Reducing the Impact of Demand Fluctuations Through Supply Chain Collaboration in the Retail Grocery Sector

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Title of thesis:
Reducing the Impact of Demand Fluctuations Through Supply Chain Collaboration in the Retail Grocery Sector

Abstract:

Purpose: The purpose of the paper is to study how a collaborative approach to supply chain management can be used to enhance supply chain performance when the demand is fluctuating and uncertain. Enablers and barriers of collaboration will be assessed to give insight into the methods of collaborating between supply chain partners.

Design/methodology/approach: The study is a qualitative two-echelon case study of a grocery retail supply chain. A conceptual framework of the implementation of collaboration on supply chain performance during uncertain demand is developed through insights from literature. Interviews conducted with key respondents are analysed to evaluate and refine this framework.

Findings: The paper shows that collaboration can be a powerful tool to reduce costs and improve performance across the supply chain, also when the demand is volatile and uncertain. This paper gives insight into one case of implementing supply chain integration on several levels and improving performance across the supply chain as a result.

Research limitations/implications: This paper seeks to extend previous literature on supply chain collaboration, information systems integration and supply chain performance through a case study. The paper will give further insight into the enablers and barriers to supply chain collaboration, however the findings are generalizable only to a limited extent. It also discusses the importance of several factors in supply chain collaboration and gives further guidelines for research questions in more generalizable research.

Practical implications: The paper will give further insight into the challenges and benefits of increased collaboration in the supply chain. It will be especially useful for practitioners in retail industry and other industries where the demand is characterized by volatile demand.

Originality/value: The paper will give new insight into the effects of collaboration on supply chain performance. The study fills a gap in research on performance in industries where the demand is fluctuating, which will be useful to both researchers and practitioners.

Keywords: supply chain management, supply chain collaboration, supply chain integration, retail, grocery, uncertain demand
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1 INTRODUCTION TO THE KAPPA

This section of the thesis aims to further explain the research decisions that underline the process and writing of the article starting on page 18. In a traditional Master’s thesis, this discussion and motivation is generally included naturally in the flow of the text. However, in the case of an academic journal article, this kind of discussion is generally not included due to the stricter restrictions on length placed by journals. The article functions as a standalone document, the Kappa is written as an accompanying document to the article section of the Master’s thesis. Therefore it is recommended to read the Kappa after the article itself for increased insight into the research methods and decisions as well as more in-depth discussion on the research project.

The primary aim of the Kappa is to show that the author is capable of an adequate level of academic discussion as well as independent research, as this is required to be demonstrated before the student is allowed to graduate. This difference is most visible in the methods section, as the whole discussion on quality of research is moved to the Kappa since journal articles rarely contain this kind of discussion. The Kappa will also present the decisions behind the data gathering and analysis process in greater detail, especially the interviewing and coding processes.

The Kappa follows the same structure as the article itself. First, the background and research problem will be presented in more detail. In the next sections, some of the theoretical reasoning and the choices behind the theoretical approach and framework will be discussed. As previously noted, the methods section is also significantly expanded. In the final chapter, the process of analysing and drawing conclusions from the data will be discussed. This section will also contain some further discussion on research limitations as well as suggestions for further research. The thesis was written as an independent research project, as the author did not receive any compensation for writing the thesis nor was the author employed by any company while writing the Thesis. However, the decision to choose this specific case company came from the author’s previous working experience as well as personal contacts gained while working in the grocery retail industry.
2 BACKGROUND AND ADDITIONAL DEFINITIONS

The central concept of the thesis is collaboration. Collaboration is often driven by external, macroindustrial reasons, namely increased competition and a drive to improve sales and increase supply chain effectiveness (Holweg et al., 2005; Matopoulos et al., 2007). Increased supply chain integration has in part been made possible by the advances in information technology, however this has also resulted in IT losing its position as something special, instead basic IT capabilities has become a necessity for firms and supply chains (Fawcett et al., 2011). Grocery retail supply chains are generally considered logistically efficient due to the perishable nature of many goods (Taylor and Fearne, 2009) and thus it was natural to select the case supply chain from this industry.

The research problem for the thesis is based on the difficult demand environment in the retail industry. Frequent promotions, perishable goods, large number of SKUs, seasonality and weather-driven demand are just a few factors plaguing the grocery retail industry. On the other hand, grocery retail industry is generally very competitive, with virtually no differentiation concerning SKUs other than price and brand. Add to this the high concentration of the Finnish grocery retail industry and it can be said that this industry is one that requires companies to be both effective and flexible, minimizing costs while keeping store shelves stocked and fresh.

The article provided a formal definition of the terms supply chain collaboration and CPFR, however terms like transparency and visibility only got a non-formal definition and factors such as internal and external collaboration are not touched upon at all. Due to length constraints these definitions are placed here instead. Many of the SCM-related terms and constructs are also poorly defined in literature, and the meaning can vary from person to person, therefore these definitions are a representation of the position taken by the author concerning these terms.

**Transparency** – the two-way communication or sharing of information between supply chain partners (Bartlett et al., 2007). The measure of transparency be assessed on the scale opaque-translucent-transparent, and it is referring to the visibility or insight into the processes of the other party (Lamming et al., 2001).

**Visibility** – see Transparency.
**IT integration** (in the context of SCM) – “The degree to which a focal firm has established information systems for the consistent and high-velocity transfer of supply chain-related information within and across its boundaries” (Rai et al., 2006:229).

**Inter-organizational information integration** – see IT integration.

**S&OP** – “a process to develop tactical plans that provide management the ability to strategically direct its businesses to achieve competitive advantage on a continuous basis by integrating customer-focused marketing plans for new and existing products with the management of the supply chain. The process brings together all the plans for the business (sales, marketing, development, manufacturing, sourcing, and financial) into one integrated set of plans” (Thomé et al., 2012:360).
3 SUPPLY CHAIN COLLABORATION

Following the increased interest in collaborative relationships in supply chains and the evolution of IT, several different ideas and methods of collaborating have been developed during the last 25 years. These methods are generally called collaborative initiatives in literature, and this paper will also use this term. The development of inter-organizational information exchange started with a focus on developing smoother transactions through electronic data interchange (EDI) and more efficient product tracking and tracing through radio-frequency identification (RFID) technology during the 1980s and -90s (Attaran and Attaran, 2007). These technologies were focused on information exchange, but they also play a key role in several collaborative initiatives as information sharing also holds a key role in collaborative supply chains. One example of this evolution is the continuous replenishment (CR) initiative, where replenishment orders are sent automatically on the basis of POS or forecasts through EDI (Elkady et al., 2014). VMI is similar to CR, except that the supplier decides the inventory levels and replenishment programs instead of the customer (Sari, 2008). VMI is also widely used in industry, however VMI only affects the replenishment function of the supply chain, and since it relies on historical POS and inventory data, promotional campaigns will still cause problems for a VMI replenishment system (Sari, 2008). Other collaborative initiatives from the 90s addressed planning (e.g. collaborative planning or collaborative forecasting and replenishment (CFAR)), but a comprehensive initiative for integrating all aspects of information sharing in planning, collaboration and forecasting functions was lacking (Holweg et al., 2005).

CPFR was developed during the end of the 1990s to address the problems of previous SCC initiatives and take the next step in the evolution of SCC collaboration by gathering together the different functions of previous SCC initiatives, i.e. planning, forecasting and replenishment (Barratt and Oliveira, 2001; VICS, 2004). The earliest CPFR model from 1998 was a nine-step linear model, however in 2004 the cyclical model that is also used in this paper was suggested (Hollmann et al., 2015). The most recent iteration of CPFR is the 2010 version, where an IBP (integrated business planning) approach is taken to combine the benefits of S&OP and CPFR (Hollmann et al., 2015; VICS, 2010). The reason for choosing CPFR as one of the building blocks of the theoretical framework was to have an “industry best practice” comparison, as well as the high level of complexity and integration required for successful CPFR. As the author already had knowledge of the supply chain processes of the focal company, CPFR was deemed to be close to the current...
practices employed. S&OP was selected as the author knew that the focal company was formally using S&OP, and this provided another formal approach to supply chain collaboration processes and methods that the focal company used.

In the VICS 2010 framework, S&OP is positioned as the best model for internal collaboration, while CPFR is positioned as the optimal solution for external collaboration (VICS, 2010).

### 3.1. Enablers and barriers

The discussion on enablers and barriers was quite general in the article. In practise, the different enablers and barriers affect different stages of the collaboration differently. Figure 5 shows an example of a more practical approach to the implementation of CPFR, due to the nature of the different phases in the cyclic 4-step model the enablers and barriers are also different and thus the enablers and barriers from Table 1 in the article have been synthesized into the CPFR model. In the middle are trust and technology, as these are the central pillars for a successful integration of a supply chain (Barratt and Oliveira, 2001). A collaborative culture and top management support also play a key role throughout the collaboration they have been placed into the centre as well. All four stages of the CPFR process have then been given their own enablers, and some also have barriers depending on the literature.

This kind of approach pays special attention to the practical implications of SCC integration, however the aim of the study was not directly to study the implementation of collaborative schemes but rather the effects of these. Nevertheless, the way collaborative initiatives are implemented does have an effect on the success of these initiatives, and thus a closer look at the enablers and barriers to implementation in the different functions of a supply chain could provide valuable insight into the matter. Especially since one of the most frequently reported reasons for not collaborating include the complexity of the practical implementation of such complex processes, a case in point being CPFR (Panahifar et al., 2014).
Several of the enablers and barriers in Figure 5 are confirmed by studies like Panahifar et al. (2014) or Büyüközkan and Vardaloğlu (2012) that specifically studied CPFR enablers and barriers. However, since the wholesaler does not formally use CPFR, this kind of deliberation on the specific phases of CPFR were left out from the article. Another approach might have included these in the article itself, and CPFR implementation is also one of the “hot topics” of the last decade in SCM research (Hollmann et al., 2015).

### 3.2. The role of IT and the bullwhip effect

Demand uncertainty in supply chains can be a result of several different reasons, these reasons also differ between industries and the position of the firm in the supply chain. For the purposes of this paper, the sources of demand uncertainty concerning the grocery retail industry were prioritized compared to other sources of demand uncertainty. The best known effect of demand volatility and uncertain demand is probably the bullwhip effect, which is a result from a mismatch between actual demand and the orders placed.
to suppliers (Costantino et al., 2015a). In practice, this means that changes to orders to upstream suppliers caused by demand fluctuations downstream in the SC tend to become amplified for every step upstream in the SC these orders go (Lee et al., 1997). The main reasons for the bullwhip effect are poor visibility in the SC, fluctuations in the prices and forecasts, order batching and gaming (Lee et al., 1997). Decreased frequency of supplier price promotions, improvements in forecasting methods with checks on demand variability and streamlined ordering processes are ways to decrease the impact of bullwhip effect (Lee et al., 1997; Costantino et al., 2015b; Costantino et al., 2015a).

3.3. Theoretical framework

This section discusses the theoretical framework presented in Figure 3 in the article. The framework was meant as a theoretical frame for the different factors that affect the capability of a collaborative supply chain to cope with volatile demand. Due to the factors explained in the introduction, the retail sector is very prone to demand fluctuations and the consumer goods sold at the stores are often perishable, therefore it is of utmost importance that the supply chain can efficiently work under these circumstances. The companies in the supply chain have certain processes they can make use of to ensure better performance during demand uncertainties, but generally these measures come either at the cost of increased inventory costs and spoilage when using buffer inventory, or empty shelves and bullwhip effect, when trying to be flexible and answer to demand in an unresponsive supply chain. The aim of most collaborative initiatives is to introduce collaboration to at least some of the functions of planning, forecasting and replenishment, the initiatives presented in this thesis are CPFR and S&OP. The theoretical implications of these initiatives are discussed in detail in the article, and the processes are also analysed in the empirical discussion part.

An alternative SCC initiative that would have fit the criteria of comprehensive supply chain structures would have been efficient consumer response (ECR), which also originates from the grocery sector (Aastrup et al., 2008). ECR is a collaborative initiative where supply chains could integrate, or band together to create strategic alliances, to create win-win situations for all parties in the supply chain (Aastrup et al., 2008). ECR would have been a viable solution for the framework as well, however the author considered the IT-related aspect of CPFR as well as the more appropriate mix of CPFR and S&OP to rule in favour of a framework with CPFR and S&OP.
4 METHODOLOGY

The flow of the data collection process is presented in Figure 6. The research project started from the determination of industrial context and research aims. The key informant, in this case PlanMng from WS, was contacted to set up a meeting concerning the research aim, practical arrangements and schedules. Then, research questions and a theoretical framework were constructed and an interview guide was created on this basis. The key informant set up interview times with the informants for the thesis, and the interviews were carried out and analysed.

