

Tetra Pak (TP) is one out of three companies in the Tetra Laval group, originally founded in Sweden in 1951 by Dr. Ruben Rausing. Today, TP has two business areas (Figure 8): processing that sell food processing- and filling machines and packaging solutions that sell packages for food products and beverages Figure 8. TP is market leader within both these areas and they are represented in over 170 countries around the world. 38 market companies exist which are grouped in 11 so called clusters. In addition, 79 sales offices and 42 production plants exist. (Tetra Pak, 2012)

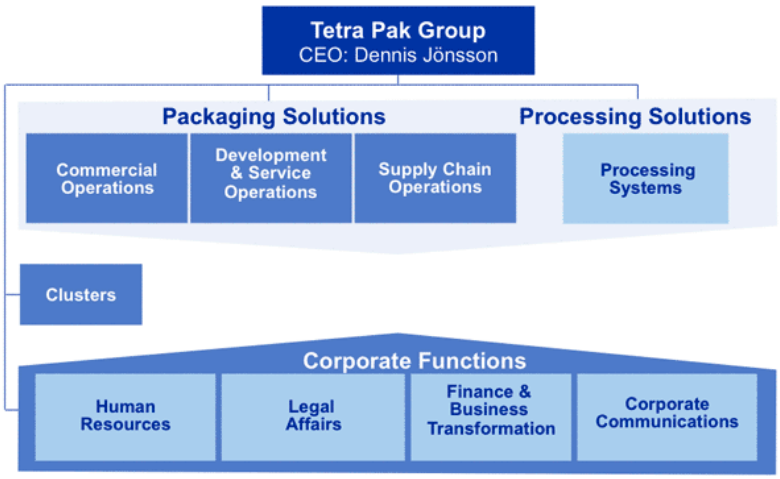

Figure 8 Organization chart of the Tetra Pak group, divided in two business areas.

TP´s global strategy 2020 stands on four pillars (Figure 9): Accelerate value driven innovation, Drive environmental excellence, Strengthen operational performance and Growth in all markets Figure 9. Employees are encouraged to work along these four key strategic priorities in all projects. (Tetra Pak, 2011)

Figure 9 Tetra Pak global strategy 2020 (Tetra Pak, 2011).

4.1.1 Tetra Pak Korea

In this master´s thesis a case study has been performed at Tetra Pak Korea (TPK), which belong to the Northeast Asia and Oceania Cluster together with Japan and Oceania[3]. Tetra Pak was established in Korea in 1983 and has today about 60-80 employees. TPK include both of the business areas processing and packaging solutions. The packaging material (PM) was initially produced locally in Korea, however the production plant was closed in 2007. Since, production has taken place overseas, mainly in China, Japan and Singapore. (Bringström, 2013)

The Packaging division in Korea includes the two departments Sales and Supply Chain Integration & Logistics. A Customer Service Representative (CSR) from Supply Chain Integration & Logistic and a Key Account Manager (KAM) from the Sales department are assigned to each customer. (Choi, 2013)

In the Supply chain operations department at TPK The Supply Chain Common Agenda (SCCA) was initiated in 2013. SCCA is a part of the division's strategic approach and it is highly prioritized in their business today. It promotes joint integration activities with customers, led by the CSR. The purpose is to identify and follow through with projects focusing on improvements within the supply chain, with special focus on customer needs, to increase TPK´s competitive advantage. Supply chain boundaries are targeted for this purpose. Challenges identified as the most critical in this work include catching the customers interest, the uncertainty of the consequences of this new and untested solutions and to align the projects with the customers supply chain optimization strategies. (Bringström, 2013)

[3] The countries in Oceania were Tetra Pak is present today are Australia and New Zeeland.

4.1.2 Transport Processes

If two companies transport processes are to be merged into one process, the two original processes need to be synchronized. Therefore, the two processes of today were carefully studied.

Transport Processes in Tetra Pak Korea

For managing of all their Supply Chain operations, TPK uses one single third party logistics (3PL) firm. Beyond organizing all of TPK ´s logistic processes, they help to develop their supply chain operations, aiming to make TPK more efficient (Bringström, 2013). According to TPK ´s contact person at their 3PL, they are more of a spider in the net than just an operational partner for planning of transports. The 3PL partner for example handles TPK´s warehouse management. (Person 1, 2012)

Once the PM has arrived in Korea, after having been shipped in containers from an overseas production factory, two main distribution methods are used for delivering the goods to the customers. In the first one, direct delivery, the container is placed on a container truck and transported to the customer directly from the port. In the second method, call-off, customers receive their goods from the 3PL´s warehouse. Direct delivery requires that the customer have the technical facilities needed for receiving and unloading a container truck as well as storage possibility. Goods delivered by call-off method are transported from the port to the warehouse, where it are unloaded and stored until customers place an order. (Person 1, 2013)

Usually goods are dispatched in the morning from the warehouse since most customers want their goods before 12 am. However, this can vary greatly and it´s the responsibility of the customer´s CSR to inform the 3PL staffs about what time the customer want their goods at their site. The truck size used varies depending on the amount of goods ordered by the customer. In 2012, 11 ton trucks were the most commonly used followed by 5 ton trucks and 1-4 ton trucks. Only normal wing body trucks are used, which opens at the side of the truck. The trucks used have no special features such as chilling possibilities. (Person 1, 2013) The truck driver signs a rules & regulations agreement as well as a service level agreement before leaving the warehouse. According to Korean labour law a worker should work approximately eight hours each day. However this can be changed in reality and drivers are often willing to work longer shifts in return of longer periods off. (Person 2, 2013)

If several call-off customers order from the same city (or nearly located cities) on the same date, these customers' goods are co-loaded in one truck at the warehouse. In this case, the truck takes a pre-determined route and unloads each customer's goods at their respective site. Customers have never expressed that they mind their position within this routes, as long as their goods arrive on time. The subsequent

destination of the truck, once unloading is finished at the customer site varies in each individual case. (Person 2, 2013) It is very rare that a truck returns empty all the way to the warehouse. Back loading possibilities exist in 80-90 % of the cases, meaning that the truck transport goods on it´s way back towards the original location. If the driving distance has been far, the truck driver might sleep in the truck overnight, to continue working the next morning. (Person 1, 2013)

When distributing PM, TPK uses their own special plastic pallets as a standard, as these fulfil their requirements of cleanliness and size. The pallets need to be brought back to the warehouse, so the 3PL uses the backhauling technique approximately every 10^{th} delivery for this purpose. (Person 2, 2013).

Costs related to Transport Processes

TPK´s 3PL partner uses another forwarder for transporting TPK´s goods, since they don´t have any own trucks for this purpose. Sometimes, they order the transport as a "one-time-service" and in this case they simply pay for a delivery from one location to another. Most commonly however, they rent a truck, including driver, on a monthly basis. The 3PL company is then responsible for optimizing the use of the truck by for example assuring backhauling possibilities. The price offered by a forwarder in general includes extra cost to cover for the routes when it need to drive empty, such as right before arriving at the warehouse and between the last unloading point and the next loading point. This cost varies depending on the possibility of backhauling nearby the unloading point. (Person 1, 2013)

TPK negotiates the price with their 3PL partner separately for all different destinations of TPK´s customers. Price varies between different customers depending on factors such as distance, backhauling, volume transported and truck type used. (Bringström, 2012) (Person 1, 2013)

In Korea the government provides a document with quotations of how much the price for transport should be between different locations in the country. This should be seen as guidelines that can be used to check that a forwarder does not charge too much. The price is calculated based on weight of goods, type of truck and the distance that the goods are transported. The government's quotations are calculated for one round trip and do not take into account possibilities of backhauling, which reduces the cost. Therefore, the actual price from a forwarder as well as for TPK´s 3PL partner is normally lower than the quotation from the government. (Person 1, 2013)

Information Flows related to Transport Processes

Globally, Tetra Pak uses the enterprise resource planning system SAP. This makes it easy to communicate within the organization as well as to take advantage of information gathered in different departments and countries. (Lowndes, 2013) However, their 3PL partner does not use a SAP system but instead use an online-based platform for gathering information as well as sharing information between TPK and its customer. This is a two way communication platform where everyone can send and receive information and can easily be changed to support the right purpose. (Person 1, 2013)

Customer Relations

TPK´s 3PL partner are responsible for the operational transport and supply chain management. Customer relations are however handled internally within the company. The KAM handles most of the direct communication towards their customer(s). The KAMs also work to develop their business relationship and future involvement, with their customer(s). (Kim2, 2013) The CSR is responsible for coordinating all operations for the customers, such as order management, assuring that they receive the right products on time and handles customer complaints (Cho, 2013).

