Information integration between retailers and manufacturers in Swedish food retail supply chains

The manufacturers’ perspective

(Final version)
SUMMARY

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Title: Information integration between retailers and manufacturers in Swedish food retail supply chains; The manufacturers’ perspective.

Background: According to study conducted by Brege in 2007, in Swedish food retail supply chains there is lack of external integration between retailers/wholesalers and manufacturers. This fact indicates that there are gaps in information integration between them which have consequences mainly for the manufacturers.

Purpose: The purpose of this study is to describe gaps, from the manufacturers’ perspective, in the information integration between Swedish retailers/wholesalers and manufacturers, and analyze what are the consequences of these gaps for manufacturers as well as propose how these gaps can be alleviated.

Method: Multiple - case study as research method has been applied. Specifically, three case companies, Swedish meat manufacturers, have been selected. Three one-hour long focused interviews combined with open-ended interviews have been conducted with two sales managers and one sales representative. The empirical evidence has been analyzed by using cross-case analysis method and pattern-matching method.

Results, conclusion: Firstly, Swedish meat manufacturers do not have access to real-time demand or POS data on store level. Instead, they receive orders from retailers based on updated demand forecast. As manufacturers do not have perfect demand information it leads to information asymmetry between retailers and manufacturers. As a consequence of inaccurate demand signal processing a Bullwhip effect can occur. Implementation of integrated information systems using EDI for exchange of POS data could solve the gap. However, small-scaled manufacturers have neither enough resources nor incentives to invest in an expensive business-to-business system. Furthermore, manufacturers with restricted production flexibility cannot utilize provided information on very detailed level; such as POS data. Thus, in these cases implementation of integrated information systems seems not to be reasonable. Secondly, it has been found that information integration between retailers and manufacturers has been significantly improved the last three or four years. The Swedish retailers are willing to provide information to manufacturers.

Future Work: The result of this thesis is based only on findings from meat manufacturers. Other sectors could be also included as well as opinion of retailers and wholesalers to identify common problems related to information integration in Swedish food retail supply chains.

Keywords: Information integration, food retail supply chain, manufacturer, retailer, Swedish
ACKNOWLEDGEMENTS

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Växjö, May 2010

Hana Hulthén
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Information integration between retailers and manufacturers in Swedish food retail supply chains
1. Introduction

The introduction chapter is intended to provide an overview of the subject, motivation, and process of this thesis. It opens with a background of supply chain management and integration in retail supply chains, giving the reader insight to the important role of information integration. Thereafter, follows problem discussion, research questions and purpose.

1.1 Background

**Supply chain integration**

In the paradigm of the modern business management the individual businesses no longer compete as autonomous entities, but more likely as supply chains. The ultimate success of a single company depends on management’s ability to integrate the company’s complex network of business relationships (Christopher 1998 cited in Lambert et al., 1998). The management of multiple relationships across the supply chain is known as supply chain management (SCM) (Hewitt, 1994). Elliff (1996) sees SCM as synonymous with integration commonly associated with advanced information technologies, fast and responsive logistics service, effective supplier management as well as customer relationship management. According to Cooper et al. (1997), SCM provides the chance to intra- and inter-company integration and management.

Furthermore, Cooper et al. (1997) stated that the supply chain comprises not only of a chain of one-to-one businesses relationship but rather a network of multiple relationships. However, Akkermans et al. (1999) pointed out that experience indicates that only a few companies are actually engaged in such extensive supply chain integration involving “supplier’s supplier to customer’s customer”. The supply chain practice seldom corresponds to the theoretical ideal. True integration is in most of the cases limited to first-tier in either direction. Moreover, the majority of resources and efforts are focused on only a limited set of activities concerned with coordinating the “hands off” of information, strategic plans and physical product between members of supply chain (Fawcett and Magnan, 2002).

Supply chain integration is achieved when two or more companies share common planning, management, execution and performance measurement information. Integrated relationship
changes the way information is shared between partners and initiates change to the fundamental business processes. Supply chain integration represents a complex challenge to supply chain partners since there are a variety of initiatives related to integration, different standards for communication and a range of business partners’ competencies and business processes. In order to benefit from the integration it is required from suppliers and customers to support a variety of simultaneous business models and communications media. The model of integration used between business partners depends on the depth of their trading relationship (Anthony, 2000). Previous studies (Lee et al., 2000, Kulp, 2002, Yao and Dresner, 2008) show that initiatives for integration lead to reduction of inventories and occurrences of stock outs as well as improved supply chain efficiency. Access to information that reflects true supply chain situation allows companies to integrate their material, information and financial flows.

On the other hand, despite of all the benefits of information integration there are many reasons for why companies do not share information, for instance concerns of security, privacy and intellectual property. Additionally, information integration requires significant investments so the benefits from obtaining or sharing information must be greater than the costs occurred (Li et al. 2006).

**Information integration**

Information integration is “…combination of data, application and system integration” as defined by Sikora and Shaw (1998, p.). In order to achieve true information integration, technical connectivity and immediate delivery of data is significant but not sufficient as data must be structured logically so they can be properly interpreted (Wakayama et al., 1998 cited in Berente et al., 2009). Information integration enables integration of processes (Sikora and Shaw, 1998). However, it is not only precondition for a truly integrated business processes as different companies and departments can have different information needs, interpretations, and practices (Berente et al., 2009). To achieve total efficiency, integration between retailers and manufacturers is crucial (Bell and Cuthbertson, 2003). To improve supply chain performance, information integration initiatives between manufacturers and retailers, in terms of information sharing and information integration systems, have been identified as a major means (Kulp et al., 2004).
There has been developed number of sophisticated information integration systems that utilize growing information technologies (Emigh, 1999 cited in Yao and Dresner, 2008). These systems encompass collaborative planning, forecasting, and replenishment (CPFR), vendor-managed inventory (VMI), continuous replenishment programs (CRP), and efficient consumer response (ECR). They lead to changes in industrial structures and improved performance of companies. Real-time information sharing allows for reengineering of supply chains. Integrated information sharing (IIS) is a basic initiative of information integration in which the downstream company (referred to as a retailer herein) agree to transfer demand and inventory status to the upstream company (referred to as a manufacturer herein) in real time (Lee, 2000). The general idea is that the manufacturer no longer monitor consumer demand through the order quantities received from retailer but determines it directly from end-customer, even if the manufacturer still obtain orders from the retailer. VMI and CRP enable even closer information integration between retailer and manufacturer (Yao and Dresner, 2008).

Furthermore, Gustin et al. (1995) stated that logistics must be able to communicate internally with functional areas such as production and marketing within a company as well as externally with other supply chain members encompasses suppliers, customer and third-party providers. To achieve these interfaces a high level of information integration is required.

1.2 Problem discussion

Information integration between retailers/wholesalers and manufacturers

In food retail sector, vertically integrated supply chains are common practice. However, the integration within the supply chain is strongly influenced by emergence of powerful retail chains that have changed the balance of power in relation to suppliers (manufacturers) (Bell and Cuthbertson, 2003). Furthermore, some retailers fear that suppliers who have knowledge about their inventory, sales and ordering practices may exploit this information for example by sharing it with their rivals or use it in way which could reduce retailer’s profitability (Kinsey and Ashman, 2000). As a matter of fact, especially in the food retail industry, information integration plays an important role in the power relation between supermarkets and the suppliers/manufacturers. It impacts their mutual trust and the implementation of IT among supply chain members. The following question that retailers ask best illustrates the
trade-off between the need to exchange information and the need to protect information: “What is the minimum set of information to share with my supply chain partners without risking potential exploitation?” (Lee and Wang, 2000, p.373). Mohtadi and Kinsey (2005) found that although information integration leads to reduced procurement and demand uncertainties, it is only retailers with greater market power and numerous suppliers who are willing to share information in order to synchronize replenishment and in that way achieve information integration. On the other hand, smaller retailers with less power withhold valuable sales information from their suppliers even if it means less supply integration. According to Kinsey (2000), information integration is difficult when there is no mutual trust between manufacturers and retailers. Consequently, they are not prepared to be partners in forecasting, planning, and coordination deliveries through shared data provided by retailer.

Additionally, Katz and Shapiro (1994) identified three issues related to implementing of a business communication and coordination systems for information integration such as expectations, coordination and compatibility. Small businesses have usually lack of resources and inclination to invest in business-to-business systems. Furthermore, compatibility of the hardware and software used by retailers and manufacturers is another issue that constitutes a gap in development of information integration that demands electronic communication.

Another gap is insufficient information sharing between supply chain partners. The consequence can be a distortion of demand information resulting often in bullwhip effect. The bullwhip effect occurs when manufacturer has only access to its immediate order data from retailers. These data can be misleading as they may demonstrate an amplified demand pattern which does not correspond to the real end-customers demand. Under these circumstances it is difficult for manufacturer to efficiently manage his internal processes. The consequence of the bullwhip effect is that manufacturer incurs an excessive raw material stock and thus raw material costs. Excess capacity and inefficient utilization and overtime, excess stock and additional transportation lead to additional manufacturing expenses (Lee et al., 2004).

**Information integration in Swedish food retail supply chains**

To illustrate, in Sweden there are currently four largest food retail supply chains (ICA, KF, Axfood, Bergendahls). The Swedish food retail market can be characterized as relatively concentrated as the four main actors represents 84.9 per cent market shares of the Swedish food retail market (Swedish Competition Authority, 2009).
Until recently, the focus of majority of food retail supply chains was on improving their internal processes as well as integration with the wholesale function to better meet expectation of their immediate customers, and less attention have been paid to improvement of the performance across the supply chains (Lau et al., 2008). This fact corresponds to the findings made by Brege (2007). In his study, data have been collected through interviews with both producers and retailers in the food supply chains. The large Swedish wholesalers/retailers and producers have been interviewed from sectors such as meat, dairy, fruit-and vegetables, bread and beverage. Brege (2007) concluded that in the Swedish food retail supply chains, the retailer-manufacturer integration has not been the main concern. Instead, the efforts have been focused towards internal integration. As a substitute of integration along the supply chain, as suggested in the literature, Swedish food retailers maintain adversary relationship in the vertical system and demonstrate a weak competitive or even collaborative relationship among companies that have a similar position in the supply chain. There is a pressure on manufacturers to integrate internally to reduce cost and to increase service performance as well as to deliver to retailers/wholesalers more frequently. The consequence of not integrating between retailers and manufacturers is building of large inventories within and between organizations with limited integration.