![Diagram of data collection process]

Figure 6  Data collection process

4.1. Sampling and interviews

The empirical data was gathered through interviews with key personnel of the focal company (WS) and two of its customers (RS and RW). The persons that were interviewed were sampled together with the planning manager of WS by analysing the purpose of the research and determining the most information-rich cases, using the so-called purposeful sampling method (Patton, 2002). A detailed schedule of interviews can be found in Table 2 in the article. To make sure that key topics were covered, an interview guide was created (Appendix 1 and 2 for English and Finnish interview guides respectively), however the answers will still be open-ended and conversational since new knowledge will most likely surface during the interviews, thus allowing for considerable
deviation from the interview guide (Patton, 2002; Ellram, 1996). The interviews are recorded with a mobile phone and field notes are used to support the analysis and present helpful ideas and directions during the interview (Patton, 2002).

### 4.2. Data coding and analysis

The data was analysed and coded through thematic analysis. The analysis of the interview data was conducted through a categorization and coding of the interview transcripts, and the results were interpreted in the light of the three research questions (Saldaña, 2013). The coding process was started by categorization or open coding, where the interview transcripts were categorized or segmented based on common attributes, in this case the three research questions (Ellram, 1996; Saldaña, 2013). Axial coding was conducted to uncover connections and similarities between coded factors, the axial codes in this factor were the different themes that rose from the first iteration of categorization (Ellram, 1996). This method is also called pattern-matching (Yin, 2009). The third sequence of the coding process was selective coding, where a central code was decided upon and other codes were related to this (Ellram, 1996). This process was iterated with regards to different approaches to the classification, and thematic analysis was conducted in between iterations to seek decisive factors with regard to the research goal and research questions. The coding was conducted in a CAQDAS (computer-assisted qualitative data analysis software) freeware program called “QDA Miner 4 Lite” (http://provalisresearch.com/products/qualitative-data-analysis-software/freeware/).

As can be seen from Figure 7, the three most frequent codes are the ones that are connected to the research questions directly. The reason for this is that the interview guide was constructed on the basis of these research questions, however this caused the framework and topics connected to it to appear less in the interviews. This may constitute a limitation to the study, as the in-depth interviews concentrate more on certain aspects of the framework. On the other hand, the answers to the interview questions gave a broad base to research how well the framework actually fits the real implementation and execution of supply chain collaboration in this supply chain.
The coded segments of the text were compiled into three categories, research questions, capabilities and processes using axial coding. The three research questions were analysed separately by compiling the answers from the five interviews into one table on the basis of themes. These themes can be viewed in the section 4 in the article, and they are based on the research questions as well as the framework. This kind of thematic comparison allowed the author to structure the data for the purpose of “identifying and describing both implicit and explicit ideas within the data, that is, themes” (Guest et al., 2012:13). This kind of thematic data allows the researcher to dig deeper than simple word counts and statistics, and uncover connections and patterns within the context of the case (Guest et al., 2012).

The analysis of the interview transcripts started as soon as the first interview was over. This allowed the author to draw conclusions and modify the approach to the interviews.
throughout the interviewing process, as the knowledge of the author increased after every interview (Patton, 2002).

4.3. Validity, reliability and generalizability

A case study has to face four checks: construct validity, internal validity, external validity and reliability (Yin, 2009). These are summarized in Table 9. By using a deductive approach grounded in previous literature and knowledge, the validity of the construction of the case can be argued to be adequate (Patton, 2002), however as a further check the interviews will also be used to validate the framework. The internal validity, or the credibility of the research, is best enhanced through certain analytical methods, e.g. axial coding (also called pattern analysis) (Yin, 2009) as well as the usage of case study protocols which includes e.g. the interview guide and descriptions of the analytical process (Ellram, 1996; Patton, 2002). It has been argued that the best way to enhance the external validity of case studies is to do the same study over and over again (Ellram, 1996), however this is out of the scope of this paper. The interview transcripts were also sent to the respondents for verification, reducing the possibility of misunderstandings and to corroborate the data where needed (Ellram, 1996).

<table>
<thead>
<tr>
<th><strong>What is the concern?</strong></th>
<th><strong>What has been done?</strong></th>
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<tbody>
<tr>
<td><strong>Construct validity</strong></td>
<td>Are the studied factors relevant?</td>
</tr>
<tr>
<td><strong>Internal validity</strong></td>
<td>Causality of data and inference of the researcher.</td>
</tr>
<tr>
<td><strong>External validity</strong></td>
<td>Are the findings generalizable to a larger population?</td>
</tr>
<tr>
<td><strong>Reliability</strong></td>
<td>Errors and biases in the study, if someone would redo the same study would they reach the same conclusions?</td>
</tr>
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</table>

Table 9  Summary of steps to ensure validity and reliability of the study. Synthesized from Yin (2009), Patton (2002) and Ellram (1996).
Due to the reality-oriented perspective of the research, objectivity will be a priority (Patton, 2002). This means, among other things, that the researcher should affect the data as little as possible, especially during the interviews (Patton, 2002). Findings from this case study might be difficult to generalize across supply chains, since some of the questions revolve around specifically this supply chain and the conditions in this case might not apply in other settings (Yin, 2009). As the retesting of the same case study in different settings is out of the scope of this research project, the generalizability (external validity) of the findings will be the weakest part of the study. However, case studies can in general give suggestions and ideas for further research (Yin, 2009).

The framework presented in the end of the literature review in the article is a general representation of the synthesis of a process of supply chain collaboration as suggested by previous literature. Thus the framework will be quite general and take a strategic perspective, the operational details of practical implementation will have to be left out due to the limitations and aims of the study. However, the study still gives good insight into the process of integrating supply chains, even without formal, complex methods such as CPFR.
5 FINDINGS AND CONCLUSIONS

This section of the Kappa will shortly discuss the empirical findings of the article, especially focusing on aspects that were considered but did not make it into the final article due to the limitations of the article. The discussion of the empirical findings were very much focused on the exchange of information. However, the focus on IT capabilities and information exchange is well founded in previous literature, as the exploitation of IT resources has been suggested to be a key catalyst for increased supply chain performance both outside the context of collaboration (Wu et al., 2006) and within the context of collaboration (Kim and Lee, 2010). Nevertheless, the literature also points out that IT integration and IT capabilities are not the one and only enabler to collaboration, or that either collaboration or leverage of IT capabilities would in itself provide an automatic way to better SC performance, the processes in the supply chain must also be properly aligned with the supply chain (Elkady et al., 2014; Wu et al., 2006; Ghobakhloo et al., 2014).

In the framework and analysis of the article, the supply chain processes are mainly approached through the perspective of CPFR and S&OP, resulting in a focus on either planning, forecasting or replenishment as well as information exchange and meetings. However, supply chain processes can contain other activities as well. Ghobakhloo et al. (2014) suggested that supply chain processes would be made up from four processes that are required for integration: activity integration, information exchange, physical flow integration and financial coordination. Rai et al. (2006) suggested three SC processes: information flow, physical materials flow and financial flow. Matopoulos et al. (2007) suggested the following nine supply chain activities: procurement, inventory management, product design and development, manufacturing and planning, order processing, distribution, sales, demand management and customer service. The activities belong to one or more supply chain processes, and several of these are touched upon at one point or another during the analysis. However, most of these activities and processes are deemed outside the scope of the article, since the focus of the article was on information flows.

The article was focused on information exchange and also touched upon activities in the form of e.g. promotion and exception management. However, most of these activities are in one way or another based on information exchange, as the case companies have opted
for an integrated SC model where much of the actual SC activities are handled by the wholesaler, thus it was quite logical to focus on information exchange first and foremost.

The main findings of the article were to review the collaborative approach taken by the focal supply chain, providing an in-depth look at the implementation and perceived enablers and barriers to the collaboration. Also, the integrated approach taken by the case supply chain can serve as a model for future supply chain integration considerations, as the future of supply chain collaboration is arguably going to move towards even deeper levels of integration and working as one company within the supply chain as well as expansions into new fields of collaborative relationships, continuing the evolution of SCM during the previous two decades (Min et al., 2005; Soosay and Hyland, 2015).
REFERENCES FOR THE KAPPA


PROPOSED PAPER

Reducing the impact of demand fluctuations through supply chain collaboration in the grocery retail sector

By

Jonatan Tapio Rantanen

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ABSTRACT

Purpose
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The study is a qualitative two-echelon case study of a grocery retail supply chain. A conceptual framework of the implementation of collaboration on supply chain performance during uncertain demand is developed through insights from literature. Interviews conducted with key respondents are analysed to evaluate and refine this framework.

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The paper shows that collaboration can be a powerful tool to reduce costs and improve performance across the supply chain, also when the demand is volatile and uncertain. This paper gives insight into one case of implementing supply chain integration on several levels and improving performance across the supply chain as a result.

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This paper seeks to extend previous literature on supply chain collaboration, information systems integration and supply chain performance through a case study. The paper will give further insight into the enablers and barriers to supply chain collaboration, however the findings are generalizable only to a limited extent. It also discusses the importance of several factors in supply chain collaboration and gives further guidelines for research questions in more generalizable research.

Practical implications
The paper will give further insight into the challenges and benefits of increased collaboration in the supply chain. It will be especially useful for practitioners in retail industry and other industries where the demand is characterized by volatile demand.

Original/value
The paper will give new insight into the effects of collaboration on supply chain performance. The study fills a gap in research on performance in industries where the demand is fluctuating, which will be useful to both researchers and practitioners.

Keywords: Supply chain management, supply chain collaboration, supply chain integration, retail, grocery, uncertain demand
1. INTRODUCTION

Supply chain integration (SCI) and supply chain collaboration (SCC) are generally considered critical for increased supply chain performance (Simatupang and Sridharan, 2002; Bagchi et al., 2005). However, several different and sometimes even conflicting definitions of collaboration exist in the academic literature (Soosay and Hyland, 2015). In this paper, supply chain collaboration is defined as two or more independent supply chain entities working together to achieve better competitive advantage than they could alone through joint planning and execution of supply chain activities (Simatupang and Sridharan, 2002; Soosay and Hyland, 2015). Even though supply chain integration is often used interchangeably with SCC (see e.g. Bagchi et al. (2005)), this paper will take the approach of Simatupang and Sridharan (2005) and view SC integration as one of five essential factors of SCC. Other critical factors for SCC include common performance measurement and incentive alignment, sharing of information, setting common goals and making decisions based on the shared goals, as well as trust in other members of the SC (Kumar and Banerjee, 2012; Simatupang and Sridharan, 2005; Hollmann et al., 2015). The reasons for supply chain collaboration can be very different between companies and supply chains, but generally the need for supply chain collaboration comes from economic pressure from fiercer competition (Matopoulos et al., 2007).

Technological advances in IT have enabled unprecedented levels of information sharing in the supply chain, e.g. point-of-sale (POS) data can nowadays be transferred almost in real-time upstream in the supply chain. Inter-organizational information integration, i.e. the level of information sharing between companies in the supply chain, is a critical part of supply chain performance and can be leveraged for a significant performance boost for the whole supply chain (Wong et al., 2015; Rai et al., 2006). However, inter-organizational information integration alone cannot guarantee optimal performance in the supply chain, different coordinating and collaborating activities are also required from the different entities in the supply chain (Sanders, 2008). Also, due to the readily available IT-solutions on the market, information and communications technology (ICT) in itself can no longer be considered a rare resource that would create sustainable profits in excess of normal returns (Wu et al., 2006). Conversely, not using information and communications technology (ICT) to enable collaboration in the supply chain at least on a basic level of information sharing could result in a serious disadvantage compared to the possible performance increase information sharing and IT integration have to offer (Elkady et al., 2014).

Due to the fact that extensive IT capabilities have become more common and frequent across organizations, the focus in supply chain research has shifted from the possibilities implementation and advances that IT offer towards a more holistic approach where intangible assets such as trust and commitment, as well as the operational and strategic fit of IT to enable SCC, have become more dominant issues when compared to purely technical possibilities and advances (Wu et al., 2006; Lai et al., 2006; Gunasekaran and Ngai, 2004). However, collaboration is about much more than information sharing only, it also includes behaviour and culture of the organizations as well as the relationships between both suppliers and customers (Singh and Power, 2009; Fawcett et al., 2011; Min et al., 2005). Especially promotional campaigns and other activities which cause demand fluctuations also require a more profound collaboration than passive information sharing (Ramanathan and Muyltermans, 2010).
During the last two decades of research into SC collaboration, several different ideas about the practical means and results of collaboration have been developed. Early advances in the field of supply chain collaboration were primarily concerned with information exchange, and these include e.g. continuous replenishment (CR) and vendor-managed inventory (VMI) (Skjoett-Larsen et al., 2003). The shift from pure information sharing towards a more relational approach can also be seen in the timeline of SCC initiatives, as e.g. Voluntary Interindustry Commerce Standards (VICS) started developing the collaborative planning, forecasting and replenishment (CPFR) model as a more advanced version of previous SCC initiatives during the end of the 1990s (Skjoett-Larsen et al., 2003). VICS CPFR has been found to be more efficient than e.g. VMI in situation where the demand is uncertain (Sari, 2008) and one of the main drivers behind the CPFR initiative is to enable better flexibility and forecasting accuracy during demand uncertainties (Barratt and Oliveira, 2001). However, fluctuating demand and demand uncertainty still causes decreased performance for supply chains using CPFR-style collaboration (Barratt and Oliveira, 2001; Ehrenthal et al., 2014) and it has been suggested that deeper collaboration is the key to decreasing the impact of demand fluctuations (Simatupang and Sridharan, 2005; Alftan et al., 2015).