Long-term and personal relationships are important parts of customer relationships in Korean business culture. A supplier needs to prove to the customer that they intend to have a long-term business together and to gain trust. The importance of trust and relationship building sometimes make it difficult to introduce new ideas and suggestions to customers. (Kim2, 2013) It was observed that the KAM´s and CRS´s carefully thought through the presented concept of Customer Integrated Transport (CIT) before deciding to present it to their customer.

4.1.3 Transport Processes of Tetra Pak Koreas Customers

Once TPK´s 3PL partner has delivered the PM at a customer, the packages are assembled and filled. The onward transport process to distribution centres or retailers vary greatly between customers. The customers are of different size and have varying number of delivery points, spread all over Korea, to which they send their products. Some customers have fixed loading times whiles others are very flexible on this point. (Kim1, 2013)

Some customers use their own trucks, however most use a forwarder or even a 3PL partner, such as TPK. The truck type used depends on what products the customer sells. (Person 1, 2013) Dairy products require chilling device in the truck to sustain product quality while other products can be shipped in regular trucks. (Kim, 2013)

Pricing is performed by negotiations between the customer and its forwarder or 3PL partner in a similar way as in the case of TPK. The same variables, such as distance, backhauling possibilities, volume transported and truck type, determine the price. Some customers say that the price they pay concern round-trip, i.e. from their site to their delivery point and back. In these cases the truck returns empty. However, most often the customer does not know what happens with the trucks after it leaves the delivery point and most of the interviewees find it unlikely that trucks return empty all the way back to their departure point. (Kim2, 2013) According to the studied customers, the trucks used for their distribution arrive empty at their site. Whether the distance which they travelled empty is far or very short is however unknown.

The frequency of trucks leaving the customer site greatly exceeds the frequency of trucks arriving with Tetra Pak goods in all of the cases studied. PM is a product that is very efficient to transport thanks to the small volume it occupies per unit. When the packages are filled at customer site the volume per unit increases greatly. Distribution of finished goods thus require a considerably larger volume compared to the delivery of PM. (Shim, 2013)

4.1.4 Linking Transport Solutions

A simplified generic illustration of the transport flow of TPK and their customers is shown in Figure 10.

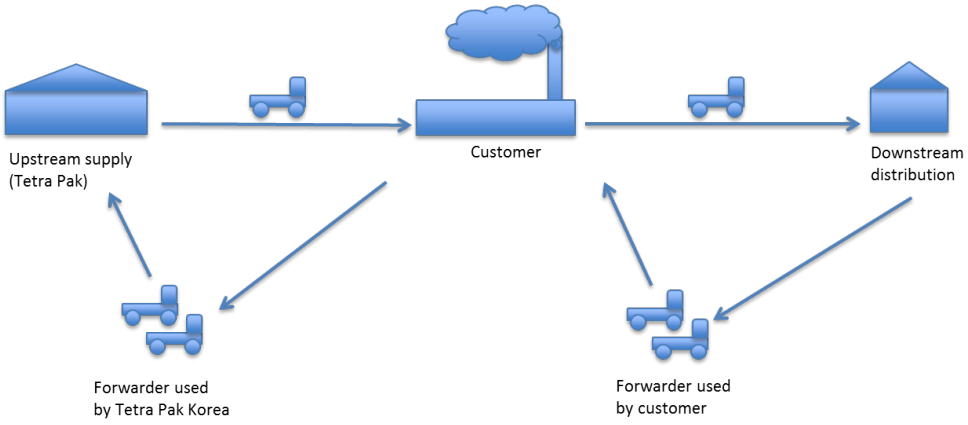

Figure 10 Generic transport flow for Tetra Pak and their customers.

The first loop (from the left) in Figure 10, shows the trucks route from its starting point to TPK´s warehouse or to the port, depending if it is a call-off or a direct delivery customer. From the warehouse/port it continues to the customer and back to its starting point. The second loop shows the truck used for the customers' distribution, travelling from its starting point to the customer site, continuing to the distribution centre or retailer and back to its starting point. The distances between

these points vary greatly in each case and Figure 10 therefor only illustrates a generic transport flow and not lengths of the different routes.

The transport flow with Customer Integrated Transport (CIT) would look as illustrated in Figure 11.

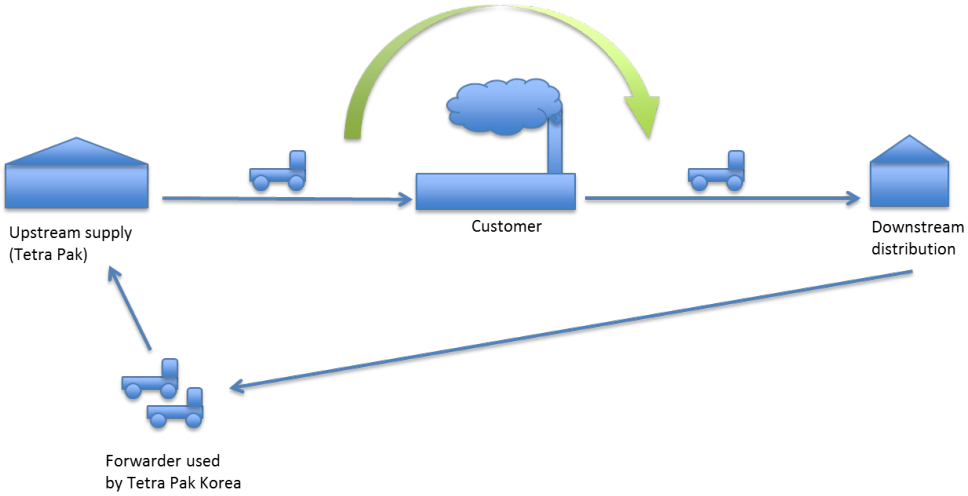

Figure 11 Transport flow with Customer Integrated Transport.

The green arrow in Figure 11 illustrates the core idea of CIT, that the same truck is used for two separate distribution processes, but as one continuous flow (Bringström, 2013).

The benefits that are believed to follow from CIT are that the total distance driven is decreased and that the number of unnecessary routes, when the truck drives empty only to reach it´s starting point or return to its base, are reduced (Person 1, 2013). Some of the interviewees believed that CIT would reduce transport cost as well as reduce the total CO_2 emissions. As these savings would be shared between TPK and their customers, TPK would increase their value proposition to their customers. (Bringström, 2013) One of the challenges most frequently expressed during interviews, was that a big part of TPK´s customers currently use the delivery mode direct delivery when PM is delivered in containers. As the container directly needs to be transported back the port after unloading goods, CIT is not possible when this delivery mode is used. (Person 1, 2013) (Person 2, 2013)

In the price charged by the 3PL company, a fee covering the route the truck must travel to reach its origin and the route between the delivery point and its next starting point is always included. When integrating the transport process, this fee will be reduced by eliminating the two routes marked with red crosses in Figure 12. If

the total distance in Figure 11 is shorter than the total distance in Figure 10, CIT would reduce CO_2 emissions (Cha, 2013).

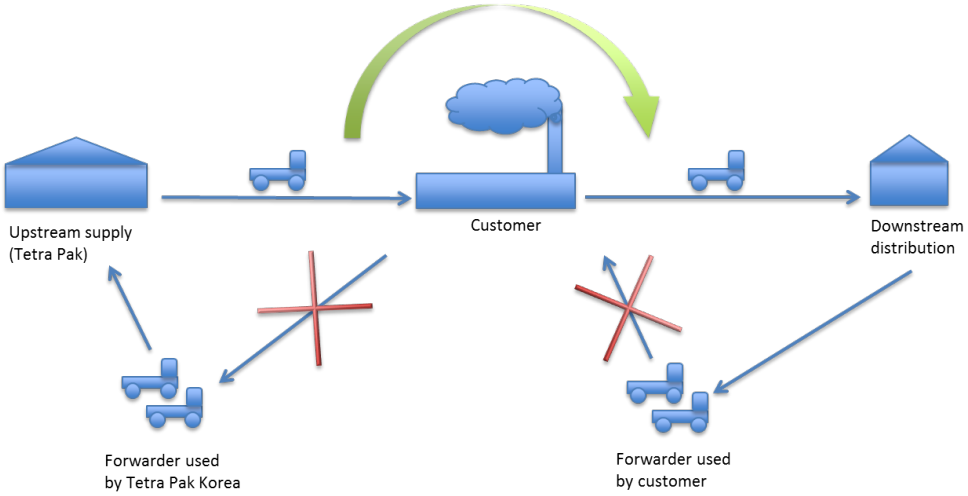

Figure 12 Routes eliminated with Customer Integrated Transport.