In comparison, European food retail supply chains apply high degree of inter-organizational integration. To coordinate interdependencies and to alleviate gaps between supply chain partners, information integration is often mentioned in literature as a basic requirement. Information integration is also what the Swedish manufacturers have requested in order to achieve external integration (Brege, 2007). This fact is also supported by Kulp et al. (2004); she stated that many of integrative efforts have been initiated by manufacturers. However, Swedish retailers/wholesalers do not seem to have the same prioritization. As a consequence, the attention is on individual transactions instead of focusing on making the supply chain more efficient. Information integration is necessary for handling interdependences, uncertainty and complexity within the supply chain. The difference between traditional food retail supply chains in Sweden and successful international chains can be found mainly in flow management, encompassing among other aspects of information transparency instead of stockholding. Malone and Crowston (1994) pointed out, that information integration is an essential prerequisite for integration of business processes. To alleviate gaps in information integration, it requires timely transfer of appropriate and usable information as the information flow in a process has to be instantaneous. Therefore, an important research area
is integration between Swedish food retailers/wholesalers and manufacturers and information integration in particular (Brege, 2007).

To summarize, as suggested by Malone and Crowston, (1994), an important prerequisite for internal as well as external business process integration is information integration. It encompasses information sharing and information integration systems between members of supply chains (Kulp, et al., 2004). As stated in literature, the gaps in information integration lead to demand distortion, building of an excessive inventory, stock-outs, problems related to production and transportation capacity and increased expenses, especially for manufacturers (Lee et al. 2004). Thus to alleviate these gaps, it is often manufacturers who initiate the integrative efforts such as information integration with retailers/wholesalers (Kulp, et al. 2004).

According to study conducted by Brege in 2007, in Swedish food retail supply chains there is lack of external integration between retailers/wholesalers and manufacturers. This fact indicates that there are gaps in information integration between them which have consequences mainly for the manufacturers. Thus, it is necessary to describe these gaps and analyze for the consequences the manufacturers face as a result of these gaps as well as suggest how these gaps can be alleviated.

The Figure 1.1 exhibits food retail supply chain, the subject to scrutiny in this thesis is highlighted in red.

![Figure 1.1 Food retail supply chain](image-url)

Information integration between retailers and manufacturers in Swedish food retail supply chains

Illustrates information integration with possible gaps

Illustrates the consequences of the gaps in information integration
1.3 Research questions

Given considerations above, the research questions to be addressed in this thesis are:

**RQ1:** From manufacturers’ perspective, where are gaps in the information integration between Swedish retailers/wholesalers and manufacturers?

**RQ2:** What are consequences of these gaps for manufacturers?

**RQ3:** How can the identified gaps be alleviated?

1.4 Purpose

The purpose is to describe gaps, from the manufacturers’ perspective, in the information integration between Swedish retailers/wholesalers and manufacturers, and analyze what are the consequences of these gaps for manufacturers as well as propose how these gaps can be alleviated.
2. Methodology

In this chapter the methodology choices for this thesis are described. Multiple case study is discussed as a research strategy. Furthermore, it is described selection of the unit of analysis, design of the inquiry form, method for collecting the empirical evidence as well as strategy for analyzing and interpretation the case study evidence. Finally, it is presented how requirements on the scientific credibility will be fulfilled.

2.1 Multiple case study – research strategy

Recalling the previous problem discussion in the introduction section, Brege (2007) concluded that there is a need for more studies examining the issue of external integration between Swedish food retailers/wholesalers and manufacturers. Furthermore, according to Brege’s study from 2007, there is a limited external integration in Swedish food retail supply chains, especially between retailers/wholesalers and manufacturers. This fact has a negative impact on information integration between supply chain partners. It indicates that there can be found gaps in information integration between them which have consequences mainly for the manufacturers. To describe the gaps in information integration from manufacturers’ perspective and their consequences for manufacturers as well as propose how these gaps can be alleviated was the purpose of this thesis.

Given the considerations above, this thesis has an exploratory nature and the results can serve as a base for conducting a survey which allows for gathering empirical data from a broader population. In exploratory research, the object of interest is how or why something is being done. It provides depth and insight into a phenomenon that calls for more research (Ellram, 1996). In the field of social science, qualitative research is often referred to as case study. The focus of this type of study is on holistic situations in real-life context and is likely to have boundaries of interest such as an organization, a particular industry, or particular type of operation (Ellram, 1996). Case study was also an appropriate research methodology for exploring a phenomenon of interest (Ellram, 1996), namely information integration. This method allowed grasping the depth necessary to understand the phenomenon as a contemporary phenomenon in real-life context (Eisenhardt, 1989). With real-life context it is
intended that the object of study occurs (or has occurred) in reality, without manipulation (Dul and Hak, 2007). It means, that empirical evidence has been gathered at manufacturers without intervening or changing their real-life settings; their way of information integration between them and retailers/wholesaler and vice versa. Furthermore, this method attempts to reconcile empirical data across cases and between cases and the existing literature on this topic. (Eisenhardt, 1989)

Moreover, defining a research question was an important step. It permitted to identify what organization should be approached and what evidence needed to be collected in a systematic way (Eisenhardt, 1989). The research question has been formulated with reference to existing theory related to information integration.

The case study method underlines qualitative, thorough study of one or more cases. It was crucial to determine if single or multiple case study should be conducted. Multiple case design represents replications that enable development of a rich theoretical framework. It enables to either demonstrate similar outcomes among replications, or to show contrasting results (Ellram, 1996). For the purpose of this thesis, a multiple case study approach has been selected in order to identify similar or contrasting patterns among the cases. Furthermore, another reason for why this approach has been used is that the analytic conclusions based on multiple cases will be more powerful than those arising only from one case (Yin, 2003).

2.2 Sample selection

Selection of the cases has been made by applying theoretical sampling as the purpose was to identify cases which can contribute to an existing theory (Eisenhardt, 1989). In order to describe gaps in information integration from manufacturers perspective in Swedish food retail supply chains, three meat manufacturers have been selected for the purpose of gathering empirical evidence. To identify the organizations of potential interest, some criteria have been set up; geographical location of the organizations, size, customer segment, and industry. Specifically, all manufacturers selected were located in Sweden. It has been attempted to achieve size diversity, in terms of annual sales, as size represented an important variable determining level and type of information integration. It allowed for studying the issue of information integration from different perspectives. Thus, manufacturers with annual sales between 12 million SEK and 1,5 milliard SEK have been chosen. Each of the selected
manufacturers had to be part of the Swedish food retail supply chains. As the Swedish food retail market consists mainly of four supply chains that totally represent 84.9 per cent of the Swedish market (Swedish Competition Authority, 2009), it can be concluded that the retail food market is relatively concentrated. Therefore, sample of three manufacturers could be considered as representative as they were part of these four food retail supply chains. Finally, meat industry has been selected as durability of product indicated that these products need to be replenished on weekly or daily basis and they can’t be stocked for a longer period of time. This fact indicated that a regular and frequent communication and information exchange between manufacturers and retailers/wholesalers had to take place. Three manufacturers that have been selected were personally contacted by telephone and personal interviews with two sales managers, Sveinn Vilhjalmsson at Lundachark AB and Kent Svensson at Pärsons Sverige AB, and one sales representative, Mårten Backgården at KLS Ugglarps AB, have been scheduled.

2.3 Case study protocol
An existing theory related to information integration were studied not only in order to develop a theoretical framework to design the inquiry form and thus enhance the data collection but also to be able generalize the results of the case study. Analytical generalization has been applied as the previously developed theoretical framework served as a template with which the empirical results have been compared (Yin, 2003). A preliminary case study protocol based on previous research and existing literature has been developed. The protocol comprises of two parts; case study plan and interview guide. Case study plan includes procedures that need to be followed during conducting of case study. It comprise of research question, statement of the purpose of the thesis, unit of analysis, methodology, sample selection, basic outline of overall case study report, collecting evidence, data analysis and time table (Ellram, 1996) (see Appendix 1). Interview guide (see Appendix 2) has been developed based on the presented theoretical framework related to the subject of information integration.

2.4 Data collection
As the source of empirical evidence, interviews have been used because they allowed for data collection focused directly on the case study topic. Three one hour long focused interviews were conducted with three meat manufacturers, specifically, with two sales managers and one sales representative, during weeks 12 and 13/2010. Throughout the interviews, conducted by
one researcher, beforehand prepared questions have been followed, in combination with open-ended interviews (Yin, 2003). The interview questions have been translated from English to Swedish; the answers have been recorded and then transcribed and translated to English. Interview guide has been e-mailed to interviewees before the interviews took place so they were informed about what type of questions to expect.

2.5 Data analysis methods
In order to analyze the evidence collected from interviews, firstly, cross-case analysis has been applied in order to reveal whether different cases share some similarities. In this method, individual case was treated as a separate case in order to aggregate results across individual cases available. A table has been developed that comprise of the manufacturers (listed horizontally) and of data categories within the research questions (listed vertically) (Ellram, 1996). Secondly, pattern matching approach has been applied to compare the empirical data about the information integration in Swedish food retail supply chains with the relevant theory related to the topic. This method helped to identify and analyzed alternative patterns to explain the key phenomenon of interest, specifically gaps in information integration and their consequences for manufacturers. It led to pattern development and compared with a previous research (Ellram, 1996). This process involved asking what was the pattern similar to or what does it opposed and why. Moreover, conflicting findings from previous research were also examined. To be able to do so a broad range of relevant theory needed to be considered (Eisnehardt, 1989). Alternative explanation of pattern has also been conducted (Ellram, 1996). Doing so increased the internal validity (Yin, 2003).