The grocery retail industry and the associated supply chains differ from supply chains in the manufacturing industry through e.g. the perishable nature of most goods and greater demand fluctuations caused by frequent promotional campaigns (Taylor and Fearne, 2009). Several earlier articles in academic journals have researched the state of SCC and different SCC initiatives in the grocery and retail industries (see e.g. Alftan et al., 2015; Ehrenthal et al., 2014; Kaipia et al., 2013; Elkady et al., 2014; Barratt, 2003), however research on the links between information sharing, SCC and SC performance in retail industry remains scarce (Elkady et al., 2014). In addition, demand uncertainty and seasonality are fields which are often poorly considered by especially small retail chains (Elkady et al., 2014). Previous research shows that increased collaboration, information sharing and joint planning are critical for e.g. fresh food supply chains, since one of the characteristics of the grocery retail industry is volatile demand (Taylor and Fearne, 2009). This paper will attempt to provide a framework for the gap between IT, SCC, and SC performance by extending knowledge from previous research and combining it with new empirical data. This study will also seek to examine the possibilities offered by SCC especially in a context of demand uncertainty and volatility.

The aim of this study is twofold. The first aim is to study the methods and reasons for the specific collaborative approach in the case context as well as enablers and barriers to collaboration perceived by the companies. The second aim is to assess the practical implications and limitations of supply chain collaboration and information sharing for this supply chain. Collaborative planning and forecasting have been shown to positively affect supply chain performance, and especially information sharing plays a prominent role when the demand is uncertain or fluctuating (Kaipia et al., 2013; Elkady et al., 2014). To gain increased insight into the areas of collaboration and information sharing, a case study was conducted within a supply chain in the grocery retail industry. A supply chain collaborative initiative, the CPFR-model of Voluntary Interindustry Commerce Standards Association (VICS), is presented as a benchmark of industry best practice in the field of implementing collaborative business practices and supply chain integration. Another collaborative method, sales and operations planning (S&OP), is also presented as an alternative method of integration. Barriers and enablers to supply chain collaboration are
gathered through previous research on SCC, and key company employees are interviewed to gain an understanding of the integration in the case supply chain.

2. LITERATURE REVIEW

This section will present the different parts of the framework of the thesis: i.e. supply chain collaboration and barriers and enablers to it as well as some central methods and processes of collaborating. The role of IT is central in supply chain integration, and thus IT alignment and integration will also be presented in this chapter. The discipline of supply chain management first emerged during the 1980s and 1990s when “supply-chain thinking” started taking root, ousting arms-length negotiations in favour for more cooperative and sustainable relationships inspired by Japanese business relationships (Skjoett-Larsen et al., 2003).

2.1. Supply chain collaboration

The first supply chain collaboration initiatives appeared in the 90s, and since then several different SCC initiatives have been developed. Despite empirical evidence suggesting that SCC results in a significant performance increase for the whole supply chain, profound collaboration within the supply chain was still rare in the early 2000s (Holweg et al., 2005). Information asymmetry and lack of trust due to opportunistic behaviour were considered key inhibitors to deeper supply chain collaboration (Simatupang and Sridharan, 2002). During the 2000s, the evolvement of IT and its application in SCM were quite widely researched, as proper IT implementation was found to be of critical importance to the performance of the SC (Gunasekaran and Ngai, 2004).

Nowadays, SCC is considered almost vital for achieving increased competitive advantage for the SC (Kumar and Banerjee, 2012). The advances in ICT and internet have made IT easily available for anyone with money to buy it, and thus the application of IT has lost the status of competitive advantage, instead becoming a competitive necessity (Fawcett et al., 2011). However, previous failures to receive automatic benefits from the implementation of IT and especially in the collaborative efforts of small supply chains have showed flaws in the thinking that SCC is a way to always increase the performance of the supply chain (Elkady et al., 2014). Also, many of the advances on SCC are still on a theoretical level and the initiatives have not progressed to widespread practical application by industry (Panahifar et al., 2014; Büyüközkan and Vardaloglu, 2012). However, the literature also suggests that collaboration is not a question of “either or”, instead supply chains collaborate on different levels with different companies, and the intensity of collaboration with different supply chain partners generally increases gradually with time, resulting in a contingent approach to collaboration among companies (Danese, 2011; Skjoett-Larsen et al., 2003).

Supply chain collaboration has been described and defined in several different ways, however the general idea is that supply chains work together to achieve a competitive edge (Soosay and Hyland, 2015). The practical implementation of supply chain management can be seen as a balance between two processes, as collaboration is both about the relationship between companies as well as the integration of the business processes of two or more companies that decide to collaborate (see Figure 1). The type of supply chain collaboration can be assessed on two different scales: systems
collaboration (Kim and Lee, 2010) and collaboration depth (Matopoulos et al., 2007). Systems collaboration can be viewed as the extent to which supply chain partners align and integrate their IT systems with each other, while the depth of a collaborative relationship can be either strategic, tactical or operational (Kim and Lee, 2010). On an operational level, firms focus on information exchange, on a tactical level firms seek some form of integration with each other and on a strategic level firms seek to develop a culture and relationship of collaboration that affect all business processes and decisions (Matopoulos et al., 2007; Fawcett and Magnan, 2002). Strategic collaboration and systems collaboration have a tendency to strengthen each other: increased depth of collaboration make increased systems integration and real-time information exchange necessary, while the sharing of increasingly sensitive data and systems integration call for a more strategic partnership between firms (Kim and Lee, 2010).

Figure 1. A general framework of supply chain collaboration (Source: Matopoulos et al., 2007:178, red numbers added by author).

The other half of the conceptual framework of supply chain collaboration (Figure 1) is maintaining SC relationships. Here the integral parts revolve around the concept of power: the levels of thrust and dependency can either enable or inhibit the development
of collaborative relationships (Matopoulos et al., 2007), while a fair sharing of risks and rewards are necessary for a successful SC relationship (Simatupang and Sridharan, 2005). As can be seen from Figure 1, the alignment of the supply chain partners is critical, as synchronization of both systems (1) and decision-making (3) is in a key role. Information sharing also plays a key role in the coordination of supply chain activities, and especially in reducing the bullwhip effect (Elkady et al., 2014). The extent of collaboration (2) is also important since supply chain collaboration requires resources and thus it is important to choose with how and on what level one should collaborate. Skjoett-Larsen et al. (2013) suggested that there are three levels of CPFR collaboration based on the scope (number of business processes in collaboration) and depth (level of integration of these processes). The same levels reoccur in the framework of Matopoulos et al. (2007) presented in Figure 1. The basic idea behind this is that companies can tailor suitable collaborative solutions for their specific needs, and this is also the method that is proposed in the framework of this paper.

2.2. Supply chain processes: CPFR and S&OP

Collaborative planning, forecasting and replenishment (CPFR) is an advanced strategic collaborative initiative first proposed and developed by the Voluntary Inter-industry Commerce Standards Association (VICS). However, in practice it takes different forms between firms and organizations that implement it (Thomé et al., 2014) and a uniform definition of CPFR has so far been lacking in literature (Hollmann et al., 2015). The literature review of Hollmann et al. proposed a following definition of CPFR: “a cohesive bundle of management practices of joint planning and decision making aimed at bridging supply and demand, strategy and operations among SC partners with the aim of improving SC performance” (2015:987). Basically, CPFR is an SCC initiative to enable supply chain partners to make joint plans and forecasts through information sharing and integration of information technology. The practical implementation of the CPFR initiative varies between firms and industries, but the basics involve collaborating on a number of issues including market strategies and promotional campaigns (collaborative planning), sharing POS and forecast data (collaborative supply and demand management) and jointly agreed performance measurement (collaborative analysis and follow-up) of all parties involved (VICS, 2004; VICS, 2010). The CPFR model generally encompasses a buyer and supplier working together for the best of the end customer, but it can also be extended to n tiers of the supply chain while still maintaining the same principles (VICS, 2004). As the name suggests, CPFR includes a lot more than passive information exchange, and it requires a deeper level of trust and commitment between SC partners than information exchange only (Hollmann et al., 2015). CPFR is also suggested to be the most advanced SCC initiative due to the reported performance improvements from industry, and unlike most of the previous SCC initiatives CPFR is also economically viable with only a few collaboration partners (Attaran and Attaran, 2007). CPFR can also be seen as a gradual process of increased depth and width of collaboration that includes other SC initiatives as well (Skjoett-Larsen et al., 2003) and CPFR can thus also be regarded as some kind of “ideal” form of collaboration that gives guidelines and ideas about the collaborative practices that firms should use.
In the CPFR framework from VICS (Figure 2), the tasks in a supply chain are divided in three sections. The outer section lists the tasks of the manufacturer while the inner section contains the tasks of the retailer. The collaborative tasks are located in the middle of these sections, and everything revolves around the end customer. The first step of CPFR is to agree on strategy and plan it collaboratively, i.e. agree on the terms of the collaboration as well as make a joint business plan (VICS, 2004). The second step is to start sharing information, e.g. sales and order forecast data, market data, production planning data etc. The third step in the VICS framework is to actually extend the collaboration to operations and thus execute the last steps agreed in the collaboration agreement on an operational level, e.g. logistics and ordering. Monitoring and analysing the performance of the collaborative agreement on an operation level constitutes the fourth and final step in the VICS framework. Based on the results from the fourth step, amendments and adjustments to the collaborative agreement and business plans are made and the cycle starts from the beginning.
S&OP (sales and operations planning) is another strategic process to align the resources of a company towards common goals determined by top management (Thomé et al., 2012). The idea behind S&OP is to gather together all individual plans of different functions and aggregate them into a single plan for the company that encompasses all functions (Thomé et al., 2012). S&OP is also suitable for aligning the plans of supply chain partners to create a single plan for the whole supply chain (Tuomikangas and Kaipia, 2014). S&OP can also be used in parallel with CPFR, in the 2010 CPFR framework S&OP and CPFR are linked through an IBP (integrated business planning) approach (VICS, 2010). S&OP takes the form of regular (at least monthly) meetings between senior executives of a company or between companies in the supply chain with the aim of aligning tactical decisions and operations to a long-term strategic goal common to the whole company (VICS, 2010; Thomé et al., 2012). In this approach, the short-term operative level of collaboration is achieved through implementation of CPFR, while long-term strategic planning is carried out through regular S&OP meetings between supply chain partners (VICS, 2010).

Even though CPFR shows great promise in theory and early case studies were generally very successful, CPFR has to date not been extensively adopted in industry (Panahifar et al., 2014; Büyüközkan and Vardaloglu, 2012). One reason to this is that CPFR is not suitable for every supply chain, as some supply chains simply have an incompatible structure, i.e. the SC contains too many firms that are either too small or dispersed, or otherwise incompatible due to e.g. information system incompatibilities (Holweg et al., 2005). CPFR is also perceived as expensive to implement due to a high resource consumption and requirements on IT capabilities, and the complexity of the initiative also makes it difficult to implement properly expect with a few key suppliers or customer (Alftan et al., 2015). Practical experiences and results from S&OP implementation through empirical cases have also not been extensively researched (Tuomikangas and Kaipia, 2014; Thomé et al., 2012) and this paper gives some insight into this area as well.