4.2 Three Customers used in the Case Study

Tetra Pak Korea (TPK) provides Packaging Material (PM) to approximately 20 - 40 customers in Korea. These customers produce for example milk, soymilk, juice and cream. The size of the customers vary greatly and their distribution processes differs in terms of for example frequency, distance to final destination and truck type used. (Person 1, 2013) (Bringström, 2013)

Due to the large variations between customers, three of TPK´s customers were selected for in-depth investigation in this master´s thesis. Factors affecting the choice include delivery mode (call-off customers) and that TPK had a high delivery frequency to the selected customer. These customers also showed interest in Customer Integrated Transport (CIT) and were willing to share some company specific information. The three customers are referred to as A, B and C. Below follows a brief introduction of respective customer. The analysis and conclusions made in coming chapters are based on more precise numbers than are presented in the report. Due to confidentiality, exact numbers cannot be specified.

4.2.1 Customer A

Customer A is located in west Korea and is a call-off customer (Kim1, 2013). Each week there are more than 20 times as many outbound trucks compared with the

inbounds truck from TPK, arriving with PM. Different trucks are used by TPK´s 3PL partner when delivering PM to A, depending on the volume of the delivery. In 2012, 5 ton trucks were most frequently used however almost as many 11 ton trucks were used. Smaller trucks such as 1 ton and 2.5 ton were used but only occasionally. A mostly use 11 ton trucks for their distribution. The trucks were mostly normal wing body trucks however some products need chilled trucks. The pallets used by TPK are gathered at customer site for backhauling transport to the 3PL warehouse about every 10th delivery that is done. (Person 1, 2013) Customer A uses different forwarders for its distribution. Concerning the time schedule, for unloading of PM as well as loading of filled packages, customer A is flexible. During the process of collecting facts and information from customer A, they proved to be cooperative and willing to share information. (Kim1, 2013)

4.2.2 Customer B

Customer B is located in central Korea and is a call-off customer. Each week B has more than 25 times as many outbound transports compared to the inbounds transports sent by from TPK, with PM. Different trucks are used by TPK when delivering PM to B, depending on the volume of their delivery. In 2012, 11 ton was the dominating size. 5 ton trucks were also used quite often, however six times less often compared to 11 ton trucks. (Person 1, 2013) Customer B mostly uses 11 ton trucks for their distribution. None of their products require chilling and therefor only normal wing body trucks are used. B has 10 own trucks but as these do not cover their total need for trucks, different forwarders are used. (Kim1, 2013) The pallets used by TPK are collected at customer site for backhauling to the warehouse about every 10th delivery that is done (Person 1, 2013). Customer B is flexible when it comes to time for unloading the PM. Loading of filled packages must however be done in the afternoon so that the trucks can dispatch early in the morning. (Kim1, 2013) During the process of collecting facts and information from customer B it has been observed that they are somewhat unwilling to share information.

4.2.3 Customer C

Customer C´s is situated in the North West part of Korea and is a call-off customer. Each week C has much more outbound transports than the inbounds transports delivered by TPK with PM. (Kim2, 2013) The exact ratio is not known. Different trucks are used by TPK when delivering PM to C, depending on the volume of the delivery. In 2012, 5 ton trucks and 11 ton trucks were most frequently used. Only a small number of trucks of other sized were used. The pallets used by TPK are collected at customer site for backhauling to the warehouse about every 10th delivery that is done. (Person 1, 2013) Customer C only uses 15 ton chilled truck, however they have expressed that they are flexible with the size. C has some own trucks, but use at least

three different forwarders for their distribution. (Kim2, 2013) Customer C does not have a fixed production schedule and strive to adapt to their customers' demand for deliveries as much as possible. This means that they sometimes need trucks with short notice. Customer C has been willing to share information. However, they stated that in the long run they see a potential risk as well as increased workload connected to sharing of information. (Kim2, 2013)

5 Evaluating Customer Integrated Transport

In the case study performed at Tetra Pak Korea, the benefits and challenges connected to an implementation of Customer Integrated Transport were investigated. This chapter, presenting the findings, is divided into financial, environmental and other aspects. The study was performed as to investigate Customer Integrated Transport in relation to the current transport set-up, used by Tetra Pak Korea and their customers today. All comparisons are therefor made in relation to this current situation.

5.1 Financial Evaluation

Several factors influence the price charged by Tetra Pak Korea´s (TPK) Third Party Logistics (3PL) partner, for trucking services. These factors include: which type of goods (weigh and volume) that are transported, total amount of goods, truck requirements and truck size, the location of loading, final destination and how big the possibility for backhauling is at the final destination. (Person 1 2013) The price is also affected by the total amount of trucking kilometres TPK order from their 3PL partner. As the 3PL is given more operations, the discount of the total price will increase since fixed costs can be spread out. (Person 1 2013) (Bringström 2013) The potential financial savings from Customer Integrated Transport (CIT) are related to eliminating certain routes driven by the truck, as explained in chapter 4. (Bringström 2013)

To be able to estimate the financial savings of CIT, the cost of the transport flow of today was compared to the cost of the transport flow if using CIT. As explained in chapter 4, the process of today is divided into two steps (Figure 10) that would be merged into one with CIT (Figure 11).

TPK´s 3PL partner was asked to make price quotations for the three different routes (Figure 13 and Figure 14), for customer A, B and C. Customers often deliver to several locations. One delivery point was selected for A, B and C respectively. The total price of route 1+2 (Figure 13) was compared to the price of route 3 (Figure 14). The comparison was made for each customer individually. This gave an indication of the price reduction, which could be achieved with CIT. An interview was performed with the individual who performed the calculations in able to understand the underlying variables.

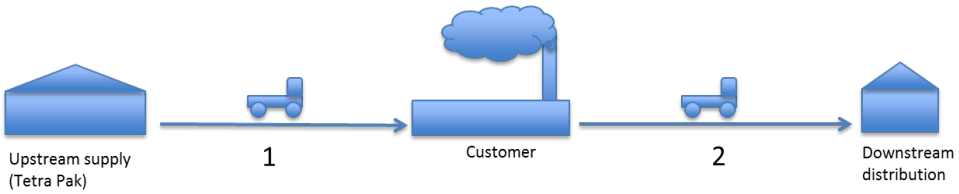

Figure 13 The two distribution processes of today.

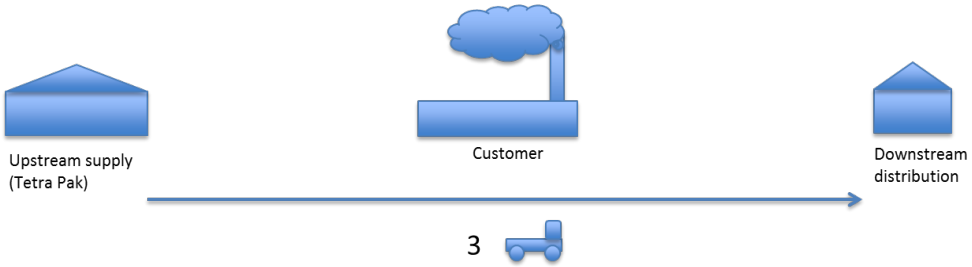

Figure 14 The integrated distribution process if using Customer Integrated Transport.

The government guidelines of suggested prices for transport in Korea, works as a base when the 3PL partner do quotations, however Person 1 (2013) further explain that there are a number of factors that will affect the final price they propose. Important factors include the possibility of backhauling and the amount of business from the client to the forwarder that is to handle the distribution.

The comparisons of the cost of today's transport flow and the flow if CIT was implemented, for customer A, B and C, are presented in Table 1. The presented results represent the total savings for the two companies together since it is an integrated process. A detailed description of the financial evaluation is found in Appendix 1.

Table 1 Financial savings if implementing Customer Integrated Transport between Tetra Pak Korea and customer A, B and C respectively.

	Customer A	Customer B	Customer C
Price savings if implementing CIT (%)	11	10	5

Bringström (2013) believes that even larger savings could be made if CIT would be implement for all customers. He further highlights the importance of the increased value proposition from TPK, to their customers, due to decreased workload.