2.6 Scientific credibility
According to Yin (2003), as a research design is expected to represent a logical set of statements, the quality of a given design can be judge according to four logical tests based on notions about trustworthiness, credibility, confirmability, and data dependability. There are four tests to be used in order to establish of any empirical social research. As case study as a research method is included in the social research the four tests were relevant for such research method. Specifically, good research design needs to fulfill requirements regarding external validity, reliability, construct validity and internal validity. The requirement on internal validity is only relevant for explanatory case studies (Ellram, 1996).
External validity
In order to be able to generalize results beyond the selected case study samples (unit of analysis) it is crucial to achieve external validity. In other words, how precisely the results represent the phenomenon that is studied is related to generalizability of results (Ellram, 1996). In this thesis, external validity was supported by selecting multiple case study approach as it allowed generalizing beyond the first case. Furthermore, the developed theoretical framework determined the level at which the generalization of the multiple-case study outcomes occurred. This is known as analytical generalization. The empirical findings of the case study were compared with the previously developed theory (Yin, 2003).

Reliability
The issue of reliability deals with repeatability of the experiment and address also possibility of replication and achievement of the same result. In case study method, there are two ways how to achieve reliability; case study protocol and development of case study data base (Ellram, 1996). In this thesis, case study protocol has been developed including the case study plan consisting of all the procedures followed during conducting the case study (see Appendix 1) and the interview guide (see Appendix 2).

Construct validity
According to Ellram (1996), construct validity is fulfilled if proper operational measures for the concept of case study have been established. The issue of construct validity is part of the data collection phase and is near related to reliability. The establishment of construct validity is associated with the following three elements; multiple source of evidence, establishing a chain of events and review the case study research made by key informants. In this thesis, two elements, namely establishing a chain of events and draft review by key informants has been applied to achieve construct validity.

Establish and maintain a chain of evidence was necessary to allow the reader of the case study report to follow the complete case study data and analysis from the first step of formulation of the research questions to the final conclusion (Ellram, 1996). In this thesis, two reviewers (tutor and examiner) have examined the whole case study report, including research questions, case study plan and interview guide. The documents have been examined for logic, flow, clarity and content in order to assure that there is a logical flow and chain of evidence (Ellram, 1996).
Draft review by key informants was another element used in this thesis to support construct validity. Each of the key informants (interviewees at manufacturing companies) have reviewed the overall case study report to ensure the correctness of the empirical evidence provided.

2.7 Summary of methodological choices

The following Figure 2.1 a summary of methodological choices relevant for this thesis is presented.

<table>
<thead>
<tr>
<th>Research strategy</th>
<th>Qualitative</th>
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<tbody>
<tr>
<td>Research method</td>
<td>Case study: multiple-case study</td>
</tr>
</tbody>
</table>
| Research techniques | Focused interviews  
|                    | Open-ended interviews  |
| Case study protocol | Case study plan  
|                    | Interview guide  |
| Data analysis methods | 1. Cross-case analysis  
|                    | 2. Pattern matching analysis  |
| Scientific credibility | External validity: analytical generalization  
|                    | Reliability: case study protocol  
|                    | Construct validity:  
|                    | • chain of evidence  
|                    | • draft review by key informants  |

*Figure 2.1: Summary of methodological choices relevant for this thesis*
3. Theoretical framework

In order to describe gaps in information integration and consequences of these gaps for manufacturers in Swedish food retail supply chains, the relevant theory related to the issue of information integration will be studied from two perspectives: information sharing and information integration systems. As a final point, theoretical framework is summarized and completed with related interview questions from interview guide to demonstrate connection between theoretical framework and empirical evidence.

The theory chapter is divided in three general parts which correspond to the three research questions presented in the Introduction chapter (see Figure 3.1).

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**Research question**

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<tr>
<th>Number</th>
<th>Description</th>
<th>Theory</th>
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<tbody>
<tr>
<td>1.</td>
<td>From manufacturers’ perspective, where are gaps in the information integration between Swedish retailers/wholesalers and manufacturers?</td>
<td>3.1 Gaps in information integration</td>
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<td>3.1.1 Methods of managing food retail supply chains</td>
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<td>3.1.2 Information integration in traditional food retail supply chains</td>
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<td>3.1.3 Information sharing between retailers/wholesalers and manufacturers</td>
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<td>3.1.4 Traditional systems without information integration</td>
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<td>3.1.5 Gaps in information integration between retailers/wholesalers and manufacturers</td>
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<td>2.</td>
<td>What are consequences of these gaps for manufacturers?</td>
<td>3.2 Consequences of gaps in information integration for manufacturers</td>
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<tr>
<td>3.</td>
<td>How can be alleviated the identified gaps?</td>
<td>3.3 How to alleviate gaps in information integration?</td>
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<td>3.3.1 Integrated food retail supply chains</td>
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<td>3.3.2 Information integration systems</td>
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</table>

*Figure 3.1: Connection between research questions and theory*
3.1 Gaps in the information integration from manufacturers perspective

3.1.1 Methods of managing food retail supply chains

The responsibility of wholesaler is to assemble products from a range of manufacturers, reorganize it according to retailers’ orders specifications and deliver it. According to Kinsey and Ashman (2000), there are three different methods of managing food retail supply chains; such as (1) self-distributing retailers, (2) third party wholesalers and (3) Direct Store Delivery (DSD).

Self- distributing retailers

Self-distributing retailer owns the distribution centers for their stores. These retailers purchase products directly from manufacturers or producers. They comprise the largest retail food chains and a number of smaller ones. These are more efficient, in terms of handling costs on its way to customer, than the traditional wholesalers.

Third party wholesalers

The third party wholesalers are the traditional food assemblers as they buy food from manufacturers and resell it to retailers. Their profits come from the price spread and payment for service they provide to stores. However, this type of business is shrinking while the self-distributing chains and direct store delivery increasing in size and efficiency.

Direct Store Delivery (DSD)

Direct Store Delivery (DSD) is the third method of operating in the food supply chains. Manufacturers (DSD vendors) deliver their own products directly to the stores and place it on the shelves. “Scan-based-trading” is used between DSD manufacturers and the larger retailers to streamline the supply chain and reduce inventory in the system. The product within the DSD system have relatively short average shelf live (70 days compared to 360 days for products delivered from a warehouse) and turnover in a store is 1.6 times higher than turnover for products delivered from a warehouse. For the manufacturers it means that they get access to real-time information from the stores’ scanner data. Consequently, they can easily monitor product movements and replenish the shelves so they are always full. This results in increased
sales. The advantages of this system for the retailer is that they will usually have sold the products before the bill due date. So the generated capital can be used for other purposes. Additionally, the manufacturer (experienced representatives) can deliver the products to the store any time of the day as it does not have to be checked and arrange it on shelves and manage the inventory in the store. Doing so, the retailer avoids the risk on buying inventory that will not sell or sell slowly. It leads to improved cash flow and reduction of tied capital and improved return on assets (Kinsey and Ashman, 2000). Furthermore, Cachon (2001) found that retailers’ desire is to minimize their own holding costs and backorder penalty costs. The manufacturers strive to reduce its holding costs and its backorder penalty cost charged by retailer. The later penalty cost is the reason for why the manufacturer wants to maintain sufficient availability of his product at the retailer.

The success of scan based trading depends on mutual trust and accurate scanning. The most efficiency is achieved when the point-of-sale (POS) data is shared in real-time with each manufacturer and they can manage the flow of inventory (Cachon, 2001).

**3.1.2 Information integration in traditional food retail supply chains**

Traditional food retail supply chains use inventory buffers to smooth the flow of goods through production in order to response reliably to volatile demand. One significant problem with this approach is that each level backs in the supply chain the volatility of demand increases while forecast accuracy decreases. As a result, manufacturer and retailers have excessive inventory on many items while they experience stock-outs of others.

Another weakness of the traditional food retail supply chains is their slow reaction to new demand trends. If a particular product suddenly starts to sell out in stores, replenishment order goes to retailer’s distribution center but not further. First after the minimum inventory level is reached an order is placed with the manufacturer. Manufacturers deliver order from their distribution center inventory until they reach their reorder point. After that, planning of new production is initiated. Traditional supply chains do not communicate consumer demand trends which results in under supply of fastest moving items (Sabath, 1998).
3.1.3 Information sharing between retailers/wholesalers and manufacturers

Information availability and communication can be considered as the basic strategy to deal with the uncertainties in supply chains. Thus, the role of inter-organizational information sharing is both to improve efficiency in order to reduce transaction costs and to facilitate inter-organizational information sharing that leads to additional transaction-processing efficiencies and/or brings a higher level of service. A significant feature of buyer-supplier relationship is the quantity and type of shared information. On the other hand, how much information can be shared is a critical issue. There can be many reasons for why companies do not share information, for instance concerns of security, privacy and intellectual property. Additionally, information sharing requires significant investments so the benefits from obtaining or sharing information must be greater than the costs occurred (Li et al. 2006).

Li et al. (2006) have identified three levels of information sharing between organizations such as (1) **transactional** (order quantities, prices, sales, product specifications, quality and delivery specifications), where information technology is used to automates the routine transactions, (2) **operational** (inventory levels, costs and schedules, production and transportation capacities, lead times and shipments), where the operational data are shared only between two nearest members, buyers and sellers, at each stage in supply chain and (3) **strategic** (point of sales information, real-time demand, understanding of market trends), where one company owns the proprietary information while the other members can use the information for gaining their strategic benefits.