### 2.3. Enablers and barriers to collaborative SC relationships

A collaborative relationship begins from two factors: trust and technology (Barratt and Oliveira, 2001). Especially trust is seen as an important enabler of collaboration, and inversely a lack of trust is seen as a barrier to collaboration (Barratt and Oliveira, 2001; Attaran and Attaran, 2007; Skjoett-Larsen et al., 2003). Simatupang and Sridharan (2005) suggested five critical factors for supply chain collaboration: a collaborative performance system (CPS), information sharing, decision synchronization, incentive alignment and integrated supply chain processes. Joint planning, problem solving and performance measurement as well as resource sharing and a collaborative culture in the collaborating companies are also important organizational enablers (Kumar and Banerjee, 2012). Other reported enablers are e.g. top management support (Kumar and Banerjee, 2012) and increased visibility in the supply chain (Barratt and Oliveira, 2001). Basically, the barriers and enablers of collaboration can be divided into two categories: supply chain relationships and supply chain capabilities. The relational category consists of factors that affect the relationships between different firms and the actors in these firms as well as within these firms (internal collaboration). Supply chain capabilities in the context of this paper can be seen as primarily IT-related, since the paper focuses on situations when the demand is volatile and effects such as the bullwhip effect become a greater concern (Holweg et al., 2005). Factors as geographical distribution and product characteristics can
also have an impact on collaborative efforts (Holweg et al., 2005), however these factors are considered outside the scope of this paper.

<table>
<thead>
<tr>
<th>Enablers of SCC</th>
<th>Barriers of SCC</th>
</tr>
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<tbody>
<tr>
<td>Trust</td>
<td>Barrat &amp; Olivera 2001</td>
</tr>
<tr>
<td>Technology</td>
<td>Barrat &amp; Olivera 2001</td>
</tr>
<tr>
<td>Collaborative performance system</td>
<td>Simatupang &amp; Sridharan 2005</td>
</tr>
<tr>
<td>Information sharing</td>
<td>Simatupang &amp; Sridharan 2005</td>
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<tr>
<td>Decision synchronization</td>
<td>Simatupang &amp; Sridharan 2005</td>
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<tr>
<td>Incentive alignment</td>
<td>Simatupang &amp; Sridharan 2005</td>
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<td>Integrated SC processes</td>
<td>Simatupang &amp; Sridharan 2005</td>
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<tr>
<td>Joint planning and problem solving</td>
<td>Kumar &amp; Banerjee 2012</td>
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<tr>
<td>Resource sharing</td>
<td>Kumar &amp; Banerjee 2012</td>
</tr>
<tr>
<td>Collaborative culture and top management support</td>
<td>Kumar &amp; Banerjee 2012</td>
</tr>
<tr>
<td>Visibility</td>
<td>Barrat &amp; Olivera 2001</td>
</tr>
</tbody>
</table>

Table 1. Enablers and barriers for supply chain collaboration suggested by literature (Source: synthesized by author).

Barriers for supply chain collaboration include problems utilizing POS data efficiently, problems of trust and an unwillingness to share sensitive information between supply chain partners (Holweg et al., 2005; Alftan et al., 2015; Bagchi et al., 2005). Supply chain collaboration is also not an automatic solution for fixing all problems in the SC, and many firms have unrealistic expectations of supply chain integration (Barratt, 2004; Elkady et
al., 2014). This kind of thinking can also result in an overreliance on technology at the expense of personal contact between supply chain partners (Barratt, 2004). Another result from this unrealistic attitude may be the neglecting of adequate front-end agreements about the specifics of the collaboration (Barratt and Oliveira, 2001) or a poor identification of optimal partners for collaboration (Barratt, 2004).

Some additional enablers and barriers apply in the context of the CPFR model due to the increased complexity compared to other initiatives. Specific CPFR enablers and barriers have not been extensively researched, even though several papers mention some examples of these (Hollmann et al., 2015). Enablers that are cited in the context of CPFR are e.g. IT systems compatibility between the collaborating firms, information security (Büyüközkan and Vardaloğlu, 2012), top management support and proper staff training (Attaran and Attaran, 2007). Like in collaboration generally, trust and the quality of shared information were considered to be critical factors for successful CPFR implementation (Hollmann et al., 2015; Büyüközkan and Vardaloğlu, 2012). Barriers specific to CPFR include e.g. a lack of internal integration or collaboration as well as a lack of understanding of the effects of supply chain collaboration and long-term partnerships on revenue generating potential (Ramanathan and Gunasekaran, 2014).

2.4. The role of IT and the bullwhip effect

The bullwhip effect occurs when demand gets amplified while progressing upstream in the supply chain due to a lack of visibility, gaming, and problematic ordering processes in the supply chain (Lee et al., 1997). Reducing uncertainty among SC partners is generally one of the main results of SCC, and collaboration also plays a key role in decreasing the bullwhip effect (Holweg et al., 2005). Collaboration, information sharing and joint planning have been found to be elemental in reducing uncertainty in the supply chain as these generally mitigate the bullwhip effect and also increase the efficiency of the supply chain (Kaipia et al., 2006). Visibility in the supply chain is one of the basic building blocks of SCC, and it is also one of the best ways to counteract the bullwhip effect (Holweg et al., 2005; Lee et al., 1997). The terms ‘visibility’ and ‘transparency’ are used interchangeably in this paper (see e.g. Bartlett et al., 2007). Transparency is considered to be a measure of the amount of information sharing that is taking place in a supply chain, however both the accuracy and relevancy (i.e. quality) of the shared data also affect how transparent a supply chain is (Bartlett et al., 2007). IT transparency and IT alignment have also been shown to affect SC performance positively (Ye and Wang, 2013). The integration and alignment of supply chain processes also serve as key catalysts in realizing performance benefits from technical aspects of IT resources in the supply chain (Ghobakhloo et al., 2014).

IT alignment is defined as “the similarity, connectivity, and compatibility of IT infrastructure between supply chain partners” (Ye and Wang, 2013:371). Both IT connectivity and willingness to share information affect the effectiveness of IT alignment, improvements in one of these fields can also help in balancing shortcomings in the other, and especially the willingness to share sensitive information is important in today’s supply chains (Fawcett et al., 2011). Therefore, it is important that IT infrastructure and collaborative efforts of firms match and support each other, and literature suggests that performance increases require investments in both IT and collaboration (Wong et al., 2015). Previous research also suggests that IT capabilities and information systems need to be developed together with collaborative partners to more efficiently utilize the
potential of IT integration (Ghobakhloo et al., 2014). Internet-based programs are very cost-effective compared to “traditional” IT integration in facilitating information exchange, since no programs or machines have to be changed to match those of other companies (Bartlett et al., 2007). Sharing POS and inventory data directly with suppliers has been suggested in order to reduce the bullwhip effect (Costantino et al., 2015) and increase the accuracy of forecasts compared to actual orders (Taylor and Fearne, 2009). However, previous studies also suggest that only sharing POS or planning data is not an adequate measure to ensure efficient supplier performance (Taylor and Fearne, 2009; Ryu et al., 2009) instead suggesting that the POS data should be converted into order forecasts and then shared with suppliers (Williams and Waller, 2010; Williams et al., 2014; Ryu et al., 2009).

In a retail setting, the frequency of promotions and the large number of SKUs create a lot of demand uncertainty (Alftan et al., 2015; Holweg et al., 2005). Promotional campaigns are very frequent in the grocery retail sector, and research suggests this is the most prominent reason for variability in demand in grocery retail chains in the UK (Taylor and Fearne, 2009). Previous data is necessarily not available and a promotional campaign generally always affects the sales of not only the product on sale but also other products in the same product group or category, or even products that are used either to substitute or in conjunction to the product that is on sale (Taylor and Fearne, 2009) resulting in increased demand uncertainty during forecasting and planning. Another factor causing demand fluctuations is seasonality caused by e.g. holidays or time of the year. Taking seasonality into account improves forecasting accuracy significantly (Ehrenthal et al., 2014) and also decreases the bullwhip effect, especially when the “base” variation in demand is low (Costantino et al., 2013). Information sharing also decreases the bullwhip effect and variance in inventory levels, all other factors being equal (Costantino et al., 2013).

2.5. Proposed framework

A visual representation of the proposed framework based on the concepts in the literature review can be found in Figure 3. This framework seeks to explain the links between SC capabilities, SC processes and SC collaboration, what they consist of and lastly how and what enables a supply chain to increase their performance during demand uncertainty through collaboration and IT. This framework also contains the key limitations of the theoretical background for this paper as well as the areas this paper will focus on.

Supply chain collaboration consists of managing supply chain activities and managing supply chain relationships. These include the process of selecting collaborative partners and what practical implementations and processes the collaboration should involve, as well as managing the levels of trust and power among partners. The implementation of supply chain collaboration is also affected by barriers and enablers to collaboration. The companies should seek to emphasize and exploit enablers while mitigating and removing barriers to collaboration.

As the literature suggests, the need for collaboration generally comes from external, macroindustrial factors in the form of increased competition. The grocery retail setting is also especially competitive due to the products being quite similar everywhere, thus making price the key competing factor between retail chains. The key drivers behind the integration of supply chain partners are therefore the need to achieve increased
effectiveness for the whole supply chain as well as higher quality service to customers. Also, the supply chain-internal reason of mitigating bullwhip effect is an important driver for increased transparency and integration in the SC. The primary focus of this article is on information flows, and thus IT capabilities become a primary driver for supply chain processes.

In this framework, the cyclic 4-step CPFR framework (VICS, 2004) is taken as a model for supply chain processes. As suggested by VICS, S&OP is also introduced as an alternative or complementary method for SC processes. The supply chain processes should support the capability of the SC to respond to demand fluctuations and ensure efficient and timely delivery of products to the end customer. In a retail setting, the general measures according to which the success or failure of the supply chain can be measured are e.g. shelf availability, freshness and waste levels (Alftan et al., 2015). Efficiently increasing service levels for the consumers therefore include both increased freshness and better shelf availability, however these measures often work against each other and this is why this was chosen as the feedback measurement in the framework. Nevertheless, the core motive for increased service levels is naturally to increase sales and revenue while minimizing the cost of inventory and spoilage.

To aid in the focusing of the research, research questions are set up and interviews with key personnel from the involved companies are set up to gather empirical data on the questions. The final aim of the proposed framework is to map what gives the collaborative supply chain capabilities to cope with uncertain demand, i.e. extend previous research on collaborative supply chains to a field which is not extensively researched yet (Elkady et al., 2014; Belcher, 2009). One of the growing aspects of contemporary SCM research is

Figure 3. Proposed framework on implementing collaborative practices into the supply chain (Source: own work of author).
how technological advances enable supply chain collaboration (Soosay and Hyland, 2015) and this is one part of the aim of this research as well. However, as can be seen from the proposed framework, there are several other factors that influence successful SCC. Thus some explanatory research is needed, to explore how the framework works in practice and how the phenomenon it seeks to clarify works (Yin, 2009). The research questions for this study are therefore the following:

**RQ1**: How are the various partners or actors collaborating in this supply chain?

**RQ2**: What are perceived as barriers and enablers to supply chain collaboration in the supply chain?

**RQ3**: What are practical implications of increased supply chain collaboration and information sharing in the supply chain?

The answers to these questions will be used to (1) validate the proposed framework and (2) develop the proposed framework if needed. A case study often answers a question about “why?” (Yin, 2009), however previous literature already give some answers to this: (1) to answer to fiercer competition (Matopoulos *et al.*, 2007) and (2) to reduce waste and increase shelf availability and effectiveness, ultimately providing increased service levels to customers (Kaipia *et al.*, 2013; Kaipia *et al.*, 2006; Alftan *et al.*, 2015). However, this study specifically focuses on the link between performance increases and collaboration with a focus on the challenges of demand volatility and uncertainty.

Naturally, there are multiple other performance-enhancing programs that can be used by a supply chain or individual firm that may or may not involve collaboration directly. These methods include e.g. lean, just-in-time, agility and flexibility of the supply chain (Holweg *et al.*, 2005), however the impact of these methods are outside of the scope and purpose of this paper and thus they will be excluded from the research conducted for this paper. The aim of this paper is also mainly concerned with information sharing and information flows between companies and how these affect the material flows, thus the development and impact of the operational level of the logistics involved are mainly outside the scope of this paper.

3. **RESEARCH METHODOLOGY**

This study will contain two echelons, with the focal company being a wholesaler, and two of its retail customers (see section 3.1 for a more thorough description). Case studies are studies that “focus on holistic situations in real life settings, and tend to have set boundaries of interest, such as an organization, a particular industry, or a particular type of operation” (Ellram, 1996:99). This research project will specifically focus on a real-life setting within a specified bound of interest (i.e. specific organization, industry and operational setting). This study will also be based on the theoretical background set out in the three research questions presented in the thesis that are based on the literature review (Yin, 2009). Case studies are appropriate methods when doing explorative research (typically why or how questions) (Ellram, 1996), in this study the first research question seeks to explore the function of the supply chain collaboration within the context of wholesaler-retailer. However, the second and third research questions are more focused on descriptive research, and case studies are also appropriate for descriptive research (Ellram, 1996; Yin, 2009). This research project will be conducted from a “reality-
oriented” perspective, placing focus on the validity, reliability and objectivity of the data in light of previous literature and taking into account the fact that total objectivity is not possible (Patton, 2002). The research process will from the outset be deductive, i.e. progress from theory to empirical testing (Patton, 2002). The author had previously been employed at the focal company, and one reason for the choice of this specific company was the familiarity of the setting as well as ease of access to the contact persons through these professional relationships.