5.2 Environmental Evaluation

In Korea, a public program exists for recording CO_2 emissions from freight transport. The program requires companies to report information such as distance travelled for transport of their products, truck type used and weight of freight. The emissions are calculated automatically and this way the government keeps track of emission levels. The government does however not limit emission levels for companies. (Person 1 2013) During interviews with all KAM´s at Tetra Pak Korea (TPK) it became obvious that efforts to reduce CO_2 emissions are not a prioritized due to the Korean government is not pushing companies to do so and that other areas such as recycling are more important for TPK. Several of the interviewees expressed that if the government provided incentives to reduce CO_2 emissions, such as emission caps or CO_2 tax, this aspect would be considered when selecting transport solution. At the moment, the Korean government is preparing the introduction of a cap- and trade system[4] for CO_2 emissions and regulations concerning reporting of emissions are becoming tougher for each year. (Cha 2013)

The environmental aspect was found to have somewhat importance when deciding whether or not to change transport solution from today's setup to CIT. Several of the interviewees express that if a transport solution proves to bring positive environmental consequences this would raise the interest for the concept. However, in the end the financial aspects would be the most important in this type of a decision. The interviewed KAM´s and CSR´s mean that the customers share the viewpoint of TPK concerning that the financial aspect is more important than the environmental, when deciding which transport solution they prefer.

TPK´s environmental manager confirmed that little effort has been done concerning CO_2 emissions from transport within the company. This was motivated by that the environmental impact of Tetra Pak is related to package waste, and therefore other environmental aspects, such as recycling and the use of better materials, are prioritized.

[4] A method to control emissions by capping the total emissions allowed to be emitted in a nation. Emissions certificates are allocated to companies and organizations, which can freely be traded.

5.3 Challenges related to Customer Integrated Transport

Merging what today is two separate transport flows into one involve synchronization of logistics operations in two different companies. This chapter presents the different factors that needs to be solved to synchronize these processes, and describes how they affect the practical applicability of Customer Integrated Transport (CIT).

5.3.1 Truck Type

In CIT, the same truck is used in a single process instead of using two trucks in two separate processes as in the current setup. The truck used must therefore meet the requirements from both processes.

The customers, to which Tetra Pak Korea (TPK) distribute packaging material (PM), operate within food processing, an industry were hygiene and cleanliness is very important (Gustavsson 2013). When transporting the PM the same requirements of truck cleanliness apply as when the customers finished goods are transported (Olsson 2013) (Person 1 2013). Distribution of food and beverage products might require special handling during distribution such as chilling. If the customer requires chilled trucks in their distribution, TPK must adapt to this to make CIT possible. Person 1 (2013) claims that the price would increase with about 25 % for route 1 (Figure 13), i.e. the first part of the CIT process, if chilled trucks were used rather than normal.

Today, CIT will only work for call-off customers since a container truck is used in direct delivery cases. A cross docking center[5] would therefore need to be used, something that would be costly. Therefore the concept is only interesting for TPK´s call-off customers at the moment. (Bringström 2013)

5.3.2 Truck Size

Using the same truck also requires the parties to agree on the size of the truck. Larger trucks are more expensive which could be an issue for the company who today use smaller trucks. Changing from larger to smaller trucks, and still transporting the same amount of goods, would require more trucks. (Person 1 2013) Both TPK and customer A, B and C express that they are flexible with the size of the trucks used (Bringström, 2013) (Kim2, 2013).

[5] A cross docking center transfers the good from a container to a normal truck or the other way around; from a normal truck to a container. (Person 1, 2012)

5.3.3 Truck Driver

Using the same truck for the entire process will most likely mean that the same truck driver will drive the total distance. Transport of certain types of goods and size of trucks requires the driver to have special permissions. It must be assured that the driver holds the required driving license for both processes. (Person 1 2013)

National labour regulations concerning for example working hours must be considered in relation to CIT. According to Korean labour law, an employee is allowed to work 8 hours per day. However, as explained above, in reality longer working days is not uncommon. (Person 1 2013) The study shows that in some cases the driver will need to work for more than 8 hours if implementing CIT.

5.3.4 Matched Delivery Schedule

The unloading schedule from TPK needs to be synchronized with the loading schedule of the customer in order to avoid too long waiting time for the truck driver and delays in the distribution process. Waiting time between unloading and loading should be maximum 1-2 hours to avoid costs of this being too high (Person 2, 2013) (Person 1 2013). The study shows that adaptation and flexibility concerning the schedule is relatively high from both TPK and customer A, B and C.

5.3.5 Matched Frequency

Matching frequency refers to if a supplier arrive with the same number of trucks as the customer need for their distribution. If a supplier would have one customer and the customer would only have that supplier and the number of trucks used for delivery and distribution were exactly the same, a 100 % implementation of CIT would be possible.

However, TPK deliver PM to many customers and the frequency to one specific customer is small in relation to that customer's distribution. One explanation to this disequilibrium is the difference in volume of an empty package compared to a filled package, which lead to that TPK´s customers require more space for their distribution. Changing to CIT might require one of the parties to use several different forwarders, which could increase their total transport costs.

According to Person 1 (2013) increased business for a forwarder will result in the possibility to give discount. However, at the same time the other party´s forwarder will get less business, something that could generate a higher price. CIT could also be seen from a holistic perspective since it concerns the transport costs of two parties. The increased transport cost for the first company is believed to be compensated by the decreased transport cost of the second company.

5.3.6 Information Sharing

To effectuate the needed synchronization a close cooperation is needed between the parties involved. Information that needs to be exchanged includes for example truck requirements, loading times and volumes distributed. Both parties must be willing to share this type of information in able to succeed in matching the two transport processes. (Bringström 2013)

In Korea, a supplier asking a customer for information is sensitive. The customers' attitude on sharing information with TPK is restrictive. However, if the supplier presents an offer, which would save money for the customer, the willingness to share information most likely increases. (Kim2, 2013) (Shim, 2013)

Another aspect of information sharing is the need for a platform of exchanging the information. The method for exchanging information could range from manual methods such as calling by telephone or sending emails, to technically advanced solutions such as using a common IT-system. Implementing a common IT tool bring an investment cost whiles manual methods require a constant labour cost. (Lowndes 2013) The online platform used by TPK´s 3PL partner would be able to handle and coordinate the shared information and data (Person 1, 2013).

5.3.7 Empty Pallet Handling

TPK use standardized plastic pallets for their products. These are brought back to the warehouse approximately every 10^{th} time delivery to a customer take place and thereafter brought back to the factory by container. (Person 2, 2013) If CIT was to be implemented to 100 % for a customer, the truck would never return to the warehouse and hence the current setup would be impossible. Possible solutions are that the pallets would follow the truck but then occupy space or that a separate transport would be organized only for returning the empty pallets to the warehouse. (Person 2, 2013) (Person 1, 2013).

5.3.8 Co-loading

TPK´s 3PL partner co-load goods of several customers as often as possible in their delivery process. The truck then drives a pre-determined route and un-loads goods at different customers. In these cases, CIT could only be possible for the last customer in this route. However, the interviewed KAM´s mean that customers don´t care about their position in this route as long as their products arrive on time. This allows for the possibility of planning the route so that the customer interested in CIT is positioned last in the route. However other aspects, such as the shortest route, might still be more important that adapting the route to CIT. (Person 2, 2013) (Person 1, 2013)

5.3.9 Own Trucks

In many of the challenges explained above, it is assumed that both the supplier and the customer use an external forwarder for distribution of products. If one of the parties would have their own trucks they would probably want to use these. This is not a problem in itself yet it requires that the whole process is matched towards that truck type and size and the other transport routes of that company (Bringström, 2013).

5.3.10 Service Level Agreement

The Service Level Agreement (SLA) of TPK and their customer need to be synchronized. The SLA establishes the level of service that is included in the forwarders offer. Companies vary in how much responsibility they want staff from the trucking company to take and the level of service is reflected in the price. A compromise of the service level must be made between the companies, as for CIT to function. (Person 2, 2013) (Person 1, 2013)

5.3.11 Summary of Challenges

In this section comments are made for respective customer (A, B and C) concerning each challenge. The comments refer to the case were CIT was investigated between TPK and the customer. N/A refers to that no information was collected in the case study. The reason to that no information was collected is most often explained by the limited communication possibilities with customers.

Table 2 Summary: challenges related to Customer Integrated Transport for customer A, B and C.

	A	B	C
Truck type	Most of the trucks are the same type as used by TPK	Same truck type is used as TPK	All trucks need to be chilled trucks, i.e. not same as TPK
Truck size	N/A	Same truck size is used as TPK	Are flexible with truck size
Truck driver	Not a problem	Not a problem	Need to stay at customer site over the night to deliver the next morning

Matched delivery schedule	Flexible with unloading and loading	Flexible with unloading, however they need flexibility when loading	Flexible with unloading, needs to load in afternoon
Matched frequency	TPK deliver less than customer need	TPK deliver less than customer need	TPK deliver less than customer need
Information sharing	Willing to share information	Quite unwilling to share information	Willing to share information but scared of increased workload
Empty pallet handling	Will be affected	Will be affected	Will be affected
Co-loading	N/A	N/A	N/A
Own trucks	Does not have own trucks	A few, but not a problem	A few, but not a problem
SLA	N/A	N/A	N/A

6 Discussion on Customer Integrated Transport

In this chapter empirical findings are analysed and discussed, using the theoretical framework as support. The goal of this chapter is to answer Research Question 2. Aspects brought up can be used as guidelines of important aspects to consider, for those who are interested in using Customer Integrated Transport.