Based on the type of information exchanged there are three levels of information sharing. The sharing of transactional information can be considered as **minimal information sharing** as they are public information that can be obtained via search. The sharing of operational information is **partial information sharing** as the company only uses information from the nearest partner. The sharing of strategic information can be thought as **near-complete information sharing** as it encompasses very sensitive information shared among all members (Li et al. 2006). Cachon and Fisher (2000) distinguished two level of information sharing; **traditional information sharing**, where the manufacturer only can observe retailer’s orders and **full information sharing**, where the manufacturer has immediate access to the retailer’s inventory data.
Gavirneni et al. (1999) concluded that manufacturers’ ability to respond to the knowledge of the retailer’s actual inventory level determines the level of benefit from information sharing. Furthermore, Kulp (2002) found that it is also *information precision* (the level of detail of the shared information; either on regional warehouse level or store level) and *reliability* (how easily the manufacturer capture and use the shared information) influences the benefits from the information sharing. O’Reilly (1982) concluded that when information used is timely, accurate, and reliable than any decision made tends to be a good one. Furthermore, it is accessibility, rather than quality of information that determines frequency of information use.

Additionally, according to Cachon and Fisher (2000), information sharing has an essential value for when the demand is unknown, for example, early sales of new products or established products on promotion. Under these conditions, information sharing can improve the ability of manufacturer to identify demand shifts. On the other hand, Gavirneni et al. (1999) stated that information sharing is of great value when capacity is not restrictive; it means that the system has enough capacity to respond to the information.

### 3.1.4 Traditional system without information integration

In traditional systems, demand is forecasted by manufacturers and retailers independently. It means that the retailer’s uses the demand to determine the order quantity to buy while the manufacturer uses the demand to select the quantity to produce (Kulp, 2002). In the traditional system (see *Figure 3.2*), the manufacturer receives only orders from retailer (Yao and Dresner, 2008).

![Figure 3.2: Traditional system without information integration](image)

### 3.1.5 Gaps in the information integration

**Incompatibility of information systems**

According to Kinsey (2000), the integration of information systems could be beneficial if more food retailers and manufacturers were participating in the same or similar system.
Specifically, the more retailers provide their sales data to manufacturers, the better the manufacturers can schedule their production and the more efficient internal operations can be achieved. Consequently, the more efficiently the manufacturer manage their production lines, the lower are their costs and the lower are their selling prices to retailers and, finally, to end-consumers.

However, the fact is that smaller businesses have neither enough resources nor the inclination to invest in business-to-business systems, as stated by Katz and Shapiro (1994). As a result, expectation of majority of retailers regarding usefulness of implementation of information technologies is low, and the price is high. Another issue is the compatibility of the hardware and software that retailers and manufacturers may have since the prerequisite for developing a relationship that require electronic communication is the ability of computer systems to communicate with each other. Thus, according to Katz and Shapiro (1994), if the food retailers were to succeed at reduced costs in the distribution channel, it would need to coordinate its efforts and to induce the smaller businesses to join the network. Furthermore, it is crucial to convince them that their participation in the system will result in reduction of their costs and provide compatibility that would make the initial investment cost and ongoing service fees lower.

Coleman (2000) cited in Kinsey (2000) suggested that this can be solved by sponsoring the network and to encourage others to joint it. Larger users can enable to smaller users a free access to the system. But the net gain to the larger users will still be greater than the costs. Alternative option is that the large users can offer an “open system”, where the third parties are allowed to supply components to the sponsor’s system on a fee basis. The program supporting the latest option is known as Uniform Code Council Net (UCCNet). As a result, both vertical and horizontal business relationship can be established between retailers and/or retailers and manufacturers who agreed to long-term partnership and to adoption of compatible hardware and software systems.

The issue of compatibility can be solved through World Wide Web (Internet) which provides an ideal place to enable seamless communication between software systems of various retailers/wholesalers and other systems of numerous manufacturers (Coleman, 2000 cited in Kinsey, 2000). Another alternative for facilitating of information sharing is EDI that enables, for example, CRP or VMI. There are two EDI transactions, such as Product Activity Record
(PAR) and Purchase Order Acknowledgment (POA). Both are referred to as Uniform Code Council standards (UCS). The PAR transaction includes sales and inventory information, such as inventory-on-hand, inventory-on-order, committed inventory, and back orders. It is provided by the retailer to the manufacturer typically on a daily basis. While the POA transaction is sent from the manufacturer to the retailer and contains information about the product numbers and quantities ordered by the manufacturer on the retailer’s behalf (Yao and Dresner, 2008).

Figure 3.3 below shows the transmission of point-of-sale (POS) data through UCCNet to food manufacturers or to wholesalers in real time (dash lines). Consequently, they can deliver the right amount of products and at the right time to the retailers’ store and keep the shelves well supplied without building an inventory anywhere along the supply chain (solid lines).

![Figure 3.3: Business-to-business partnership](Source: Kinsey (2000, p.1126))

**Cost of information integration**

The level of the stock is often determined by the upstream members of the supply chain as they have usually access to less information than the downstream members about market demand. In order to succeed as a supply chain it is crucial that the better-informed downstream members of the chain share their demand information effectively and efficiently with the less-informed upstream members (Chu and Lee, 2006).

Furthermore, Chu and Lee (2006) claim that effective information integration allows a supply chain to generate a higher supply chain profit. On the other hand, information integration
often includes cost. If the informed member solely bears the full costs of information integration and if there is no system to distribute the earned profit that is generated through the information sharing to the informed member, then there is no incentive for the informed party to share information with the uninformed member. In fact, retailers admit that information integration with manufacturers can offer them some savings, but many retailers are doubtful about benefits for their firms in providing additional information for manufacturers (Clark and Hammond, 1997).

Chu and Lee (2006) claim that costs represent the main hinder of information integration. They concluded that the retailers’ decision wheatear or not reveal the information to the manufacturer depends on two factors; the cost of revealing the information, and the nature of the market demand. Regardless of the type of market demand, the retailer prefers to withhold the demand information from the manufacturer if the cost of information integration is large. On the other hand, when the cost of information integration is smaller, the retailer is prepared to reveal the information to the manufacturer if there is a high market demand, but will withhold the information if the market demand is low. The reason is that the retailer bears no overstock cost, and thus would like the manufacturer to stock as much inventory as possible. If the retailer is aware of high demand, then he wants to make sure that the manufacturer receives the demand information correctly and consequently keep a higher level of inventory. If the retailer knows that the demand will be low, then there is no incentive to reveal the information to the manufacturer. Chu and Lee (2006) concluded that there is a cutoff value of market demand that divides these two situations. Generally, to facilitate information integration, reduction of costs of information integration and increase the profit margin of either the retailer or the manufacturer (or decreasing their costs) is crucial.

As the manufacturer is likely to make better inventory level decisions and thus attain higher expected profits under the condition that better information about the market demand can be obtained. Then the manufacturer has a motivation to help to decrease the cost to the retailer of revealing the information. Retailer’s cost reduction of revealing the information can be achieved through the implementation of information technology (IT) with appropriate system integration. It also can contribute to encourage information integration. IT enables many supply chain practices. However, investment in IT has to be economically reasonable. It is suggested that the manufacturer could share part of the IT implementation costs in order to decrease the retailer’s cost (Chu and Lee, 2006).
Additionally, Chu and Lee (2006) concluded that some information is more expensive to reveal than others. It is recommended to use the least costly information if they are various types of information serving the same purpose. For instance, to share aggregated data is often less costly than to share point-of-sales (POS) data. Therefore, if aggregated data are sufficient for a specific purpose, the sharing of POS information is unnecessary. In general, the incentives for the downstream members of supply chain to reveal information will increase if the cost of revealing information is reduced. Consequently, the upstream members get a better chance of receiving valuable information from the downstream members. Chu and Lee (2006) found that lower operating cost facilitates information sharing. For that reason, the upstream members are encouraged to develop lean business processes to decrease internal operating cost. Doing so, it may motivate downstream members to voluntarily share information with their upstream partners. Finally, different types of information shared have different impact on decisions made upstream. Additionally, the incentive of downstream members to information integration is likely to depend on the type of shared information.

3.2 Consequences of gaps in information integration for manufacturers

**Higher transactional and inventory costs**

The information asymmetry between the participators in supply chains represents a significant problem. The manufacturer do not have access to perfect demand information, similarly, the retailer/wholesaler do not have sufficient information on supply. This information asymmetry results in uncertainties and inefficiency which have impact on inter-organizational information sharing resulting in higher transaction-processing costs, inventory costs and lower service level (Li et al. 2006).

**Demand distortion – The Bullwhip effect**

Lee et al. (2004) stated that to achieve coordination across supply chain it is crucial to manage information flows among members of supply chain. It has direct impact on production scheduling, inventory control and delivery plans of members in the supply chain. If the retailer pass along the information to the manufacturer in form of orders instead of retailers’ sales it leads to the systematic distortion in demand information. The demand distortion occurs as the retailer’s orders do not coincide with the actual retail sales. As a consequence, it can mislead upstream members in their inventory and production decisions. More specifically,
the variance of orders can be larger than variance of sales, and the demand distortion is likely to increase as one move upstream – this phenomenon is called *bullwhip effect*. The implications of the bullwhip effect are serious. For instance, excess raw material costs for manufacturer, additional cost related to excess capacity, inefficient utilization and overtime, excess cost for warehousing and additional transportation costs. Lee et al. (2004) identified four sources of the bullwhip effect; (1) demand signal processing, (2) rationing game, (3) order batching and (4) price variations.

**Demand signal processing**

Distortion of demand information occurs when the retailer send orders to the manufacturer that are based on retailer’s updated demand forecast. Consequently, the manufacturer is not aware of the true demand in the marketplace. The production scheduling based on such distorts signals become inefficient.