3.1. Case company and industry presentation

The focal company, which is called WS in this paper, is a wholesaler in the Finnish grocery industry. The retail customers of WS that are part of this research are called RS and RW in this paper. RS is a retail chain consisting of several hundred small grocery stores operating nationwide in Finland. RW is a retailer-wholesaler, whose customers consist of primarily smaller grocery and retail chains and corporate customers in the HoReCa (Hotel, Restaurant, and Catering) sector. RW also operates cash-and-carry grocery stores that serve both private and corporate customers (primarily small restaurants) directly around Finland. WS also has other customers, but these two are the most important when considering revenue and volumes, and thus only these two customers will be included in the case study. RS and RW also have a symbiotic relationship with WS through a shared ownership. Figure 4 shows a simple description of the material flows of the case supply chain.

Figure 4. Material flows in the case supply chain.

The Finnish grocery retail industry is very concentrated, with the two biggest corporation groups having a market share of approximately 80% and the four biggest groups having a combined market share of almost 95% (Nielsen, 2015). This results in a situation where the groups are generally vertically integrated, i.e. the grocery chains and wholesalers belong to the same group of companies. This means that the Finnish grocery industry is an industry where whole supply chains can be said to compete directly with each other.
instead of individual grocery stores. Conversely, this also means that retailers switching first tier suppliers (wholesalers) is usually not a risk, however many of the second tier suppliers usually supply the same product to competing retail chains. In this particular supply chain, the co-ownership reduces the risk of any of the companies switching to a competing supply chain.

3.2. Data gathering and analysis

The empirical data was gathered through semi-structured interviews with key personnel from the three companies, see Table 2 for a more detailed data gathering schedule. The sampling was made together with the planning manager of WS, the sampling method was a purposeful sampling based on the perceived quality of information that the respondent could give (Patton, 2002). An interview guide was created to aid in the data gathering process and give structure and coverage to the interviews, however the interviews were still conversational with open-ended questions to allow increased depth (Ellram, 1996; Patton, 2002). During the analysis process some additional questions arose, these were answered through e-mail correspondence with PlanMng from WS.

<table>
<thead>
<tr>
<th>Organization</th>
<th>Title</th>
<th>Abbreviation</th>
<th>Date</th>
<th>Interview duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>RS</td>
<td>Logistics Manager</td>
<td>LogMng</td>
<td>4.3.2016</td>
<td>0h 52 min</td>
</tr>
<tr>
<td>RW</td>
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<td>LogDev</td>
<td>9.3.2016</td>
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<td>PlanMng</td>
<td>15.3.2016</td>
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<td>LogMng</td>
<td>15.3.2016</td>
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</tr>
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<td>LogDev</td>
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<td>Planning Manager</td>
<td>PlanMng</td>
<td>12.4.2016</td>
<td>E-mail</td>
</tr>
</tbody>
</table>

Table 2. Interviews conducted for this paper, as well as e-mail used to collect information.

The data collected from the interviews was analysed according to the seven steps presented by Spiggle (1994) and these were combined with the coding method suggested by Ellram (1996). These seven steps are presented in Table 3.

The coding was done in steps, by first segmenting the text through a deductive approach starting from the research question. The next step was to look at the framework, and deduct categories of relevant codes from it. Through the analysis of the contents of the coded parts of text within these segments or categories, the three first steps of the seven-step process could be carried out. The codes from categorization and axial coding were then analysed through and compared with a central code, this central code was the capability of supply chain to cope with demand uncertainty. The results will be discussed in the next chapter when the contents of the interviews are presented.

Thematic analysis was used to analyse the coded interview transcripts. Thematic analyses are interpretive analytical methods that “[…] move beyond counting explicit words or phrases and focus on identifying and describing both implicit and explicit ideas within
The data, that is, themes” (Guest et al., 2012:13). Thematic analysis thus focuses on finding meaning (themes) in the text, and the coding process also reflects this as the first iteration codes were paragraphs and chunks of text concerning a theme that were narrowed down into more accurate thematic descriptions in later coding iterations, and finally gathered together again to form coherent meanings, themes and topics. Based on interpretation of the themes that rose from the interviews, conclusions were drawn and the framework was refined and verified on the basis of these conclusions.

<table>
<thead>
<tr>
<th>Step</th>
<th>Definition</th>
<th>Coding (when applicable)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Categorization</td>
<td>Classifying the data into different categories or codes.</td>
<td>Categorization</td>
</tr>
<tr>
<td>Abstraction</td>
<td>Grouping empirically grounded codes together to create larger conceptual categories.</td>
<td></td>
</tr>
<tr>
<td>Comparison</td>
<td>Explore similarities and differences across the data.</td>
<td>Axial</td>
</tr>
<tr>
<td>Dimensionalization</td>
<td>Create a “scale” or “dimension” for different categories or concepts.</td>
<td></td>
</tr>
<tr>
<td>Integration</td>
<td>Use inductive approach to integrate the findings into higher order theoretical construct.</td>
<td>Selective</td>
</tr>
<tr>
<td>Iteration</td>
<td>The analytical process is not a stepwise process, but instead the researcher moves back and forth between these steps.</td>
<td></td>
</tr>
<tr>
<td>Refutation</td>
<td>Critically examine the constructs that arise from the analysis.</td>
<td></td>
</tr>
</tbody>
</table>

Table 3. Seven steps of qualitative data analysis together with three coding methods used in this study. (Source: based on Spiggle, 1994; Ellram, 1996)

4. FINDINGS AND DISCUSSION

The analytical process started with the selection of codes under different topics and comparing these with each other (categorization and axial coding). The first topics that were explored were the three research questions, the second iteration of the same methods of data coding and collection was made on the basis of the framework presented in Figure 3 in section 2.5, the results of these iterations are presented in this section. The research questions are reviewed and answered in this section, and the implications for the framework are discussed. Conclusions and implications are then presented in the final section of this paper.
The first research question warranted a deeper study into the areas in which the companies collaborate, as well as the reasons for collaboration. The first research questions (RQ1) was the following:

**RQ1: How are the various partners or actors collaborating in this supply chain?**

Table 4 presents a summary of the comments presented on the topic of collaboration. As can be seen from the answers, the companies collaborate in all phases of the physical flow of goods through the supply chain. The companies collaborate on a range of issues beginning from the procurement, quality control and import of goods. Forecasting and replenishment is centralized to the wholesaler, and strategic business plans are made in collaboration through regular meetings on multiple executive levels. This can be seen as e.g. collaboration with regards to exception management and promotional campaigns, but also in the day-to-day distribution and logistics as these are largely handled by the wholesaler. The distribution of goods is outsourced to third party logistics (3PL) firms, WS coordinates and handles the process of sending the right cargo with the right truck to its customers but does not own the trucks itself.

<table>
<thead>
<tr>
<th>Areas for collaboration</th>
<th>Reasons for collaboration</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Centralized forecasting and replenishment at WS</td>
<td>• Work as one company</td>
</tr>
<tr>
<td>• Joint planning</td>
<td>• Create win-win-win situation</td>
</tr>
<tr>
<td>• POS data and information exchange</td>
<td>• Less surprises</td>
</tr>
<tr>
<td>• Promotional campaign and product range management.</td>
<td>• Decrease redundancies</td>
</tr>
<tr>
<td>• Distribution and logistics</td>
<td>• Enable better service to end customer, start from customer needs</td>
</tr>
<tr>
<td>• Procurement and importation</td>
<td>• More timely and accurate deliveries and forecasts</td>
</tr>
<tr>
<td>• Logistics and distribution</td>
<td>• Create additional value for customers</td>
</tr>
<tr>
<td>• Product quality control</td>
<td>• Consolidation of functions create economies of scale</td>
</tr>
<tr>
<td>• Exceptions and promotional campaigns</td>
<td>• Common forecasting data for whole supply chain</td>
</tr>
<tr>
<td>• Integrated data transfer to both upstream and downstream partners</td>
<td>• Increased supply reliability</td>
</tr>
<tr>
<td>• Meetings, planning sessions</td>
<td>• Increased capacity utilization</td>
</tr>
</tbody>
</table>

Table 4. Summary of interview responses concerning collaboration.

The interviewees list multiple reasons for this kind of collaborative approach. The case supply chain is characterized by a drive to enable better service to the end customer and increase efficiency or reduce redundancies in the supply chain. The motive for increased collaboration is to increase the efficiency of the supply chain, and one of the interviewees commented on the collaboration in the following way: “[…] of course we work more like a single company […], create a win-win-win situation through success” (LogMng, RS,
interview 4.3.2016). The role of WS in the supply chain was described in e.g. the following way: “we are this kind of strategic supply chain partner, so we have sought integration both with customers and towards suppliers [...] and build more added value through this, compared to buying and selling which is more like traditional wholesaling” (LogMan, WS, interview 15.3.2016). As Simatupang and Sridharan (2005) suggested, supply chain collaboration needs a fair balance of power, and this supply chain has resolved the issue through the ownership structure of the wholesaler. Thus, a lot of the executive power can be transferred to the wholesaler without the retail echelon of the supply chain losing control. Costs of this arrangement are generally also distributed according to the resources allocated to each of the retailers.

Some of the interviewees also mentioned that important reasons for collaboration were e.g. the idea to use shared and common information and to work more like a single company across the supply chain, instead of everyone doing their own thing. The supply chain collaborates on multiple levels, as Danese (2011) and Skjoett-Larsen et al. (2003) suggested collaboration can be seen as a gradual process or a contingency from “basic collaboration” to “advanced collaboration”. This is also something that can be applied to the collaborative practices of WS, as it collaborates on different levels with some of its customers than with others, based on mutual needs and understandings. As suggested by literature (e.g. Matopoulos et al. (2007)) companies should choose with whom and with what they want to collaborate (operational-tactical-strategic level). WS has a high level of collaboration with especially RS, and this has also brought efficient synergies to both companies.

The collaboration in the supply chain is quite extensive, as a centralized forecasting and replenishment function is managed by WS and the goal is to use this data as far as possible both downstream and upstream in the supply chain. The management of relationships in the SC is handled through agreements on cost sharing and trust building, and also through KPI and data showing that the integration actually works. This leads to the topic of the second research question, as the second research question inquired about the factors that were considered to enable supply chain collaboration, and inversely about barriers to this kind of collaboration.

RQ2: What are perceived as barriers and enablers to supply chain collaboration in the supply chain?

Table 5 presents a summary of interview responses on the topics of enablers and barriers. Three key topics emerged in the interviews that cover most of the enablers mentioned: culture (trust, willingness to collaborate, top management support), communication and (technological) capabilities. These topics are also frequently found and cited in literature as key enablers to SCC (Barrat and Oliveira, 2001). The role of IT was mentioned several times, however the underlying culture of openness, trust and communication was in a key role in enabling the technological aspects of collaboration. Barrat (2004) suggested that overreliance on technology was one major reason for failed SCC, and literature also suggests that this kind of trust and collaborative culture is the starting point of collaboration (Barrat and Oliveira, 2001).
<table>
<thead>
<tr>
<th><strong>Enablers</strong></th>
<th><strong>Barriers</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>● Sufficient data handling capacity</td>
<td>● Culture of secrecy</td>
</tr>
<tr>
<td>● Integrated and possibly online data</td>
<td>● Silo thinking both inside firms and whole supply chain</td>
</tr>
<tr>
<td>● Accurate POS data</td>
<td>● Complexity of SC</td>
</tr>
<tr>
<td>● Culture of collaboration</td>
<td>● Traditional thinking and resistance to change</td>
</tr>
<tr>
<td>● Processes adapted to collaboration</td>
<td>● Future uncertainties</td>
</tr>
<tr>
<td>● Open communication and trust both within company and across SC</td>
<td>● Some planning processes when information is shared too late</td>
</tr>
<tr>
<td>● Real-time data transfer</td>
<td>● Lack of trust</td>
</tr>
<tr>
<td>● Electronic waybills and SSCC codes</td>
<td>● Customers competing with each other</td>
</tr>
<tr>
<td>● Regular meetings with SC partners</td>
<td>● Forecasting accuracy not good enough</td>
</tr>
<tr>
<td>● Commitment to common goals and a common vision</td>
<td></td>
</tr>
<tr>
<td>● Company structure and ownership</td>
<td></td>
</tr>
<tr>
<td>● Adequate resources and willingness to put in an effort</td>
<td></td>
</tr>
<tr>
<td>● Support from top management and the corporate strategy</td>
<td></td>
</tr>
<tr>
<td>● Automatic data transfer</td>
<td></td>
</tr>
<tr>
<td>● Integrated IT systems</td>
<td></td>
</tr>
<tr>
<td>● Efficient supply management tools</td>
<td></td>
</tr>
<tr>
<td>● Accurate demand forecasts</td>
<td></td>
</tr>
<tr>
<td>● Stable and reliable IT systems</td>
<td></td>
</tr>
<tr>
<td>● Ease of use of IT system</td>
<td></td>
</tr>
<tr>
<td>● Visibility and acceptance of KPIs</td>
<td></td>
</tr>
<tr>
<td>● Information sharing and common data throughout the SC</td>
<td></td>
</tr>
<tr>
<td>● Open communication and honesty about problems</td>
<td></td>
</tr>
<tr>
<td>● Common history of working together</td>
<td></td>
</tr>
</tbody>
</table>

Table 5. Summary of interview responses concerning enablers and barriers to collaboration.
The barriers were more diverse, and the views on the matter differed more between respondents as well. Generally, the topic of barriers was considered more difficult, as the collaboration in the supply chain seemed to be working very smoothly. The IT capabilities of the supply chain was generally considered to be adequate, but the accuracy and reliability of the forecast was mentioned as a limit to the extent of IT-enabled collaboration. However, the main barriers were seen in collaborative culture and traditional thinking that causes companies to hold information secret from supply chain partners, and this is also in line with previous research (Bagchi et al., 2005).