6.1 Is Customer Integrated Transport financially profitable?

Lumsden (2007) describes that pricing for transport activities often are performed using the rate method, in which parameters such as distance travelled, weight and volume of goods are considered. The price will cover for costs beyond the direct cost of moving the goods from one point to another, such as administrative costs and costs for when the truck must drive empty to reach the loading point. This means that as the volume of a Third Party Logistic (3PL) company's business increase, fixed costs can be spread over more transports and the price decreases. Another aspect affecting the price is the possibility to backhaul freight after delivery. Parts of the costs can then be shared between different customers. (Hensher & Brewer, 2004)

The financial evaluation of Customer Integrated Transport (CIT) performed in the case study, showed that the total transport cost for the two distribution processes of the supplier Tetra Pak Korea (TPK), and the customers A, B and C respectively, would be reduced by 5-11 % if CIT was implemented. This reduction is found by the estimation performed by TPK´s 3PL partner who gave price quotations for the routes 1, 2 and 3 (Figure 13 and Figure 14). The price reduction is the cost difference of transporting goods the different routes, as explained in chapter 5.1. In the follow up interview, Person 2 (2013) explained the parameters considered when giving a price quotation. These parameters conform to those in the rate method. The possibility for backhauling at the different end destinations had also been taken into account, by considering geographical location of customers in the current network. Lastly, costs for driving empty to reach the loading point were covered for in the price.

The result that showed that the price offered was lower for driving route 3, compared to driving route 1 plus route 2 can be traced to several reasons. As the goods transported, and the distance for transporting these goods, are the same in both scenarios, this can not be said to have affected the price difference. The distance driven to reach the loading site however varies between the scenarios. With CIT (Figure 14) the truck only need to drive from its starting point to TPK´s warehouse which is the first loading site whiles in todays process it must drive this initial route both to reach TPK´s warehouse and the customers (A, B and C

respectively) loading sites. Further, the end point will vary between the cases and backhauling possibilities might have been bigger at the location of the end point if using CIT, which might also explain the lower cost.

Another important aspect to reflect upon when analysing the price difference observed in this case, is the location of the starting point of trucks used by TPK´s 3PL partner. Today, TPK´s customers do not use the same firm as TPK, and since the customers are spread out over the country, they are likely to use 3PL companies located close to their filling sites. The price, which was offered for route 2 (Figure 13), might have been more expensive than the customers' current prices, due to the longer starting distance for the truck to reach the site. Approximate prices of what customer A, B and C currently pay were collected. The accuracy of these was evaluated as very uncertain, and thereof these were not used in the comparison made in the case study.

Even though the result from the financial evaluation indicates that CIT could save money compared to the transport solution used today, all above explained factors should not be forgotten when analysing the result. Information about what the customer pay today, as well as what service is included in their price must be known to comment on whether CIT imply cost savings for the customers. If technical or operational changes are required to pave the way for CIT, this could also involve costs. During the study, a number of factors that might pose obstacles to CIT, were identified (see chapter 6.1.3). The study did not include quantifying any financial effects of these factors.

6.2 Are environmental aspects important?

To reach the ambitious international goals in reducing CO_2 emissions, which have been set up until 2050, the transport sector must play a significant role (OECD/IEA, 2009). Concerning initiatives and studies aiming to decrease CO_2 emissions in the transport sector, focus has been on passenger transport (Regmi & Hanaoka, 2010) Both top-down and bottom-up approaches could be used to steer the transport sector to more environmentally friendly solutions. Trucking has to a large extent escaped the top-down efforts imposed up until today. (Rodrigue, Slack, & Comtois, 2013) Due to this and the fact that freight transport emissions account for one third of the transport sectors total emissions (Regmi & Hanaoka, 2010), there are opportunities for improvement if looking upon transport from a CO_2 emission viewpoint.

Weijers et al. (2012) suggest improved cooperation with Supply Chain (SC) partners as well as with other stakeholders or developing new concepts for delivery, as

measures to lower CO_2 emissions within the transport sector. If Customer Integrated Transport (CIT) eliminates some of the routes when the truck drives empty, CO_2 emissions would be reduced. The length of the distances of these routes varies in each individual case. Even though they are short, the increasing pressure of finding environmentally friendly transport solutions due to the international goals, solutions eliminating the smallest route could become interesting.

All interviewees in the case study were asked to comment upon their view on CIT in relation to environmental aspects and in specific CO_2 emission reduction. The general attitude was disinterest in environmental features of the concept. This attitude was in most cases traced to that no financial benefits were associated with reducing CO_2 emissions. Even though tetra Pak Korea (TPK) today prioritize other environmental aspects such as recycling and choice of material in their products, the environmental manager confirmed that increased costs related to emitting CO_2, would likely make initiatives to reduce CO_2 emissions more attractive.

Up until today, basically no economic incentives related to CO_2 emissions reduction exist in Korea. As governmental restrictions on CO_2 emissions have become tougher lately, emitting CO_2 might soon become more costly for companies. The statement from Rodrigue et al. (2013), about that freight transport has succeeded to escape many of the policies controlling emissions, seem to pertain in Korea. Based on the attitudes of the interviewees, it seems as if a top-down approach in the freight transport sector would make companies in Korea more interested in considering the environmental aspects of CIT.

6.3 Which practical obstacles must be handled?

During the interviews, 10 technical or operational factors were brought up as possible challenges related to Customer Integrated Transport (CIT). From a practical point of view, none of these are impossible to solve. The issue is rather the cost of overcoming each challenge. Lumsden (2007) states that to attain benefits from integrated logistics, solutions should be viewed from a holistic perspective. The aim should be to decrease the total cost rather than reducing cost for isolated activities. It is interesting to discuss these factors from a financial angle, as to evaluate the economical value of CIT from a holistic perspective. In Table 3 these 10 factors are listed, and their possible financial impact is discussed.

Table 3 Financial impacts of technical and operational factors related to Customer Integrated Transport.

Truck Type	If one of the companies handles goods that require special trucks, such as for example trucks with chilling capacity, the other company need to adjust to these requirements. McKinnon and Ge (2006) mention this as one of the obstacles when aiming at 100 % utilization of trucks. Using a truck with chilling capacity cost approximately 25 % more compared to a normal truck, meaning that it would reduce economical savings from CIT.
Truck Size	The price for a truck varies with size: a smaller truck is less expensive than a bigger one. However, if considering a certain amount of goods that should be transported, it might be more cost efficient to use a bigger truck since a smaller truck in this case would mean a higher number of transports. In other words, increased costs can be caused both by that one company must use bigger/smaller trucks than necessary or that the other company need to use smaller trucks, forcing them to drive the route more times. Another aspects mentioned during interviews was the difference in volume required by TPK´s products and their customer's products, as filled packages require more space than unfolded packages. The volume of the product could affect the size of trucks.
Truck Driver	The most important aspect related to the truck driver is that the use of CIT might require longer working shifts if the second driving route will take the driver further away from the starting point. This might affect cost of the trucking service.
Matched Delivery Schedule	Matching the schedules of the supplier´s delivery and the customer's distribution is crucial. This factor does not in itself affect costs. However, indirect consequences such as changes in production schedule or warehousing might affect costs.
Matched Frequency	In the case of TPK, the number of trucks used when delivering packaging material (PM) to a customer is much smaller than the number of trucks used by the customer in their distribution. As described, this is explained by that PM require very little space