To overcome this distortion effect, the manufacturer should have access to the demand data at the retailer. Electronic data interchange systems between retailer and manufacturer provide a good solution as these systems provide quick and easy transmission of demand data to upstream members of the supply chain. However, access to the data for forecasting purposes is only a part of the solution as the different forecasting methods can still lead to higher variances in ordering and demand distortion. Thus, to eliminate the bullwhip effect, it is recommended to have a single member of the supply chain who will carry out forecasting and ordering for the other members. Multi-echelon centralized inventory control system can be implemented (Clark and Scar, 1960). Systems such as Vendor-managed-inventory (VMI) or Continuous Replenishment Programs (CRP) proved to be efficient due to their ability to consolidate information processing. VMI is recommended especially for grocery industry (Crawford, 1994). Shortening of replenishment lead-times also contributes to elimination of the bullwhip effect (Fisher, 1994 cited in Lee et al. 2004).

**Rationing game**

Rationing game occurs when the retailer can unrestrictedly decide on order quantities, free returns and generous order cancellation policies. Additionally, gaming can arise as a consequence of retailer’s self-protection against imaginary shortage as opposite to real
shortage. The nonproductive gaming can be avoided if the manufacturer shares information about production and inventory with downstream members of the supply chain. Furthermore, it can be decided on different rules of allocating supply for retailers in a situation of shortage. A solution could be to allocate the supply in proportion to the retailer’s market share in the preceding period (for example, retailer’s share of total sales of the product) (Lee et al. 2004).

**Order batching**

Order batching is routinely used by retailers as they are constantly trying to gain savings in pricing (through volume discounts) and transportation. Order batching arises as a result of the periodic review process and the processing cost of a purchase transaction.

In order to alleviate the demand distortion caused by the periodic review process, the manufacturer should have access to sell-through data and/or inventory data at the retailer. This information will be used by the manufacturer for production scheduling that is based on sales rather than orders. Ordering costs and batch size can be reduced by employing EDI-based order transmission system. Furthermore, third party logistics providers are able to take advantage of scale economies as they can create a full truckload through order consolidation from geographically close retailers (Lee et al. 2004).

**Price variations**

The frequency and the depth of manufacturer’s promotions (for example, wholesale price discounts) causes another source of bullwhip effect. Retailers/wholesalers want to benefit from the discount offered during a short period of time. As a consequence, the manufacturer experiences uneven production scheduling, unnecessary inventory expenses and distort demand information.

As a solution, the manufacturer may continue with the high-low pricing strategy, but instead coordinate purchase and delivery schedule. It means that the manufacturer and the retailer/wholesaler can sign a purchase contract according to which the retailer/wholesale is allowed to purchase a large amount of goods at a discount under condition that the goods will be delivered in multiple time points evenly dispersed. Doing so, the manufacturer can
schedule production more efficiently, the retailer/wholesale can apply strategic buying practice and both parties can reduce their inventory carrying costs (Lee et al. 2004).

To summarize, to alleviate the bullwhip effect the combination of sell-through data, exchange of inventory status information, order coordination and simplified pricing methods are recommended. The manufacturer can easily respond to retailer order patterns and improve forecasting of future demand. Therefore, sharing information related to replenishment allows for reduction of retailers’ stock-outs, manufacturers’ stock-outs and directly increase profit margins. Additionally, to share information about consumer preferences should help the manufacturer to develop products that better meet customers’ requirements.

On the other hand, sales data and inventory data have been traditionally proprietary to retailers with no responsibility or reason to share it with others. But the prerequisite for mitigating the bullwhip effect requires that the manufacturer get access to these data. Theory suggests that the net profit from efficient supply chain coordination should be redistributed among members (Lee et al. 2004).

3.3 How to alleviate gaps in information integration?

3.3.1 Integrated food retail supply chains

The major characteristic of an integrated food retail supply chains is that they are linked organizationally and coordinated with information flows, all the way from raw material to on-time delivery of finished products to end-customer. To facilitate co-ordination of supply chain activities, business relationships based on partnership between supply chains members are established. The whole supply chain is connected through information about expected and actual demand, supply and movement. This information is utilized in order to co-ordinate activities of supply chain partners. All partners have access to business planning, forecasting, point-of-sale information, inventory status and other information necessary to coordinate the flow of products (Sabath, 1995).

According to Kulp et al. (2004), working as a partners rather than only transferring information between supply chain members generates the greatest benefits. The integration between retailer and manufacturer result in the ability of the supply chain to faster respond to
end-customer demand through improved production scheduling, enhanced inventory management and improved product and services. Martin et al. (2006) suggest that if the replenishment system among members in the supply chain would be connected and each mode in the supply chain was working off the same plan, lost sales, excess inventory, wasted resources and unnecessarily high costs could be eliminated.

As stated by Bell and Cuthbertson, (2003), the nature of integration between retailers and manufacturers depends on a range of factors. One of the most significant factors is the nature of the products sold. Pourakbar et al. (2009) define the main features of the fast moving consumer goods (FMCG) as high turnover and relatively low cost. The profit margin made on these products is small; however, the large amounts that are sold can yield a substantial cumulative profit. Improvement in service level and reduction in lead time will result in lower cost and improved quality. The challenge for manufacturers and retailers of FMCG is, thus, to efficiently manage the flow of stock and information through the supply chain from manufacturer to retailer in order to meet customer requirements more effectively.

3.3.2 Information integration systems

In order to achieve a more efficient food supply chains, retailers and manufacturers started to collaborate and promoted electronic exchange of consumer sales data and inventory management information, known as efficient consumer response (ECR) (Yao and Dresner, 2008). The Efficient Consumer Response Working Group identified possible cost savings through improved communication between business partners in four strategic areas; product assortment, new product introduction, promotion and replenishment (Vergin and Barr, 1999). Other systems are collaborative planning, forecasting, and replenishment (CPFR), vendor-managed inventory (VMI), and continuous replenishment planning (CRP). The implementation of these integrated systems results in changes in industrial structures and enhancement in company performance. These systems enable to reengineer supply chain through real-time information sharing as the manufacturer no longer monitors end-customer demand through the retailer’s order quantities but determines it directly from the end-customer (Yao and Dresner, 2008).

The above mentioned integrated systems presuppose that individual food chains establish an electronic data interchange (EDI) system with their suppliers (either manufacturers or
wholesalers) to facilitate a continuous electronic flow of product movement information to manufacturers who can assure a continuous flow of product to the stores, just in time to replace the decreasing inventory. Doing so, stock-outs can be avoided at the retailer and production can be smoothed out at the manufacturer. Consequently, building of en excessive inventory at manufacturer’s warehouse or wholesaler’s warehouse can be prevented (Kinsey, 2000). Below follow descriptions of five integrated systems, such as Integrated Information Sharing (IIS), Continuous Replenishment Planning (CRP), Vendor-Managed Inventory (VMI), Collaborative Planning, Forecasting, and Replenishment (CPFR) and Scanned-Based Trading (SBT).

a) Integrated Information Sharing (IIS)

In this collaborative program, the retailer agrees to share demand and inventory status in real-time with the manufacturer (Lee et al. 2000). In integrated information sharing (IIS) program the manufacturer no longer needs to monitor end-customer demand through the retailer’s order quantities but determines it directly from the end-customer, although the manufacturer still obtains orders from the retailer as the retailer is responsible for placing orders (Yao and Dresner, 2008).

b) Continuous Replenishment Planning (CRP)

Continuous Replenishment Planning (CRP) is built on the partnership between supply chain members that alters the traditional process from the generating purchase orders based on economic order quantities to the replenishment by the manufacturer based on actual and forecast data. The main goal of the CRP is to decrease the cost related to producing and moving products through the manufacturer – retailer supply chain (Vergin and Barr, 1999). Yao and Dresner (2008) pointed out that CRP demands the manufacturer to link the continuous replenishment process with the retailer and accordingly increase the frequency of replenishments. Furthermore, in CRP system, manufacturers and retailers share inventory data in order to increase frequencies of replenishment and reduce inventories for both partners. The purpose is that all levels of the supply chain operate with better knowledge of downstream inventory status. This allows for a synchronization of product flow from the manufacturer through point of sale. It is expected that the benefits will increase to all the participants in the CRP process. Retailers decrease their ordering costs through passing the
inventory management function to the manufacturers. The reduced ordering cost allows for more frequent deliveries and, thus, smaller cycle inventories. Faster information flow from retailers regarding sales enables more efficient production and quick adjustment to demand changes. Consequently, inventory deficits or excesses can be avoided. This should provide opportunity for both manufacturers and retailers to reduce their safety stock inventories and at the same time eliminate stock-outs. Enhanced warehouse productivity, reduced transportation costs, less redirection of product from location to location as well as less damaged product are the main benefits (Vergin and Barr, 1999).

Additionally, Vergin and Barr (1999) found that CRP provides significant reductions in inventories and stock-outs. However, they also concluded, that the manufacturers did not take advantages of all the potential internal supply chain benefits. To capture these benefits it is required to develop more integrated CRP processes.