Enablers were considerably more prominent when the interviewees were asked about possible enablers and barriers. In particularly, the technical aspects and collaborative culture were applauded by the respondents. However, previous research suggests that IT alone is not enough to enable collaboration on a profound level, and thus it would seem like the corporate culture has enabled the technical side of the integration to work at its full potential. Forecasting accuracy was also at some points not good enough, and then flexibility and communication were considered necessary along with improved forecasting abilities to enable the collaboration to go further. Most of the respondents had also positive attitudes towards the idea of further integration, and that there were further gains to be realized from increasing the depth and width of integration. Also, the shared ownership and company structure solved many of the issues related to power that Matopoulos et al. (2007) pointed out, i.e. the wholesaler does not gain all the power in the supply chain even though the forecasting and replenishment is concentrated to it.

However, the respondent emphasized that the barriers were quite minor compared to the enablers, and that the practical results and KPIs strongly supported collaboration. As the transparency of KPIs became better through increased understanding of the partners business decisions, it was also easier to “sell” the new collaborative practices within the organizations as the numbers supported this development. The interviewees were also quite content with the results of the integration in the supply chain, and this could also be seen from the answers to the last research question.

**RQ3: What are practical implications of increased supply chain collaboration and information sharing in this supply chain?**

Table 6 lists the practical implications experienced by the interviewees. The interviewees reported a range of benefits, including more efficient SC operations and improved customer service. Generally, the collaboration was not regarded as something that would bring additional costs or other harmful effects, as the integration of processes such as forecasting and replenishment freed time from other instances in the supply chain instead. If costs arose from some collaborative activities, the costs would usually be divided between the customers according to the volume impact of the process.

The main benefit of the collaboration at the retailers (RS and RW) was a more efficient allocation of workforce: the store employees no longer had to spend as much time ordering and managing store inventory levels, instead the centralized forecasting and replenishment function freed more time for the “core business” of selling and serving customers. The main benefit at WS was more efficient capacity utilization and more possibilities for optimization. The integrated forecasting and replenishment function at WS also provided better visibility and less redundant work throughout the supply chains, and this was also one of the stated purposes of this arrangement. This was commented on in the following way by one of the interviewees: “Well, the starting point for all these
kinds of implementations was to start by freeing time at the store end to concentrate on the relevant tasks, that is customer service. Ordering was not their actual core activity, rather it is selling products and serving customers. [...] And of course through all the possibilities to forecast we have more information at our disposal here at [WS] so we have the possibility to plan our activities better” (PlanMng, WS, interview 15.3.2016)

<table>
<thead>
<tr>
<th>Respondent</th>
<th>Practical implications of increased depth or width of collaboration</th>
</tr>
</thead>
<tbody>
<tr>
<td>RS, LogMng</td>
<td>Improved exception management, improved delivery reliability, increased flexibility, increased ordering accuracy and decreased time consumed by the ordering process, increased visibility and measurability of processes, synergies of division of labour and skills through centralized forecasting and replenishment, increased warehousing effectiveness.</td>
</tr>
<tr>
<td>RW, LogDev</td>
<td>Less personnel required for forecasting and ordering, less human mistakes in the ordering process, increased visibility and accountability of performance, easier access to performance data.</td>
</tr>
<tr>
<td>WS, PlanMng</td>
<td>Store employees have more time for sales and customer service, better possibilities to plan and forecast SC operations, larger amount of accessible information, decreased spoilage and increased security of supply.</td>
</tr>
<tr>
<td>WS, LogMng</td>
<td>Work that was previously done downstream in the SC now moves upstream and becomes an integrated function, decreased spoilage and increased shelf availability resulting in increased sales, better plans and prioritization for peak seasons in the warehouse, increased SC effectiveness and more optimal use of capacity, decreased inventories across the SC, increased visibility and possibility to tweak inventory levels on a store and product level to achieve an optimal fit, possibility to affect inventory levels quickly and in advance.</td>
</tr>
<tr>
<td>WS, LogDev</td>
<td>Increased delivery accuracy and information flow to customers.</td>
</tr>
</tbody>
</table>

Table 6. Summary of interview responses concerning practical implications of collaboration.

As a result of the collaboration, the exchange of information has increased significantly between the companies. Especially the concentration of the forecasting and replenishment functions to WS has affected the information flow, as a lot of information now moves automatically between the firms. Kim and Lee (2010) suggested that the level of IT integration and the level of strategic cooperation between companies strengthen each other, and the results from this supply chain would seem to corroborate that. Also, the level of IT integration has been shown to positively affect SC performance (Ye and Wang, 2013) and that the collaborative efforts of the supply chain need to match those of the
investments made into IT to produce optimal results (Wang et al., 2015). According to the interviews, the developments in IT capabilities of this supply chain have generally started from the needs of the customers or the supply chain, and the retailers could sometimes also actively take part in the development of logistical processes and IT capabilities in the supply chain. Thus the increased supply chain collaboration would seem to result in more efficient information exchange, both concerning IT systems and joint planning, and this in turn would affect the supply chain performance positively in multiple areas like capacity utilization, forecast accuracy, inventory levels and shelf availability. To be able to better assess the IT integration and IT capabilities of the SC, the interviewees were also asked about these factors and Table 7 summarizes the answers to these questions. However, previous literature also suggests that development of IT capabilities together with collaborative partners is beneficial for the development of the IT systems (Ghobakhloo et al., 2014).

The quality of exchanged information is another issue that has been previously researched and has been shown to affect the success of IT integration and collaboration (Bartlett et al., 2007). The retailers send POS and inventory data to WS almost in real-time, and in addition to this the company employees and managers meet regularly to share plans. WS makes demand forecasts based on this data, and shares this forecast data both with suppliers and customers (e.g. through order suggestions) as well as with the internal stakeholders at the wholesaler. Previous literature has suggested that sharing forecast data is more efficient than sharing POS data since suppliers can have a hard time translating POS data into actual demand data, thus increasing the risk for bullwhip effect and inefficient operations in the SC (Holweg et al., 2005; Taylor and Fearne, 2009; Ryu et al., 2009).

The proposed framework had three sections that affected the collaborative supply chain’s performance during demand uncertainties. These sections were IT capabilities, SC collaboration and SC processes. Table 7 contains the answers given by the interviewees when asked about IT systems and IT integration, while Table 8 contains the answers for the topics of collaborative processes. Since the macroindustrial constraints can be considered a given, the framework does not seek to explain how companies can change these. Instead, the process starts from looking at IT capabilities and collaborative solutions, and then see how these affect the processes of the SC. The proposed supply chain processes were CPFR- and S&OP-based processes in the context of this SC.

Visibility is critical for the reduction of bullwhip effect, while IT integration and alignment allow the collaborating companies to more efficiently exchange information and also increases the visibility in the supply chain (Costantino et al., 2013). The information sharing in the supply chain had improved significantly with the new approach to forecasting and replenishment, and ordering accuracy had gone up accordingly. As the orders originate from the wholesaler as order suggestions and then come back to the wholesaler or goes directly to suppliers, the wholesaler has extremely good visibility into the retail section of the supply chain. Therefore the chances of bullwhip effect occurring between retailer and wholesaler has been all but eliminated since the wholesaler took over the forecasting and replenishment of its customer’s retail outlets. The exchange of information among the companies was also considered to be on an adequate level, however this was also one of the points that were seen as areas were further development would be both possible and beneficial.
<table>
<thead>
<tr>
<th>Company</th>
<th>IT integration with SC partners and within the company</th>
<th>IT capabilities of company</th>
</tr>
</thead>
</table>
| RS      | POS data transfer.                                   | ERP system with internal databases.  
|         |                                                     | Forecasting and replenishment integrated at WS. |
| RW      | Daily exchange of inventory and sales data as well as certain predefined KPIs.  
|         | Order suggestions to our ERP system.                | ERP system with internal databases.  
|         | Open orders transfer almost in real-time.            | Online real-time webstore.             
|         | Webstore with real-time availability querying.       | SSCC code standards.                 
|         | Integrated forecasting and ordering function at WS. | Capability to place orders with PDA devices. |
| WS      | Level of integration varies between customers:       | Automated forecasting and replenishment (F&R) software for customers, based on actual POS and inventory data.  
|         |     • least integrated only transfer orders          | Automated forecasting and replenishment (F&R) software for own warehouse, based on simulated future orders from F&R software for customers.  
|         |     • most deeply integrated transfers POS, inventory and campaign data | ERP system with internal databases.  
|         | Integrated forecasting and replenishment for RS and RW through replenishment team. | WMS (warehouse management system).  
|         | Common forecast data exchanged both upstream and downstream in the SC. | |
|         | Automated data exchange.                             | |
|         | Integrated demand forecasting with workforce planning. | |
|         | Some separate IT systems, but shared information and automated reports from these as well. | |

Table 7. Summary of interview responses concerning IT integration and capabilities.
The IT resources of the three companies are quite well integrated and aligned. All three companies use their own ERP software packages to handle company-internal data like product and category data, store shelf charts and spoilage. However, these systems exchange information automatically on sales and inventory data, and the forecasting and replenishment for most products at both RS and RW are integrated at WS, in the forecasting and replenishment (F&R) software and through the replenishment team. The F&R software creates order suggestions on individual store and product levels based on the forecasted demand, and sends these to the customers. The store employees at RS can still modify these order suggestions before they are sent to suppliers, at RW the order suggestions are practically immediately transferred on as orders to the suppliers. IT integration was thus generally seen as a key to supply chain performance, as LogMng of RS said: "[...] how integrated our collaboration is and how integrated our data handling is, I believe these are our core so that we can then build those additional needs, basic doings" (interview 4.3.2016). In addition, SSCC code standards are used to identify which trucks contain what to enable more accurate schedules for delivery and replenishment. The warehouse F&R program at WS uses simulated orders to calculate warehouse forecasts and replenishments and this is used as basis for the procurement teams that handle warehouse replenishment at WS. Table 8 summarizes the comments on the collaborative forecasting and replenishment arrangements.

S&OP processes were mentioned by both RS and WS. The S&OP meetings were meant to tackle a range of issues from category management and physical distribution to demand and sales forecasting and exception weeks (e.g. holidays). In addition to S&OP meetings, other planning meetings with more specific agendas also regularly took place. These meetings included e.g. meetings between top management from the different companies, meetings where all customers are present and finally team- or agenda-specific meetings between WS and customers, depending on the needs of the individual customer. However, the general aim of the collaborative planning was to have a common action plan for the supply chain that is planned in advance, as e.g. exceptional weeks may require several different scenarios based on e.g. weather or the weekdays of holidays. This kind of joint planning and regular meetings are very good tools to increase the transparency of the supply chain, and the findings of this case corroborate earlier research that transparency would increase supply chain performance through e.g. increased forecasting accuracy and decreased inventory levels throughout the supply chain (Bartlett et al., 2007).