	when transported whiles filled packages are volume demanding. Overcome this irregularity might have negative financial impacts for one company and positive financial impacts for the other due to the required change of 3PL provider. As also mentioned, this might however be a zero-sum-game if the losses made by one company are compensated by the gains made by the other company. Since the financial savings achieved by CIT is intended to be shared between the two companies, this will in this case not be a problem. The problem of unmatched frequency was in this case traced to the large difference in volume between the products of TPK and the products of their customers. This problem might not exist if both companies handle products of equal volume.
Information Sharing	Several of the interviewees brought up that shared IT platforms when sharing information might be needed. Bowersox et al. (1999) highlight the need for IT tools when sharing information. However, the study shows that already existing IT platforms within supply chain could be enough for covering the need of CIT and hence no extra investments would be needed in TPK´s case. Another aspect is the willingness of sharing information, were trust between the parties is central (Bowersox, Closs, & Stank, 1999). This is a management issue rather than economic, however financial investments to improve customer relationship management should be considered.
Empty Pallet Handling	Empty pallets must be brought back to TPK´s warehouse. CIT make this impossible since the truck will be reloaded with new goods and head towards the next delivery point. One possible solution is that the truck collects the pallets on its way back to the warehouse. The detour that this infers would in that case imply added costs. Another possibility would be to have standardized pallets between the supplier and customer.
Co-loading	Co-loading the products of several customers when distributing goods is an action taken to increase payload and in turn make the distribution process as cost efficient as possible. In the cases when TPK´s goods are currently co-loaded, CIT is only possible for the last customer in the distribution route. The financial savings achieved from co-loading can be put in relation to those

	of CIT, to evaluate whether less co-loading would be financially acceptable in return of being able to apply CIT for more customers. Using the route concept might also create problems if delivery schedules need to be coordinated.
Own Trucks	If one of the companies owns the trucks that they use for distribution, rather than using a forwarder, this company will most likely be unwilling to change and use a forwarder since this will increase their costs. If CIT is implemented using the privately owned trucks, the whole process (i.e. the distribution of both parties involved) will need to adapt to that truck size and type. The network, and hence the possibilities for backhauling, is most likely smaller for a private company compared to a 3PL company, something that would affect the cost picture.
Service Level Agreement	The Service Level Agreement (SLA) is negotiated individually in each case between the forwarder and the truck owner if the forwarding company leases trucks. The content in the SLA is important to consider when comparing prices between different 3PL companies since it can vary greatly.

6.4 Customer Integrated Transport in a strategic context

Bowersox et al. (1999) mention the importance of integrating with customers, as well as with suppliers, for a company to achieve their strategic goals in an environment exposed to competition. The core idea of Customer Integrated Transport (CIT), and it´s believed positive consequences such as cost savings and CO_2 emission reduction, are aligned with the efficient and sustainable transport solutions believed to be competitive in the near future. The strategic approach of the Supply Chain (SC) operations department at Tetra Pak Korea (TPK), defined in the Supply Chain Common Agenda (SCCA), focus on activities with strong customer focus and target mainly SC boundaries. CIT cover many of the aspects prioritized in SCCA. The case study shows that the increased integration within the SC that is achieved with CIT could have a positive correlation with a multinational company's strategic goals.

Strategic advantages related to Supply Chain Integration include the possibility to increase control throughout the SC, increased influential possibilities of the SC, sharing expertise and experience (Stank, Crum, & Arango, 1999) and customer satisfaction that could lead to more customers (Bowersox, Closs, & Stank, 1999). Several of the interviewees at TPK mentioned that CIT could bring long-term

strategic advantages such as better value proposition to customers, more insight in customers operations and a closer and better relationship between the parties. These advantages are believed to create a competitive advantage. As the study was performed from a supplier perspective, and due to the fact that direct communication with customers was limited, the customer view upon strategic benefits was limited. No information about the strategic goals of customer A, B or C was collected.

Even though increased integration in theory can be associated with several strategic benefits, some interviewees expressed perceived challenges related to these benefits. To catch the customers' interest and to convince them of the benefits connected to CIT was one of the challenges mentioned. The restrictive and uninterested attitude observed from some customers could be linked to that they were not convinced of the benefits with CIT when the concept was presented to them. This strengthen the notion that the added value that CIT bring for each of the involved parties must be stated clearly, and that a means of measuring value must be established (Bowersox, Closs, & Stank, 1999) Measuring strategic benefits might however be difficult and as Jayaram et al. (2010) mention. The benefits must often be evaluated in a long-term perspective to be observed, something that many companies find difficult. In the evaluation of CIT, companies should not forget to consider the long-term perspective.

6.5 Can Customer Integrated Transport add more value than a 3PL solution?

During the case study, Customer Integrated Transport (CIT) was met with scepticism from most of the interviewees. One of the main arguments against the success of CIT was that third party logistic (3PL) companies, which core business idea is to make transport as efficient as possible, would always propose a cheaper and better offer. Many argued that 3PL companies have well-developed networks which allow them to optimize backhauling and hence minimize trucks running empty.

One of the most important differences between CIT and the normal operations of a 3PL company would be that while the 3PL company make the business as efficient as possible based on how companies choose to run their distribution, CIT involves the parties to adapt and coordinate their delivery processes, as to enable CIT. If companies are willing to make the effort of adapting their processes as to enable CIT, other positive consequences could possibly follow from the increased integration.

Increased integration of the Supply Chain (SC) could generate several benefits. Beyond those already brought up in this chapter, Caputo and Mininno (1996) argue

that the aim of integrating logistics with a customer is to improve efficiency and find synergy effects and Lumsden (2007) states that integrated logistics mean better coordination of different logistics activities. According to the view of Bowersox et al. (1999) of competition being more and more between SCs, rather than between companies, it is necessary to integrate both with customers and suppliers in the SC to succeed in the competition. These advantages are of such a character that they do not follow directly by the use of a 3PL company but could be positive consequences from CIT.

From another perspective, increased Supply Chain Integration (SCI) could bring difficulties. Harrison and van Hoek (2011) highlight that integration across company boundaries are both time- and resource consuming. Jayaram et al. (2010) claim that SCI is complex as it involves the introduction of more levels and dimensions. The information that has to be shared is becoming more and more sensitive and the benefits must often be evaluated in a long-term perspective to be observed, something that many companies find difficult. Most interviewees at TPK were positive towards those benefits related to increased integration, however many got stuck in thinking about the challenges. Stank et al. (1999) mean that that the success of SCI lies in companies' discovery of its advantages. As the general view of the interviewees was scepticism concerning that CIT would be more beneficial than allowing a 3PL take the responsibility, the potential advantages were obviously not clear enough. The synergy effects following with applying CIT must be obvious to those involved, as to motivate the required effort and engagement.

CIT solves the problem of the truck travelling empty between the point of unloading and the starting point for backhauling. It also eliminates the take-off distance for the customer involved in CIT. One issue however remains. Many of the interviewees commented on that at some point a truck must return to its starting point. This is foremost due to that the drivers must return. The geographical location of the truck, and hence the distance from its base, might be another if CIT is used, compared to if it is not. The possibility for backhauling at the end location if using CIT might be smaller or bigger compared to the end location if not using CIT. To fully understand which transport solution that is more efficient, the backhauling possibilities of the company, or the 3PL firm handling the transport, must be known.

It is clear that 3PL companies, with well-developed networks and hence good possibilities for backhauling, will pose a challenge, if aiming to implement CIT using own trucks. However, CIT could add additional value related to the increased integration of the SC that a traditional 3PL solution could not. One option is that companies, which believe that their own, and their customers, transport would be suitable for SCI, could cooperate with their 3PL partner to implement the concept.

6.6 Summary of Discussion

This case study showed several aspects that need to be considered in relation to Customer Integrated Transport (CIT). The authors categorized these aspects in four groups: Financial-, Environmental-, Strategic- and Practical. Figure 15 summarizes important observations and findings in each of these groups.

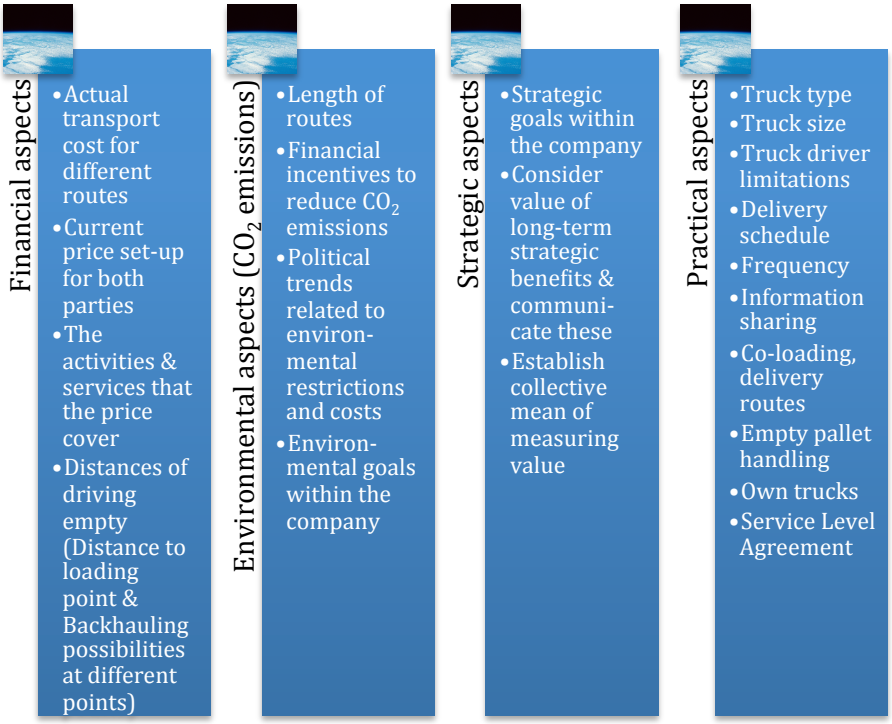

Figure 15 Summary: aspects necessary to consider when evaluating Customer Integrated Transport.