Below are the key factors for to succeed in implementing CRP (Vergin and Barr, 1999):

- All business functions should be linked into a seamless processes with effective measures such as total system cost reduction, efficiency and profitability
- Cross-functional teams should identify the key business processes to enhance the overall flow and meet customer requirements
- Corporate culture that continuously invest in education and training at all levels should be supported as well as development of new performance measures

Finally, CRP represents a real “paradigm shift” from the rival relationships in the food supply chains to the environment that encourages creative partnerships. However, many companies have established changes as an extension of a traditional system. This can be observed at companies which implemented CRP because their customers demand it. Instead of making significant changes in their organizations, they usually make only an “add-on” to the existing distribution and planning systems. Generally, the factors that prevent more extensive implementation of CRP are issues such as unwillingness to alter traditional business practices; inability to become involved in a win-win partnership and finally lack of commitment across the entire organization to change the way of doing things (Crawford, 1994 cited in Vergin and Barr, 1999).
c) Vendor-Managed Inventory (VMI)

With Vendor Managed Inventory (VMI) system, manufacturer is given permission from the retailer to manage inventories at retailer’s location (in addition to information sharing and more frequent replenishments). The purpose of this close collaboration between manufacturers and retailers is to rationalize inventory in the supply chain. With VMI, the retailer no longer sends orders to the manufacturer, but the manufacturer is responsible for the ordering decision on behalf of the retailer. The shared information received from the retailer provides the basis for the ordering decision (Yao and Dresner, 2008). The manufacturer determines both the order and the production quantities. He observes the retailer’s inventory and/or sales information as a substitute for consumer demand and utilizes this data for production and delivery planning. The benefits from the VMI system depends on the information the retailer provide to the manufacturer. The level of detail of the information may vary. For instance, some retailers transmit their regional warehouse inventory information to the manufacturer while others share sales and inventory information on store level. The latter type of information gives a more accurate picture about the actual end-customer demand. The final success of the VMI is affected by the level of detail with which the retailer decides to disclose internal accounting information to the manufacturer. Moreover, the manufacturer’s ability to properly capture the information provided by the retailer is also crucial. Otherwise, the information is useless if the manufacturer can’t incorporate it in his decision making. Thus, in order to take full advantage of the VMI system, the retailer and the manufacturer should make sure that the sales and inventory information provided by the retailer is as accurate as possible and also that the manufacturer has ability to receive and utilize this information correctly (Kulp, 2002). Waller et al (1999) studied VMI in retail supply chains and concluded that benefits of this system are very convincing, particularly in inventory reduction without impacting customer service levels.

According to Kulp (2000), to select a information integration system, the manufacturer compares the profit made with a traditional system and that with a VMI system. In the traditional system, the retailers use more accurate demand signal in order to determine the order quantity, but does not take into the consideration the total supply chain costs. In the VMI system, on the other hand, the manufacturer decides the production and order quantity based on total supply chain costs and/or less reliable demand information. Kulp (2002) concluded that VMI systems do not automatically result in higher profits compared to
The success of VMI depends more likely on the choices made by both partners regarding the information properties. In case the manufacturer obtains information from a fairly inaccurate or unreliable system, than it can be concluded that the traditional system generates higher expected profits.

The Figure 3.4 below illustrates the sequence of related activities of both the traditional and the VMI. They differ in the way the retailer communicates information to the manufacturer. In the traditional system the demand signal is not directly revealed by the retailer to the manufacturer. Specifically, the manufacturer does not get a signal from the retailer before the production is initiated.

Conversely, the VMI system includes communication. The retailer provides the demand signal directly to the manufacturer and he produces and delivers in accordance with the transmitted signal. It is assumed that the retailer sends the information correctly. The contract signed between parties ensures that using the VMI system will not cause the retailer any harm. To provide the manufacturer with inaccurate information would mislead the manufacturer in determination of the order quantity; resulting in a suboptimal order quantity and higher inventory costs. Therefore, it is in retailer’s interest to provide the manufacturer with correct information about the demand signal (Kulp, 2002).

**Traditional system without information integration**

- Contract signed
- Produced by Manufacturer
- Ordered by Retailer based on signal
- Delivered to Retailer
- Consumer demand realized

**VMI System**

- Contract signed
- Signal sent to Manufacturer
- Produced by Manufacturer
- Delivered to Retailer
- Consumer demand realized

*Figure 3.4: Model Timeline of Traditional and VMI systems*  
*Source: Kulp (2002, p.657)*
d) Collaborative Planning, Forecasting, and Replenishment (CPFR)

Collaborative planning, forecasting, and replenishment (CPFR) system is applied by the manufacturers and the retailers that are using scanner data to forecast future sales, to share their forecasts and agree on delivery of products on a prearranged schedule. The CPFR system enables to transmit scanner data in real time to manufacturers/wholesalers through an Internet interface. Manufacturers/wholesalers are responsible to observe the flow of sales and to adjust the agreed deliveries to maintain the shelves stocked. The main precondition to the successful implementation of the CPFR is the development of a compatible electronic system and relationship based on trust between the manufacturer and the retailer (Blair, 1999 cited in Kinsey, 2000). Anthony (2000) stated that this system can be used to reinforce additionally the overall supply chain visibility and management as the manufacturers and retailers jointly work to develop sales forecast and agree to parameters of acceptable variances. Specifically, the point-of-sale (POS) data is followed against the joint forecast. In case the variances surpass the agreed upon tolerance levels, both manufacturers and retailers are informed and an appropriate action can be taken. Close collaboration between the supply chain partners is crucial to proactively manage the inventory replenishment processes in order to reduce inventory levels across the supply chain.

e) Scan-Based Trading (SBT)

Scan-based trading (SBT) differs from the CPFR system in the ownership of the products in store. In SBT system, the products stay in the possession of the manufacturer until they are sold. Direct Store Delivery (DSD) suppliers are manufacturers that delivery their products directly to the retailer’s store and place it on the shelves. To streamline the replenishment process and to reduce the inventory in the system, SBT between DSD manufacturers and large retailers has been introduced (Weinstein, 1999). This system is applied for product that have a relatively short average shelf life and higher turnover than products delivered from wholesalers. The advantages of the SBT system are that the manufacturer receives real-time information from the store’s scanner data. This facilitates the monitoring of product movements and the replenishment process which result in increase of sales. The advantage to the retailer lies in not owning the inventory until it is sold. Doing so, less capital is tied up in inventory and at the same time the working capital between the time of the sale and the time the bill is due is higher. It enhances retailer’s cash flow and return on assets (Blair, 1999 cited in Kinsey, 2000).
a) Integrated Information Sharing (IIS)

The dash lines illustrate information flow
The solid lines indicate physical goods flow
The thicker solid lines show increased replenishment frequency

Adapted from: Yao and Dresner (2008, p.362)

Figure 3.5: Information and physical goods flow in the IIS, CRP, VMI, CPFR and SBT systems

Information integration between retailers and manufacturers in Swedish food retail supply chains
3.3.3 Summary of the information integration systems

The Figure 3.5 shows a descriptive comparison of information flows and physical goods flow in the above described systems. In the IIS, the manufacturer has access to information about real customer demand through POS data. However, the retailer still places orders. In the CRP system, the manufacturer links the continuous replenishment process with the retailer to increase the frequency of replenishments. Manufacturers and retailers share inventory data. With the VMI system, manufacturer is given permission from the retailer to manage inventories at retailer’s location (in addition to information sharing and more frequent replenishments). In the CPFR system, scanner data are used by the manufacturer and the retailer to forecast future sales, to share their forecasts and agree on delivery of products on a prearranged schedule. In SBT system, products are delivered directly to the shelves in retailer’s store and they stay in possession of the manufacturer until they are sold.
### 3.4 Summary of the theoretical framework

The following *Figure 3.6* summarizes the theoretical framework presented in this chapter.

#### 3.1 Gaps in information integration from manufacturers perspective

<table>
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<tbody>
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<tr>
<td>- Owns distribution centers for their stores</td>
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<tr>
<td>- Purchase directly from manufacturers</td>
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<tr>
<td><strong>Third party wholesalers:</strong></td>
</tr>
<tr>
<td>- Buy products from manufacturers and resell to retailers</td>
</tr>
<tr>
<td><strong>Direct Store Delivery (DSD):</strong></td>
</tr>
<tr>
<td>- Manufacturers deliver directly to stores/on shelves</td>
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</tbody>
</table>

#### 3.1.2 Information integration in traditional food retail supply chains (3, 4, 5, 6, 7, 8, 9)*

- Use inventory buffers to smooth product flow and response to volatile demand
- Do not communicate consumer demand trends
- Slow reaction to new demand trends
- Excessive inventory, stock-outs
- Under supply of fastest moving items

#### 3.1.3 Information sharing between retailers/wholesalers and manufacturers (10, 11, 12, 13, 14, 15)*

- Is crucial when demand is unknown, volatile
- Is reasonable when production capacity is unrestricted
- *Minimal information sharing*: transactional information
- *Partial information sharing*: operational information
- *Near-complete information sharing*: strategic information
- Information precision (store/warehouse level)
- Information reliability (the ability of manufacturer to capture and use the information)

#### 3.1.4 Traditional system without information integration (16, 17, 18)*

- Manufacturers receive only orders from retailers

#### 3.1.5 Gaps in information integration between retailers/wholesalers and manufacturers (19, 20, 21)*

- **Incompatibility of information systems:**
  - Lack of resources to invest in B2B systems
  - Compatibility of hardware and software between manufacturers and retailers
- **Cost of information integration:**
  - Cost of revealing information to manufacturers is a main hinder for information integration
  - If the cost is too large, retailers withhold the demand information
  - If the cost is small, retailers reveal demand information if the demand is high but withhold if the demand is low
  - Implementation of IT systems reduces these costs and encourage retailers to share information
3.2 Consequences of gaps in information integration for manufacturers (22, 23)*

- **Higher transactional and inventory costs:**
  - Information asymmetry between manufacturers and retailers

- **Demand distortion – The Bullwhip effect:**
  - Demand signal processing: manufacturers receive order instead of sales information which leads to inefficient production scheduling
  - Rationing game: retailers can unrestrictedly decide on changes in order quantities, free returns and order cancellations
  - Order batching: retailers gain savings through volume discounts which leads to distortion of demand information for the manufacturers
  - Price variations: manufacturers promotions (wholesale discounts) disturb production and delivery planning

3.3 How to alleviate gaps in information integration?

3.3.1 Integrated food retail supply chains (24)*

- Organizationally linked
- Coordinated through information flow
- Partnership between supply chain partners
- All partners have access to business planning, forecasting, POS data, inventory
- Improved production scheduling, inventory management and products
- Faster respond to customer demand

3.3.2 Information Integration Systems (25)*

a) **Integrated Information Sharing (IIS):**
  - Manufacturers have access to real-time customer demand information (POS)
  - Retailers still place orders with manufacturers

b) **Continuous Replenishment Planning (CRP):**
  - Manufacturers link the replenishment process with retailers
  - Manufacturers and retailers share inventory data

c) **Vendor-Managed Inventory (VMI):**
  - Manufacturers have permission to manage inventory at retailers´ location

d) **Collaborative Planning, Forecasting, and Replenishment (CPFR):**
  - Manufacturers and retailers jointly forecast sales, agree on delivery schedule

e) **Scan-Based Trading (SBT):**
  - Manufacturers delivery direct to store shelves,
  - Products are in possession of manufacturers until they are sold

Note: * Indicates a number of related interview question in interview guide (see Appendix 2)

Figure 3.6: Summary of the theoretical framework
4. Empirical findings

This chapter starts with presentation of case companies followed by description of empirical evidence. The empirical evidence has the same structure as presented in the theoretical chapter. Specifically, gaps in information integration between retailers/wholesalers and manufacturers has been described at each case company in terms of method of managing food retail supply chain, information integration, information sharing between retailers/wholesalers and manufacturer, systems for information integration and gaps in information integration between retailers/wholesalers and manufacturer and how to alleviate these gaps. Finally, summary of the empirical evidence has been developed.