While several of the processes in the fields of collaborative planning, forecasting and replenishment are similar to CPFR processes presented earlier in the VICS (2004) CPFR framework, WS does not formally use CPFR processes, opting instead for a formal implementation of S&OP (WS PlanMng, E-mail 12.4.2016). The reason for this was not known, and thus it could be an interesting topic for further research as to why a company would choose one over the other when comparing CPFR and S&OP. Nevertheless, the framework presented in section 2.5 would seem to give an adequate representation of the collaborative implementation of this supply chain, as well as aid in the comprehension of the effects of the wholesaler-integrated F&R model. The answers to RQ3 also corroborated this approach, as especially the collaborative planning, forecasting and replenishment processes gave the opportunity to plan ahead and act fast.
<table>
<thead>
<tr>
<th></th>
<th>RS</th>
<th>RW</th>
<th>WS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>S&amp;OP</strong></td>
<td>Plan according to sales and demand changes.</td>
<td>-</td>
<td>Exception management, product assortment, campaign forecasts, physical distribution.</td>
</tr>
<tr>
<td><strong>Other meetings</strong></td>
<td>Meetings concerning traditional planning as well as seasons, exceptional weeks, categories and assortment, marketing.</td>
<td>Weekly meeting with replenishment team.</td>
<td>Regular meetings: operative planning team, joint meetings together with all customers, replenishment team, top management of companies.</td>
</tr>
<tr>
<td><strong>Collaborative planning</strong></td>
<td>Category changes, special and exception weeks, action plan for different scenarios agreed in advance.</td>
<td>-</td>
<td>Planning based on the same forecast distributed both upstream and downstream in SC, plan ahead for different scenarios.</td>
</tr>
<tr>
<td><strong>Collaborative forecasting</strong></td>
<td>Collective, summarized forecast for all customers at WS, WS shares integrated forecasts in SC, forecasts used to steer business, flexible forecasting to suppliers.</td>
<td>Forecasting integrated at WS, only some products are forecasted locally, plans based on this forecast.</td>
<td>Integrated forecasting for customers, calculate forecasts for both products that go through WS and products that come directly from supplier, campaign planning and forecasting jointly with RS.</td>
</tr>
<tr>
<td><strong>Collaborative replenishment</strong></td>
<td>Replenishment planned ahead during exception weeks, WS coordinates replenishment of all products that goes through WS.</td>
<td>WS handles replenishment for most products.</td>
<td>Send order suggestion on the basis of forecast to customer, coordinate replenishment in the areas of physical distribution and product prioritization, WS handles most of the replenishment for some customers (RS, RW).</td>
</tr>
</tbody>
</table>

*Table 8. Summary of interview responses concerning collaborative processes.*

The flexibility among companies was also reported to have become better as the supply chain uses the same forecast and communication with both suppliers and customers is regular. The realized increases in capability for the supply chain during demand
uncertainty was reported to be mainly in the form of reduced spoilage and stock outs, i.e. better forecast accuracy. This was achieved through regular communications and the alignment of the supply chain according to the same forecasts. To facilitate this, IT capabilities play a pivotal role in the supply chain, as integrated IT systems enable the integrated F&R software to function in a better capability.

The case supply chain is special in the extent of integration that WS has with RS and RW. Not only are most of the forecasting and replenishment functions “outsourced” to WS concerning the products that WS is warehousing and distributing to them, WS also handles the forecasting and replenishment for many of the products that are not part of the “wholesalers products”, i.e. they never enter the warehousing and distribution network of WS. This kind of integration model gives a centralized actor, WS in this case, extremely good visibility and control of both material and information flows in the supply chain. The business decision are still made at the customers, and the retailers balance the power and dependency factors through joint ownership of the wholesaler, but the logistics have been extensively centralized. This synergy enables the supply chain to function efficiently despite demand volatility, as long as the data from the retailers is of high quality and WS in turn can provide quality services for the retailers.

5. CONCLUSIONS AND IMPLICATIONS

This study has given an in-depth view into the collaborative approach taken by the case supply chain consisting of a wholesaler and two of its customers. The study has shed more light on the factors of implementation and execution of two dyadic, two-echelon collaborative relationships, and a theoretical framework constructed on the basis of previous literature was evaluated in light of the empirical evidence gained from five in-depth interviews at the three companies. The literature review, while not exhaustive, gave a comprehensive big picture of the contemporary state of supply chain collaboration research and especially on the relationship between IT and success in collaboration. The theoretical section of the article proposed a framework for supply chain collaboration with a focus on IT integration and CPFR- and S&OP-inspired collaborative processes, and the empirical part verified the validity of the framework.

The study found that increased information sharing and IT integration together with supply chain collaboration provided increased supply chain effectiveness for all involved parties. The most important enablers for collaboration were found to be trust and collaborative culture in conjunction with technology. On the other hand the most important barrier identified was the unwillingness to share information or ultimately to collaborate, this finding highlights the importance of acceptance of collaboration among company personnel and managers, as well as the importance of extensive information sharing. Previous literature supports the findings of both enablers and barriers, and especially the trust issues are also prominent in this case (Barratt and Oliveira, 2001; Simatupang and Sridharan, 2002; Simatupang and Sridharan, 2005).

The proposed framework was found to be mostly appropriate from both a theoretical and an empirical point of view. However, WS does not use formal CPFR processes, instead relying on S&OP. While these are both complimentary and overlapping, there is still some differences in the collaborative processes of these methods. The answer to the question why CPFR was foregone in favour of S&OP remains unanswered, and this could be an
interesting venue of research for future researchers. However, the results would suggest that even though a firm has not officially adopted CPFR, the processes and ideas of CPFR can be used quite universally when adapted to different companies. This process of implementing collaborative approaches on a range of functions and building up the IT capabilities to support this seems to have been a gradual process with a limited beginning and expansion later into areas where the companies experienced a need for it, and this finding is corroborated by literature as well (Danese, 2007; Skjoett-Larsen et al., 2003). However, the findings also suggest that the centralization of forecasting and replenishment to the wholesaler, together with the sharing of forecast data both upstream and downstream in the supply chain, can be a very powerful method of increasing supply chain efficiency.

Key limitations for this study are the small sample and data gathering methods, meaning that the findings will not be applicable to a more general population. Even though the findings are not well generalizable to other supply chains or industries, this study may give interesting pointers for future research. Also, this study gives insight into complex processes and the nature of the collaboration in this supply chain. The results of this article will thus be of interest to practitioners looking for ideas and cases of practical implementation of a deep and strategic supply chain collaboration. The main practical implications of this article are therefore to highlight the importance of information sharing and strategic alignment on successful collaboration. A societal impact of this study can also be identified, as one of the results of increased forecasting accuracy means less spoilage, therefore resulting in less waste and pollution. Academic researchers will gain some insight into further research opportunities, as the differences in preference between S&OP and CPFR remains unanswered due to limitations to this study. Future research could also seek to quantitatively verify the effects of centralized forecasting and replenishment to one actor in the supply chain for the customers and the whole supply chain. Furthermore, the limitation to not include any suppliers of WS may warrant additional studies from a multi-echelon viewpoint.
## REFERENCES


APPENDIX 1  INTERVIEW GUIDE (ENGLISH)

Allotted time for one interview: 1 hour.

Introduction
- Name, title, responsibilities etc.
- How would you describe your company’s role in this supply chain?

RQ1 – How is the collaboration working in this supply chain?
1. What are the areas in which you are collaborating with the wholesaler/retailer?
2. Why are you collaborating in the supply chain?
3. How are profits and costs from the collaboration distributed among the parties?

RQ2 – What are supply chain collaboration enablers in your supply chain?
4. How well do you think the IT systems currently aid in the exchange of information?
5. What information do you share with your customers/suppliers?
6. How do you communicate with your suppliers/customers, do you have e.g. joint meetings?
7. How does the corporate culture affect collaboration?

RQ3 – What are the practical implications of supply chain collaboration?
8. Do you plan and make forecasts together with your customers/suppliers?
9. What do you usually do when the demand turns out to be smaller or larger than forecasted?
10. How do you think that collaboration has affected the performance of your company?

Special situations
11. What are typical exceptional situations and what are the reasons for these?
12. How do you prepare for periods when the demand is particularly uncertain?
13. How does collaboration affect the capability to control special situations?

RQ2 – What are barriers to collaboration?
14. What costs arise from collaboration?
15. What are restricting factors in collaboration?
16. What are the areas of collaboration that you think could still be further developed?
APPENDIX 2  INTERVIEW GUIDE (FINNISH)

Yhden haastattelun kesto: 1 tunti.

Intro
- Nimi, titteli, työtehtävät yms.
- Miten kuvaluisitte yrityksenne roolia toimitusketjussa?

TK1 – Miten yhteistyö toimii tässä toimitusketjussa?
1. Millä alueilla teette yhteistyötä toimittajan/asiakkaiden kanssa?
2. Minkä takia teette yhteistyötä toimitusketjussa?
3. Miten yhteistyöstä saadut hyödyt ja haitat ja hitaan osapuolten kesken?

TK2 – Mitkä ovat toimitusketjun yhteistyön mahdollistajat toimitusketjussanne?
4. Kuinka hyvin nykyiset tietojärjestelmät auttavat ja tukevat tiedonjakoa?
5. Mitä tietoja jaatte tavarantoimittajien/asiakkaiden kanssa?
6. Miten kommunikointe tavarantoimittajien/asiakkaiden kanssa, onko teillä esim. yhteisö tapaamisia?
7. Miten yrityskulttuurit vaikuttavat yhteistyöhön?

TK3 – Mitä ovat käytännön seuraukset toimitusketjun yhteistyöstä?
8. Suunnitteletteko ja teetekö ennusteita yhdessä tavarantoimittajien/asiakkaiden kanssa?
9. Miten te yleensä toimitte, kun ennuste ei vastaa toteutunutta kysyntää?
10. Miten te yleensä toimitte, kun ennuste ei vastaa toteutunutta kysyntää?

Poikkeustilanteet
11. Mitkä ovat tyypillisiä poikkeustilanteita ja mitkä ovat näiden syyt?
12. Miten valmistaudutte jaksoihin jolloin kysyntä on poikkeuksellisen vaihtelevaa?
13. Miten yhteistyö vaikuttaa poikkeustilanteiden hallintaan?

TK2 - Mitkä ovat toimitusketjun yhteistyön esteet?
14. Mitä kustannuksia yhteistyöstä syntyy?
15. Mitkä ovat rajoittavia tekijöitä yhteistyössä?
16. Mitkä ovat yhteistyön alueita joissa sinun mielestä olisi edelleen kehitämisen varaa?
APPENDIX 3  CODEBOOK

Research questions

- **COLLAB**
  
  **Brief Definition:** Reasons, factors and methods of collaboration.

  **Full Definition:** Answers at least one of the following questions:
  - How is the collaboration organized in the SC?
  - Why are the companies collaborating (in the way they do) in the SC?

  **When to Use:** Apply this code to all references to factors that describe the collaborative elements, practical organization of the collaborative elements or reasons for collaboration.

  **When Not to Use:** Do not use this code for reference to factors that describe the results or implications of collaboration (see PRACTIC) or for factors that enable or inhibit the collaborative elements in the SC (see ENBA).

- **ENBA**
  
  **Brief Definition:** Enablers and barriers for SC collaboration.

  **Full Definition:** Factors that acts as barriers or enablers for collaborative enablers in the SC.

  **When to Use:** Apply this code to all references to factors that describe anything that can be seen as an enabler or a barrier to collaboration.

  **When Not to Use:**

- **PRACTIC**
  
  **Brief Definition:** Practical implications of SC collaboration.

  **Full Definition:** Answers the questions:
  - What has been gained from increased collaboration?
  - What has changed since deeper integration?

  **When to Use:** Apply this code to all references to results and factors that can be regarded as results of collaboration or integration.

  **When Not to Use:** Do not apply this code to the description of the collaborative practices (see COLLAB) or to possible problems or improvements that are not a result from collaboration.

- **Capabilities**

- **ITINT**
  
  **Brief Definition:** IT integration in the supply chain.

  **Full Definition:** How are the different IT systems integrated in the supply chain, and how does information travel through these integrated IT systems.

  **When to Use:** Use when topic is on integrated IT systems, automated information flows or similar.

  **When Not to Use:** Do not use on IT systems that are not in communication with other SC partners (see ITCAP) or on non-automatic information transfer (see INFO).

- **ITCAP**
  
  **Brief Definition:** IT capabilities of the supply chain.

  **Full Definition:** Programs and IT processes in the supply chain that can be considered capabilities of the supply chain or individual companies.

  **When to Use:** Use when respondent mentions an IT program or other technology that enables information sharing or gives other capabilities to the supply chain.

  **When Not to Use:** Do not use when talking about how the software is integrated or information is transferred (see ITINT and INFO).

Processes

- **SOP**
  
  **Brief Definition:** Sales & Operations Planning.

  **Full Definition:** This category contains all explicit mentions of "SOP" or "sales and operations planning" or similar that respondents used.

  **When to Use:** Use when the respondent uses the term "SOP", "sales and operations planning", or some derivation of these.