7 Customer Integrated Transport for Tetra Pak Korea

In this chapter recommendations for how Tetra Pak Korea could proceed with Customer Integrated Transport are provided. Individual evaluations are made for customer A, B and C and factors that the company should focus on if proceeding with this transport solution, are brought forward. Research Question 3 is answered in this chapter.

Considering Tetra Pak´s global goals and Tetra Pak Koreas (TPK) strategic initiative Supply Chain Common Agenda, Customer Integrated Transport (CIT) fits from a strategic point of view. When investigating how realistic an implementation would be, it was realized that many challenges must be overcome, but that the type and magnitude of these challenges differed between customer A, B and C. Some of the challenges were related to the type of products that TPK and their customers produce, as these vary greatly in volume and in character and therefor have different requirements when transported. Other challenges were related to the specific customer rather than to the industry, such as the openness and willingness of sharing information.

Interviewees from TPK confirmed that those of the investigated customers, who were willing to cooperate, did so because of their good relationship with TPK. Several interviewees also brought up the aspect that a good relationship with the customer would be a fundamental condition for CIT. TPK should consider the relationship they have with different customers when selecting which customers that could come in question for CIT. These observations confirm the beliefs of Lampert (2008) concerning the importance of segmenting customers and managing them differently in aim to sustain good relationships with them. One could also argue that TPK could improve their customer relationship if implementing CIT, as it would mean increased coordination. This could in turn increase the competitive advantage of TPK compared to competitors.

The financial evaluation indicates that TPK could save 5-11 % together with its customer, by implementing CIT. This result can be used to capture the customers' interests for the concept. However, the current prices paid by the customers for their distribution are unknown and this study did not evaluate costs related to the practical challenges. These results should therefor be used as are indicators rather than proof for that CIT could save money.

The distribution processes and associated aspects varied between customer A, B and C. It is therefore difficult to draw detailed, general guidelines around CIT, from these cases. Each case that seems interesting for an implementation of CIT should be investigated separately. The identified factors in this case study (Figure 15) can however support in this evaluation by highlighting areas and aspects, which are important to consider when evaluating the suitability and profitability of CIT.

Out of the three studied customers, CIT was more suitable for some than others. An implementation of CIT is considered to be most suitable for customer A, from a TPK perspective. The study showed that A would have the highest financial variable savings out of A, B and C. Further, A already use the same truck type as TPK and the schedule for unloading and loading of goods is flexible. These features make the adaptation process smoother. Challenges that remain include the pallet handling and TPK´s need to provide incentives by bringing forward more accurate financial proof for CIT being profitable, as to motivate A to cooperate and share the required information. Customer C is considered to be the least suitable for CIT from a TPK perspective. The 5 % in financial savings that the study showed for customer C is likely to be insufficient to outweigh the investment costs associated with the practical obstacles.

A more in-depth study of the actual financial benefits compared to existing challenges must be made, for all customers, before it is possible to be sure of whether an implementation of CIT is beneficial or not. The study highlights the many practical obstacles that need to be overcome and that would require a lot of resources both in terms of money and time. Also, to achieve the competitive advantage through value creation, a central aspect is that the customers associate the offer with increased value. Based on the observed attitudes, TPK´s customers do not yet perceive CIT as a value adding transport solution. Therefore, the authors do not suggest TPK to implement CIT as a new transport solution at this stage. However, if interest were shown from one of their customer a pilot study of the concept for this customer would be interesting, as this would allow for further evaluation of the concept.

8 Contributions and Final Remarks

Customer Integrated Transport is an unexplored concept, and the purpose of this master´s thesis was to explore it. This chapter concludes the findings from the case study. The generalization of these findings are commented, reflections on the process and the conclusions of the study are brought forward and further research is suggested.

8.1 Conclusions

- **The concept in a theoretical context**: No unified description of Customer Integrated Transport (CIT) similar to the definition of the concept used in this study was found during the literature review. CIT was positioned against existing theories, which showed that the concept was of strategic interest. CIT would also contribute to a more lean and agile supply chain, something that is of interest for many companies today. Other studies also describe information sharing between companies as an essential issue that has to be solved. IT and the relationship between a supplier and customer could play a significant part in solving that issue.

- **Customer Integrated Transport as an efficient transport solution:** The core idea of CIT: to integrate the distribution processes of two companies, aims to make transport more efficient – both from a financial and an environmental perspective. This study concluded that CIT have the potential to save money in a holistic perspective including supplier and customer. This study also showed that companies tend to care less about environmental aspects as long as these are not related to financial savings, when choosing transport solution. However, since activities with environmental impacts are believed to become more costly in the future, it is concluded that CIT is interesting from both these perspectives.

- **Benefits:** The empirical study showed that the most important aspect when evaluating CIT is the financial and that cost reductions could be achieved by using CIT. Theory also showed that other long-term positive aspects, such as competitive advantage and increased agility, could follow from integration in the supply chain. However, the empirical study made it clear that many customers were skeptical due to that the advantages of CIT were not obvious to them. The conclusion is that benefits of this character should be evaluated in financial terms to emphasize the importance of these.

- **Challenges**: Many of the challenges identified were practical obstacles that need to be overcome when integrating two transport processes. These obstacles are considered manageable. However, related costs need to be evaluated. Other challenges observed along the way include the unwillingness of companies to share information and the need to coordinate distribution activities between the involved companies. It was further concluded that obstacles of more management character require good Customer Relationship Management and trust building.

- **Case specific evaluation**: After performing this study, it was understood that CIT could generate financial savings in the distribution process for TPK and its customers. By looking at how CIT would work for TPK in relation to three different customers, it was observed that transport flows, physical circumstances and attitudes vary greatly from case to case. The conclusion is that it is necessary to evaluate CIT in the specific context of each individual situation, to determine whether it would gain from implementing CIT. Figure 15 was brought forward in this study, and aims to support in this evaluation.

- **Definition of Customer Integrated Transport:** The definition of CIT stated in the beginning of the study was as follows:

  When a supplier offers its customer the possibility to integrate its distribution process with the distribution process of the supplier by using the same truck for both inbound and outbound transports.

  After performing this study and increasing the knowledge about CIT, this definition is still considered to be an appropriate description of the concept.

8.2 Accomplishment of the Purpose

The purpose of this master´s thesis was to increase knowledge about the concept Customer Integrated Transport (CIT). To fulfill the purpose the authors developed three research questions, which has been answered and discussed in various parts of this report.

In chapter 3.5 research question 1 was discussed and CIT was positioned to existing theories within logistics and related fields.

Research question 2 was answered by using knowledge gained both in the theoretical review and in the empirical study. Benefits and challenges identified are discussed in chapter 6 and the most important findings are presented in chapter 8.1.

Research question 3 is discussed and answered in chapter 7. This chapter simultaneously serves as recommendations to the case company Tetra Pak Korea, concerning how they should approach CIT.

The authors believe that the three research questions have been answered, and therefore the study has also fulfilled its purpose.

8.3 Generalization of the Study

Considering the results of the study and reflecting upon how these can be used in a wider context, weakens many of the takeaways. However, the authors believe that some findings are valid in a more general context.

For Tetra Pak as an international company many of the operational challenges as well as the strategic benefits would be the same, however the calculated financial savings found in this study should be seen as Tetra Pak Korea specific. One also needs to consider national specific rules, regulations and structures within logistics in general, and transport specific.

For the food processing industry in general, several of the challenges identified in this case study are believed to be important aspects even in other cases. One example is the truck type, as products within the food processing industry often require special treatment in different ways. However, challenges such as for example matched frequency and pallet handling would be company specific. Also strategic benefits depend on the strategic goals of each company.