Figure 4.1 illustrates that in order to provide answers on the research questions empirical evidence was gathered from three case companies; Lundachark AB, Pärsons Sverige AB and KLS Ugglarps AB.

<table>
<thead>
<tr>
<th>Research questions</th>
<th>Empirical evidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. From manufacturers’ perspective, where are gaps in the information integration between Swedish retailers/wholesalers and manufacturers?</td>
<td>Case company A: Lundachark AB</td>
</tr>
<tr>
<td>2. What are consequences of these gaps for manufacturers?</td>
<td>Case company B: Pärsons Sverige AB</td>
</tr>
<tr>
<td>3. How can be alleviated the identified gaps?</td>
<td>Case company C: KLS Ugglarps AB</td>
</tr>
</tbody>
</table>

Figure 4.1: Connection between research questions and empirical evidence
4.1. Case company A – Lundachark AB

**General information**
Lundachark AB is a meat manufacturer founded in 2002 with production site located in Lund. Number of employees in 2010 is 10, annual sales are estimated at 12 mil. SEK and product assortment comprises of 10 different types of sausages. Lundachark’s main principle is product quality. Their first product is so called “LunnaMellen” which became immediately a great success and is today considered as a well known and sought-after product in Lund region. The plant equipment is modern and production fulfills environmental requirements as well as international standards such as Hazard Analysis and Critical Control Point (HACCP) which is a systematic preventive approach to food safety ([www.lundachark.se](http://www.lundachark.se), 2010-04-12).

The following information is based on interview conducted 2010-03-24 with Sveinn Vilhjalmsson, sales manager at Lundachark.

Lundachark’s products are delivered to 120 customers; 40 out of the 120 customers represent petrol stations, fast food stands, restaurants and sports grounds which represent. Furthermore, an significant customer segment are 80 retail stores located in Southwest Sweden that are part of the four main Swedish food retail supply chains, specifically ICA, KF, Axfood and Bergendahls ([Interview with Sveinn Vilhjalmsson, sales manager, 2010-03-24](http://www.lundachark.se)).

4.1.1 Gaps in information integration at Lundachark AB

**Method of managing food retail supply chain**
Lundachark’s products are delivered from production site directly to retail stores. However, it is only in the 4 largest stores out of 80 there the products are not only deliver to the store but placed on the shelves by Lundachark’s employees. As Lundachark AB uses its own truck for distribution it is important to achieve efficiency through distribution scheduling based on close geographical location of retailers. Deliveries are scheduled on day after retailer has placed order.

**Information integration between retailers and Lundachark AB**
All products are made to order at least two times a week so they don’t have any stock at production site. Inventory buffer or any other inventory is not used to smooth production,
instead additional personnel are hired or overtime work is scheduled. The reason for not using inventory is short durability (max 4 weeks) of their products. Backorders have never been experienced as they have a sufficient order statistics from previous years which facilitates estimation of seasonal trends and variations. Based on this order statistics production can be easily planned ahead although not longer than 1 week ahead due to impossibility to stock products for longer period of time. However, if some production problems occur and order can’t be delivered on a predetermined day according to customer specification Lundachark AB is allowed to postpone the delivery to a next day. Furthermore, production capacity is flexible as there is possibility to hire additional stuff or work overtime when needed. The demand can be considered as stable except of seasonal trends and variation, nevertheless, they are predictable and possible to plan for. Information regarding end-customer demand trends and preferences is obtained regularly on weekly basis. At each product delivery to retail store, Lundachark AB employee responsible for distribution has contact with personnel at store and gets information about end-customer demand trends in terms of previous sales and anticipated future sales. This is only done through verbal contact between Lundachark AB and retailers.

**Information sharing between retailers and Lundachark AB**

Lundachark’s employee is frequently in telephone contact (one to two times per week) with retail stores (specifically, with store personnel responsible for meat products) to get known if they wish to place order or not as well as stores inventory level in shelves and how much is needed to be ordered. Prices are determined by Lundachark AB and there is no price negotiation with retailer. They keep updated regarding actual sales as their contact with retailers is very frequent and regular (one or two times a week). If it has been estimated that future sales will be higher than the actual real sales, the next delivery (one week later) will be lower in order to level out the stock at a particular retail store. Delivery specifications are agreed upon when order is placed. As rule, the delivery take place one day after order has been received by personnel at Lundachark AB by phone. Inventory level at retailers is determined also using their own data base about previous orders quantities for a respective retail store combined with verbal information from stores. Costs are fully determined by manufacturer and no price negotiation or costs control from retailers takes place. Production and distribution capacity is very flexible as they produce and deliver products at least two times a week. Production and distribution scheduling is fully adaptable to retailers needs. Lundachark AB doesn’t have access to point of sales information from retail stores in a

Information integration between retailers and manufacturers in Swedish food retail supply chains
standardized and automatic way. However, thanks to regular personal contact between manufacturer and retail stores, they are kept informed about customer demand preferences, trends as well as sales and estimated future sales. This information is shared at least once a week and is always on store level. Generally, sales manager is satisfied with the quality, accuracy and reliability of information received.

**System for information integration**

Regarding customer demand forecasting, manufacturer and retailer conduct it independently. However, it has not substantial impact on production planning and distribution scheduling since Lundachark AB have generally very good and regular personal contact or contact by phone with retailers and is, thus, well informed about end-customer demand preferences. Lundachark AB has never experienced any free returns or order cancellation. Invoices are sent to retailers twice a month and it is only paid for products that are sold to end-customer.

**Gaps in information integration**

Lundachark AB does not utilize any automatic or standardize IT systems for information exchange with retailers. Instead, frequent communication and information exchange take place through personal contact with retail store representatives and through phone contact. To invest in IT systems for information exchange doesn’t seem to be reasonable as the manufacturer is of small size and doesn’t plan any expansion. Lundachark AB has not access to any point-of-sales data from retailers provided on a standardized way (see Figure 4.2). Instead, phone contact and verbal contact are used for the purpose of information exchange in terms of order quantities, previous sales and estimated future end-customer demand.

**4.1.2 Consequences of gaps in information integration for Lundachark AB**

Lundachark AB does not offer any price discounts to retailers. The only occasion for discounts is when manufacturer organize a demonstration of its products at retail stores. This happens after mutual agreement between both parts. Even if Lundacharks production and distribution capacity is flexible, more than one demonstration per week means substantial disturbance and can’t be handled with additional personnel or over time work. For that reason, there can only take place one demonstration at time. Otherwise a stock keeping of products would be necessary which is not desirable as they have restricted stock capacity and durability of products is limited.
4.1.3 How to alleviate gaps in information integration at Lundachark AB

**Integrated food retail supply chains**

The information from retailers about order size, anticipated future end-customer demand and planned demonstration is incorporated in production and distribution planning on weekly basis. Raw material is delivered to Lundachark AB two times a week as well as the personnel is prepared to work over time if necessary so they are flexible enough to react and adjust their production quantities in accordance with retailers demand. Furthermore, as the durability of their products is limited as well as stock possibilities, the production can only be planned one week ahead.

**Information integration systems**

The following Figure 4.2 shows how the end-customer demand information (POS data) and order information is transmitted from retailers to Lundachark AB. Specifically, POS data are available only to retailers. There is no direct automatic and standardized transfer of POS data directly to Lundachark AB. However, Lundachark AB is regularly informed through retailers’ representatives in a particular store about end-customer preferences, sales of different products and anticipated future end-customer demand. The information is provided only verbally during a personal contact or through telephone contact. Regarding the physical replenishment process, products are delivered form Lundachark AB directly to retailers’ stores. In very few cases (in 4 out of 80 stores), products are placed directly on shelves by Lundachark AB employee.