  **When Not to Use:** Do not use when the respondent does not explicitly mention "SOP", "sales and operations planning", or some derivation of these, when talking about information sharing (see INFO) or supply chain processes (see e.g. PLAN).

- **INFO**
  
  **Brief Definition:** Information sharing without explicit mentioning of SOP.

  **Full Definition:** The descriptions of meeting processes and non-automatic information sharing processes within the supply chain.

  **When to Use:** Use when talking about meetings or other formal or informal ways to share information.

  **When Not to Use:** Do not use when the
respondent explicitly mentions S&OP (see SOP) or the information flow is automatic or integrated (see ITINT).

**PLAN**

*Brief Definition: Planning process.*

*Full Definition: How is the planning in the supply chain organized and carried out.*

*When to Use: Use when the respondent talks about planning in the supply chain.*

*When Not to Use: Do not use when the respondent talks about S&OP (see SOP), information sharing (see INFO) or forecasting (see FORC).*

**FORC**

*Brief Definition: Forecasting process.*

*Full Definition: How is the forecasting in the supply chain carried out, what are the processes involved.*

*When to Use: Use when the respondent talks about how the forecasting process works in the supply chain.*

*When Not to Use: Do not use when the respondent is talking about planning (see PLAN) or replenishment (see REPL).*

**REPL**

*Brief Definition: Replenishment process.*

*Full Definition: How is the replenishment process organized in the supply chain. This concerns everything from the individual retail stores all the way to the warehouse of the wholesaler.*

*When to Use: Use when the respondent talks about the replenishment process.*

*When Not to Use: Do not use when the respondent talks about planning (see PLAN) or forecasting (see FORC).*
## APPENDIX 4  CODE STATISTICS

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SVENSK SAMMANFATTNING

Inledning
Samarbete (eng. collaboration) i flödeskedjan har i allmänhet ansetts vara kritiskt för konkurrenskraften i dagens läge (Simatupang & Sridharan, 2002). Litteraturen har använt växlande definitioner för samarbete och integration i flödeskedjan, men i denna avhandling beaktas de som synonymer och den följande definitionen för samarbete i flödeskedjan används: två eller flera självständiga aktörer i flödeskedjan arbetar tillsammans, för att uppnå starkare konkurrenskraft än de kunde ensamma, genom samarbete med att planera och genomföra aktiviteter i flödeskedjan (Soosay & Hyland, 2015; Simatupang & Sridharan, 2002). Orsakerna till samarbete inom flödeskedjan kan vara väldigt olika för olika företag, men i allmänhet är samarbetet en följd av ökad konkurrens (Matopoulos et al., 2007).

Utvecklingen inom IT-branschen har också möjliggjort en djupare integration inom flödeskedjan än någonsin förut, och i dagens läge kan t.ex. försäljningsdata nästan i realtid överföras uppströms i flödeskedjan. Denna utveckling inom IT kan resultera i stora förbättringar av effektiviteten i flödeskedjan. Trots dessa framsteg är automatisk informationsöverföring inte en automatisk förbättrare av flödeskedjans konkurrenskraft, dessutom krävs i allmänhet olika koordinerande aktiviteter för att möjliggöra samarbeten med hjälp av ny informationsteknologi (Sanders, 2008). På grund av detta har fokus inom forskningen flyttat från de tekniska möjligheterna till implementering och komplettering av IT och samarbete inom flödeskedjan (Gunasekaran & Ngai, 2004). Speciellt aktiviteter som kampanjer och prisnedsättningar, vilka skapar växlingar i efterfrågan, kräver ett djupare samarbete än endast passivt utbyte av information (Ramanathan & Muyldermans, 2010).

Problemformulering och syfte
Dagligvaruhandelsbranschen är en väldigt konkurrensutsatt bransch, där efterfrågan ständigt växlar som en följd av t.ex. säsonger, kampanjer och väder. Dessa faktorer är industrirelaterade, och flera av dem är sådana som företaget varken kan påverka eller förutsäga ordentligt på förhand. Flera modeller för samarbete inom flödeskedjan har föRTS fram och integration inom flödeskedjan är ett område som det forskats mycket i, Trots detta finns det inte mycket forskning om sambandet mellan IT-integration, samarbete inom flödeskedjan och prestationen av flödeskedjan inom
dagligvaruhandelsbranschen (Elkady et al., 2014). Denna avhandling avser att fylla detta gap. Denna avhandling är en fallstudie inom en dagligvaruhandelskedja i Finland, och målet är att undersöka hur samarbetet inom denna flödeskedja fungerar och vilka följer detta samarbete har. För att undersöka implementeringen av samarbete i denna flödeskedja, kommer ett ramverk att konstrueras utifrån tidigare forskning. Detta ramverk presenteras i slutet av litteraturgenomgången, och resultaten från intervjuerna kommer att diskuteras med tanke på ramverket. För att rikta forskningen ställdes även tre forskningsfrågor upp:

**FF1: Hur samarbetar de olika aktörerna i flödeskedjan?**

**FF2: Vilka faktorer möjliggör eller förhindrar samarbete inom flödeskedjan?**

**FF3: Vad är de praktiska följderna av ökat samarbete och informationsutbyte inom flödeskedjan?**

Det slutgiltiga målet med en flödeskedja inom dagligvaruhandeln är att sälja produkter och betjäna kunder på ett effektivt sätt. I dagligvaruhandeln påverkas dock kunderfarenheten även av faktorer som t.ex. om det finns tillräckligt med produkter i hyllorna och är dessa produkter fräscha, och de här är områden som ofta lider då dagligvaruhandeln inte har lyckats prognostisera efterfrågan rätt av en orsak eller annan (Taylor & Fearne, 2009). Det enda sättet att effektivt öka på nivån av dessa prestationssätt är att på ett heltäckande sätt öka på noggrannheten och pålitligheten i prognoserna och även dela med sig av planer och data i flödeskedjan. Därför är en effektivökning av nivån på kundservice den faktor enligt vilken flödeskedjan styrs i det förslagna ramverket i avhandlingen.

**Litteraturgenomgång**

Samarbete inom en flödeskedja kan ske på flera olika nivåer och inom flera olika funktioner. Typen av samarbete mellan företagen inom en flödeskedja kan bedömas med hjälp av två klasser: systemsamarbete och djup av samarbete (Kim & Lee, 2010; Matopoulos et al., 2007). Systemsamarbete avser hur integrerade och anpassade företagens IT-system är med varandra, och djupet av samarbete kan antingen vara operationellt, taktiskt eller strategiskt. Samarbetets intensitet är dock inte en stegetvis skala, utan det finns flera olika nivåer och företag kan vara mera integrerade inom vissa områden än inom andra (Danese, 2011).

Samarbete inom flödeskedjan kräver flera saker för att fungera, och förtroende mellan affärsparter är det centrala varifrån hela samarbetet byggs upp (Barratt & Oliveira, 2001). Teknologi är en annan kritisk faktor, och de stora satsningarna som krävs på ERP-system och motsvarande kan vara ett problem för företag som inte har dessa resurser (Barratt & Oliveira, 2001). I allmänhet kan dock faktorer som möjliggör och faktorer som hindrar samarbete delas in i två kategorier: relationsmässiga och resursmässiga. Förtroende är ett exempel på den första kategorin medan IT är ett exempel på den andra kategorin. Speiellt komplexa samarbetsinitiativ som t.ex. CPFR är ofta svårare att implementera på grund av de ökade resursbehoven och t.ex. uppfattningen att nyttan för företaget inte motsvarar dessa investeringar (Ramanathan & Gunasekaran, 2014). Tidigare forskning visar också att utvecklingen och användningen av IT-kapacitet i samarbete med andra företag i flödeskedjan är ett väldigt effektivt sätt att öka på
prestandan (Ghobakhloo et al., 2014). På grund av detta kan IT anses vara i en nyckelroll i samarbetet i flödeskedjan, och speciellt hur IT-integrationen och anpassningen har lyckats. För att sammanställa litteraturgenomgången ställdes ett ramverk upp i figur 1.

**Figure 1**  Föreslaget ramverk för avhandlingen.

**Metodgenomgång**

och ramverket. Ett e-postmeddelande med följdfrågor som uppstod under analysen skickades ut och besvarades av chefen för logistikplanering hos grossisten.

**Analys och diskussion**

Den empiriska undersökningen ämnade svara på forskningsfrågorna.

1. **Hur samarbetar de olika aktörerna inom flödeskedjan?**

   Företagen samarbetar på flera plan och på olika sätt, beroende på vilken grad av integration de gått in för. Grossisten är väldigt djupt och brett integrerad med de två kunderna som var med i studien, grossisten sköter nämligen om prognostisering och distribution av nästan alla produkter för kundernas räkning. Dessutom planerar och prognostiserar grossisten kampanjeförfrågan tillsammans med dagligvaruhandelskedjan. Ett av syftena bakom samarbetet är strävan att arbeta mer som ett företag i flödeskedjan, och därför finns det också ett stort intresse för att integreras djupare i fortsättningen.

2. **Vilka faktorer möjliggör eller hindrar samarbete i flödeskedjan?**

   IT var en av de centrala faktorer som möjliggör samarbete enligt respondenterna, speciellt den gemensamma prognostiseringen var en viktig möjliggörare. Kulturen och attityderna i företagen var också positivt inställda till samarbetet, och de goda resultaten man fått hittills stödde den här utvecklingen.

3. **Vad är de praktiska följderna av ökat samarbete och informationsutbyte inom flödeskedjan?**

   Respondenterna ansåg i allmänhet att samarbetet möjliggjorde effektivare verksamhet i flödeskedjan och därmed bättre service för konsumenterna. Grossistens kunder ansåg att speciellt viktig inverkan hade flyttandet av prognostisering och påfyllning av butikerna till grossisten, då detta betydde att butikspersonalen kunde ägna mera tid åt deras kärnverksamhet, d.v.s. kundbetjäning och försäljning. Hos grossisten såg man att den största nyttan av samarbetet uppkom i form av effektivare kapacitetsutnyttjande: på grund av samarbetet kunde man sprida ut efterfrågetopparna från kunderna på längre tider och därmed få en jämnare och i medeltal högre kapacitetsutnyttjning. Dessutom gav de integrerade prognostiserings- och påfyllningsfunktionerna verktyg att påverka
materialflöden snabbt och effektivt genom ändringar i de centrala parametrarna hos grossisten.

Företagen använder inte CPFR formellt, men trots detta liknar flera av flödeskedjans processer det som föreskrivs i CPFR. Dessutom används formella S&OP-processer i flödeskedjan, och både S&OP-möten och andra möten ordnas regelbundet både internt och mellan företagen i flödeskedjan. Idén bakom S&OP-möten är bland annat att få en gemensam plan i flödeskedjan som är anpassad enligt de olika parternas behov och önskemål. Företagens IT-resurser är även mycket väl integrerade, och enligt respondenterna utvecklas IT-integrationen hela tiden mot en djupare nivå av integration. Precis som tidigare forskning föreslog, så kan samarbetet ses som en kontinuitet av processen av djupare samarbete och större integration, och därför används flera avancerade samarbetsprocesser i flödeskedjan även om uttryckligen CPFR inte används formellt.

**Slutsatser**

Svaret på forskningsfråga 3 ger ett intryck av att samarbetet har förbättrat prestandan av flödeskedjan signifikant då efterfrågan är osäker. Den största orsaken till detta var de gemensamma prognoserna som hela flödeskedjan tog del av samt den integrerade påfyllningsverksamheten hos grossisten. Dessa framsteg förbättrade kapacitetsutnyttjandet och flexibiliteten i hela flödeskedjan, och gav verktyg att reagera snabbt på ändringar i efterfrågan. Flödeskedjans IT-resurser spelar en nyckelroll i detta arrangemang och detta stöder även ramverket. Trots att CPFR inte används formellt i flödeskedjan kan ett avancerat samarbete i stil med CPFR urskiljas ur flödeskedjans processer, och dessutom används även S&OP formellt. Allt detta tyder på att ramverket därmed ger en bra bild av samarbetsprocessen och hur den har implementerats och utvecklats i denna flödeskedja.

Begränsningar till studien uppstår främst på grund av naturen av en fallstudie, dvs. studiens resultat går inte att generaliseras till en större population. Trots detta kontribuerar studien till empirin genom en inblick i hur en flödeskedja har lyckats förbättra prestandan på en väldigt svår och konkurrensutsatt marknad, och andra företag som vill implementera liknande samarbetsförhållanden i flödeskedjan kan få tips och riktlinjer från denna studie. Dessutom ger denna studie vissa intressanta riktlinjer för fortsatt forskning, bland annat orsakerna till valet av S&OP över CPFR i flödeskedjan kräver fortsatt forskning.