As the basis of transport is similar globally, CIT would in theory be interesting anywhere in the world. Several of the advantages related to CIT, such as improving their value proposition and saving cost, are aspects interesting for companies independent of nation or industry. CIT is further aligned with many of the pushing trends within supply chain and transport. However, many things that were observed as important factors for the success of CIT in this case, such as for example the importance of financial incentives related to environment, are believed to vary between countries and cultures. Therefor, the findings of this character are not considered as directly transferrable to other situations. Many of the practical and operational challenges identified are related to transport processes in general, and would therefore apply in other cases, independent of country or culture.

Information sharing was observed to be an important aspect to consider when stretching outside a company's boundaries, as CIT does. This finding is considered to apply to many situations, even concerning cooperation and integration not related to transport.

8.4 Reflection of Research Process and Conclusions

At the end of this thesis, when conclusions have been made, it is worth reflecting upon the chosen research process to evaluate if it provided an optimal approach to answer the purpose of the study.

The choice of spending much time on-site at the case company in Korea brought positive aspects. Thanks to open-minded and friendly attitude, many formal, as well as informal, interviews were performed, which allowed for a good understanding of relevant areas.

If the study was performed once again, the authors believe that one of the most important improvements would be to assure that equal input was collected from both the supplier and the customer, to assure that both parties perspectives were considered. The result of mainly being in contact with Tetra Pak Korea (TPK) resulted in an incomplete picture of CIT and its associated benefits and challenges. The most problematic limitation by performing the case study for TPK was that the authors were very dependent on the case company for the empirical collection as few customers spoke English.

The authors believe that the research process of alternating theoretical and empirical research, and the choice of performing an in-depth study at a specific case company, was suitable when investigating a new and unexplored transport solution. This allowed the discovery of aspects associated with CIT, which might not have been observed otherwise. However, the study would probably have had a better structure if the theoretical- and empirical study had been performed subsequently.

8.5 Further Research

More case studies would further develop the understanding of Customer Integrated Transport (CIT) and improve the description provided in this thesis. The authors believe that it would be interesting to perform a similar study, using companies within other industries than packaging solutions and dairy/food industry, as case companies. This would provide insight in which of the findings in this study that are related to the actual concept and which that are case specific.

In similar studies were the aim is to evaluate if CIT is a profitable transport solution, the authors recommend to widen the scope as to include a financial evaluation of observed practical and operational challenges. By including the cost of managing these challenges, a better-informed decision can be made. This study did not attempt to quantify the environmental effects of CIT. It could be interesting to quantify both how much CIT would alter the amount of CO_2 emitted compared to

other transport setups as well as to attempt to express these emissions in financial terms.

CIT was, in this study, evaluated as a concept that was initiated by a supplier. Further studies could investigate aspects that would occur if the concept would be initiated by a third party logistic service provider, but with the involvement of the supplier and customer. CIT could then be combined with other types of efficient transport solutions used by a forwarder.

Also, further studied could look into consequences of extending the idea of CIT even further by for example including return transports or suppliers and customers further up- or downstream in the supply chain.

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10 Appendix

Appendix 1 - Financial Calculations

The calculations were performed by Tetra Pak Korea´s 3PL partner. Quotation for the cost for trucking service, at the different steps in the process (Figure 13 and Figure 14) was given. By comparing the quotations for step 1+2, with the quotation for step 3, the savings by using Customer Integrated Transport (CIT) were found (equation (1) and (2).

$$S_{(KRW)} = (P1 + P2) - P3 \quad (1)$$

$$S_{(\%)} = 1 - (P3/(P1 + P2)) \quad (2)$$

S – Savings

P1 – Price for transport step 1

P2 – Price for transport step 2

P3 – Price for both step using CIT

The calculations were based on the use of a standardized 11 ton wing body truck as this is the most commonly used truck by TPK and customer A, B and C.

Table 1 Quotations for the different processes. (All prices have been modified multiplied by a factor).

	Customer		
	A	B	C
Price As-is today with two processes (KRW)	529,200	404,600	530,600
Price for one process with CIT (KRW)	469,000	364,000	504,000
Price savings (KRW)	60,200	40,600	26,600
Price savings (%)	11	10	5

Appendix 2 - Interview material

A number of interviews were held with various people both in Sweden and in Korea, starting from December 2012 and until April 2013. All the interviewees were, if not working within the Tetra Pak organization, connected to Tetra Pak in some way. The interviews were of semi-structured, unstructured or focused nature. Below follows examples of questions asked during these interviews.

Interview Questions concerning Supply Chain Integration

1. Tell us about who you are and what your position is?
2. What is significant for the food processing industry that TPK is acting in?
3. Can you tell us about the relationship between Tetra Pak Korea and its customers?
    a. What kind of data and information is exchanged between TPK and its customer?
    b. How does the supply of products flow between TPK and its customer?
    c. How does the information flow work between TPK and its customer?
4. After having been introduced to the concept of Customer Integrated Transport what are you spontaneous reflections?
    a. What would be the benefits?
        i. Financially?
        ii. Environmentally?
        iii. Practically?
        iv. Strategically?
        v. Other?
    b. What would be the challenges?
        i. Financially?
        ii. Environmentally?
        iii. Practically?
        iv. Strategically?
        v. Other?
    c. How would the relation between TPK and its customer change if implementing CIT?
    d. Would the concept be more interesting is environmental benefits related to the concept were proven?

Interview Questions concerning Transport and Logistics

1. Tell us about who you are and what your position is?
2. What are your main tasks and responsibilities at your work?
3. Can you describe the existing distribution process of package material from producing factory to the TPK´s customer? What are the key activities? What are the main challenges?
    a. For call-off customer?
    b. For direct delivery customer?
4. What is significant for the food processing industry that TPK is acting in?
5. Can you describe the further distribution process for TPK´s customer?
    a. To where do they distribute their products?
    b. What trucks are they using?
    c. How many trucks do they send?
6. How does the forwarding industry in Korea work?

Interview Questions concerning Tetra Pak Koreas Customers

1. Could you describe the customer?
    a. How big is it?
    b. Where is it located?
    c. What kind of products does it produce?
2. What was the response from the customer when introduced to the concept of Customer Integrated Transport?
    a. Did the customer see potential in the concept in general?
        i. Financially?
        ii. Environmentally?
        iii. Practically?
        iv. Strategically
        v. Other
3. Was the Customer willing to provide the information needed for CIT? If not, why?
4. Does the customer consider environmental aspects in relation to their transport?

Appendix 3 - Overview of Conducted Interviews

Interviewee	Company	Position	Type of interview	Subject/Topic	No. Of interviews	Average time of interview	Date
Bringström, Jesper	TPK	Supply Chain Management Director	Semi-structures and Unstructured	Supply Chain Integration & Logistic Processes	>15	1 h	Dec-May
Cha, Jay	TPK	Environment Manager	Semi-structures and Focused	Environmental regulations Korea/TPK	5	1h	Feb-Apr
Cho, Angela	TPK	CSR	Semi-structured and Unstructured	Supply Chain Integration & Logistic Processes	5	1h	Feb-Apr
Choi, Maggie	TPK	CSR	Semi-structured and Unstructured	Supply Chain Integration & Logistic Processes	3	0.5h	Mar-Apr
Gustavsson, Sofia	TPS	Quality Manager	Semi-structured and Unstructured	Quality	1	1h	21-jan
Kevin, Kil	TPK	Key Account Manager	Semi-structures interview	Sales & customer relationship	1	1h	19-apr
Kim, Jimmy	TPK	CSR	Semi-structured and Unstructured	Supply Chain Integration & Logistic Processes	5	1h	Feb-Apr
Kim1, Andrey	TPK	CSR	Semi-structured and Unstructured	Supply Chain Integration & Logistic Processes	3	0.5h	Feb-Apr
Kim2, Allen	TPK	Key Account Manager	Semi-structures and Unstructured	Sales & customer relationship	5	1h	Feb-Apr
Lowndes, Gareth	TPS	Super User Trainer	Semi-structured	Enterprise Software (SAP)	1	4 h	23-jan
Olsson, Martin	TPS	Warehouse Manager	Unstructured	Logistic Processes	1	2 h	22-jan
Person 1	3PL	Manager	Semi-structures and Unstructured	Logistic in Korea & Supply Chain Integration	7	1 h	Feb-Apr
Person 2	3PL	Senior Managing Director	Semi-structures and Focused	Warehouse operations & Logistic Processes	2	1h	14-feb
Shim, Jeff	TPK	Key Account Manager	Semi-structures interview	Sales & customer relationship	2	1h	26-mar
Steve Cho	TPK	Key Account Manager	Semi-structures	Sales & customer relationship	1	1h	22-apr
Wittlock, Kristina	TPS	Supply Manager	Unstructured & Focused	Environment	1	1h	28-feb