![Diagram](image)

Inventory buffer

*Figure 4.2: Information integration between retailers and Lundachark AB.*

The following *Figure 4.3* summarizes empirical evidence collected at Lundachark AB.
### 4.1.1 Gaps in information integration at Lundachark AB

#### Methods of managing food retail supply chain
- **Direct Store Delivery (DSD):**
  - deliveries directly to stores, on shelves (only in 4 cases)

#### Information integration between retailers and Lundachark AB
- Made to order two days per week
- Stable demand + predictable seasonal trends and variations
- Sufficient order statistics
- No stock-outs
- No inventory buffer to smooth product flow
- Capacity problems solved through: additional personnel, work over time
- End-customer trends and preferences obtained weekly from stores verbally

#### Information sharing between retailers and Lundachark AB
- Demand is known
- Production capacity is flexible
- **Minimal information sharing:** transactional information
- **Partial information sharing:** operational information
- **Near-complete information sharing:** strategic information (except of POS data and real-time demand)
- Information is shared on store level (one or two times a week)
- Very good ability of Lundachark AB to capture and use the information – pro-activity in searching information

#### System for information integration
- Demand forecasting is conducted independently on retailers
- Lundachark AB receives only orders from retailers
- Regular personal contact
- Well-informed about end-customers trends and preferences
- No free returns or orders cancellations

#### Gaps in information integration
- No automatic, standardized IT system for information exchange is used
- Small size manufacturer, no reason to invest in for example EDI
- Frequent communication by phone or direct contact
4.1.2 Consequences of gaps in information integration for Lundachark AB

- **Higher transactional and inventory costs:**
  - Information symmetry between Lundachark AB and retailers stores

- **Demand distortion – The Bullwhip effect:**
  - Demand signal processing: Lundachark AB receives orders instead of POS
  - Rationing game: any free returns, order cancellations have been experienced
  - Order batching: no volume discounts to retailers
  - Price variations: Lundachark AB organizes demonstrations at retailers with price discounts, only one demonstration/week due to production and distribution disturbance

4.1.3 How to alleviate gaps in information integration at Lundachark AB

**Integrated food retail supply chains**
- Coordinated through information flow: order size information, anticipated future end-customer demand and planned demonstrations are incorporated in production and distribution planning
- Partnership between Lundachark and retailers, very good contact
- Lundachark AB has no access to POS data, demand forecasting is done independently
- Fast respond to retailers’ demand

**Information Integration Systems**
- Lundachark AB is regularly informed by retailers about end-customer preferences, sales of products and (no POS data and real-time demand are available to Lundachark AB) and anticipated future end-customer demand, however, demand forecast is done independently on retailers
- Retailers still place orders with manufacturers

Figure 4.3: Summary of the empirical evidence from Lundachark AB

4.2. Case company B – Pärsons Sverige AB

**General information**

Pärsons Sverige AB has been founded 1987 under name Charklaget AB and today is a Sweden’s leading manufacturer of meat for sandwiches. The company started as producer of beef and pork with direct distribution to retail stores. Later in 1994 the production of cured meat was initiated and 1997 the new trademark Pärsons has been launched. 1998 curd meat assortment became larger and was distributed directly to wholesalers. 2006 the Pärsons company has been acquired by Scan and today is part of the HKScan group (www.parsons.se, 2010-04-16).
The following information is based on interview conducted 2010-03-26 with Kent Svensson, sales manager at Pärsons Sverige AB.

Preferably, Swedish meat is used, with a few exceptions, for production of 90 product items. Production takes place at three facilities located in South part of Sweden, such as Strövelstorps and Halmstad. Pärsons Sverige AB has 180 employees and 800 million SEK in annual sales. They are part of the four major Swedish food retail supply chains; ICA, KF, Axfood, Bergendahls and international food retail supply chains operating in Sweden such as Netto and Lidl.

4.2.1 Gaps in information integration at Pärsons Sverige AB

Method of managing food retail supply chain

Pärsons products are delivered to retailers’ distribution centers with exception of very few typical seasonal products which are delivered directly to retailers’ stores as the volumes of those products are sufficiently large. It would be too costly to deliver all Pärsons products directly to retailers’ stores due to small quantities to be transported to each store. At retailers’ distribution centers Pärsons’ products are re-distributed together with products from other manufacturers to retailers’ stores all over Sweden and Denmark. Pärsons has no direct contact with retailers’ stores but only on central level with retailers’ distribution centers. It takes approximately one and half day from production to delivery of products to retailers’ distribution center. The lead time from order to delivery have to be as short as possible as their products are perishable (durability is in average four weeks). The products are not allowed to be older than 1 week when delivered to retailers’ distribution centers. For example, average durability is 20 days. Production can take maximum 3 days, the products can be stocked at retailers’ distribution center for 3 days and the remaining time of 14 days the products should be available to end-customer at stores.

Products are distributed through third part logistics provider. Doing so, an efficient and environmentally friendly transportation can be ensured.

Information integration between retailers and Pärsons Sverige AB

As cured meat products cannot be stocked for longer period of time, stock-outs can occur as result of a limited production capacity. Seasonal trends and variations are a major reason for
this phenomenon. However, Pärsons is aware of the seasonal demand fluctuation thanks to rich historical order statistics. Another factor which influence end-customer demand pattern, and is difficult to predict for, is weather. Generally, it can be concluded that end-customer demand and thus production is higher during sunny weather. Otherwise, the end-customer demand during the whole year can be considered as relatively stable. However, Pärsons is flexible enough to react on seasonal demand changes and personnel is prepared to work over time when needed.

Due to a limited durability of products they are made to order and directly send to the retailers’ distribution centers. Generally, 98 per cent service level to retailers’ distribution centers has been set up. The overall goal of the supply chains that Pärsons is part of is to achieve 100 per cent service level at the retailers’ stores so the end-customer does not experience any stock-outs. As traditional stock is not used due to short durability of majority of Pärsons products, capacity problems can occur, especially before periods of increased end-customer demand. To alleviate the capacity problems and stock-outs, a predetermined level of inventory buffer can eliminate the problems in some cases. The inventory buffer is mainly used for products that need longer production time, for example 10 weeks, and also for raw material. These products also have a longer durability. However, products that have short durability can be produced fast and thus inventory buffer is not used. Generally can be concluded that the shorter durability of products the less the inventory buffer. Here, the demand peaks can be solved through personnel working overtime. Another solution is that when demand is higher than supply, the quantities that have been produced under the condition of limited capacity are divided between retailers’ stores.

As Pärsons is connected with all retailers’ distribution centers via EDI system all information he receives is in an automatic and standardized way. According to Svensson, information accessibility is in interest of all members of the supply chain. The retailers’ distribution centers want to provide all information to manufacturer and vice versa. In most of the cases, the process of information exchange is initiated when predetermined re-order point (ROP) at point of sales is reached. A new order is automatically generated and sent from the store to retailer’s distribution center. At the distribution centre there is a predetermined level of minimum inventory buffer from which the incoming order from a particular retail store can be replenished instantaneously. The first in/last out method is used at distribution centers for replenishing of orders received from stores. It means that products are used for replenishing
orders placed by stores in the opposite chronological order in which they are delivered to
distribution centers from Pärsons (see Figure 4.4).

Even at the distribution centre a minimum reorder point (ROP) is determined. When the ROP
is reached an order is automatically generated and sent through EDI system to manufacturer.
Svensson is pointed out that even if the reorder and replenishment process is fully automatic it
is necessary to regularly check the information in system with the physical situation at store
level. Doing so, increased accuracy of the information exchanged between all parties in the
supply chain as well as contribute to elimination of wastage and loss resulting in ordering
more products than necessary. The level of the ROP is determined individually for each
product at both store level and retailers’ distribution centers level in accordance with actual
sales and predicted future sales including campaigns.

![Information Flow Diagram]

\[\text{Retailers’ store} \quad \text{Retailers’ distribution center} \quad \text{Pärsons Sverige AB} \]

\[\text{Last out} \quad \text{First in} \]

\[\text{Inventory buffer} \]

*Figure 4.4: Information integration and replenishment process between retailers’ stores, distribution center and Pärsons Sverige AB*

However, at new products, especially when there is no similar or comparable product that is
already in sale, the information availability about past sales is scarce or even non-existing. In
this case, it is difficult to predict end-customer future demand and provide this information to
the distribution centers and additionally to the manufacturer.

Information about end-customer preferences is mainly provided by retailers’ distribution
centers. Pärsons’ have no direct communication with retailers’ stores. The only way of getting
in contact and directly exchange information with stores is through 12 Pärsons’ sales
representatives. These people visit regularly retailers’ stores with occasion of demonstrating
new products. These demonstrations also provide opportunity to get information about end-
customer demand trends and preferences and this information is then communicated further to the sales manager at Pärsons. Furthermore, information about disturbances and changes in terms of orders are also discussed at retailers’ level. Based on this information including of new products into existing assortment at stores is suggested by Pärsons and negotiated with retailers’ representatives who approved or disapproved launching of new products. However, in order to get information about end-customer demand trends and preferences it is crucial for manufacturer to be very proactive and initiate contact with retailers as well as continuously come up with new products and ideas.

**Information sharing between retailers’ distribution centers, stores and Pärsons Sverige AB**

Information about order quantities is transmitted from retailers’ distribution centers to Pärsons through EDI system on daily basis. Price is determined by Pärsons but it is negotiated with purchaser at retailers. As some materials used for production of Pärsons’ products, such as packaging have to be imported, greater fluctuation of exchange rate influence the selling price. In that case, it is necessary to negotiate a price change with retailers. Usually, 12 weeks after a new adjusted price have been successfully negotiated; the new price is realized at store level. Information about sales of Pärsons’ products is communicated through the 12 Pärsons’ sales representatives that have direct contact at store level. Another source of sales information is automatic transmission of sales for the previous month. However, the sales information is provided to Pärsons only once a month retroactively. Deliveries to retailers’ distribution centers are carried out in accordance with predetermined delivery plan which can be adjusted if needed. Delivery plan consists of information about how many days per week deliveries should take place to retailers’ distribution centers. It is distribution centers that decide on delivery schedules. Generally, each delivery to distribution centers comprise of two parts; basic quantity of products for ordinary prices and additional quantity intended for to be sold for campaign prices.

There is no information sharing taking place between retailers’ distribution centers and Pärsons regarding inventory buffer levels at retailers’ distribution centers. It has to be pointed out that this information is not confidential. According to Svensson, for Pärsons this information is not necessary, however, at new products they want to have access to this information as it is useful for their production planning. Information about order quantities is considered as more important for Pärsons. Costs are determined by Pärsons, however, the final price is negotiated with retailers representatives. On the other hand, information about
production and distribution capacities as well as lead times at Pärsons are known to retailers’
distribution centers. Point of sales (POS) data or real-time demand is not available to Pärsons
on daily basis, however, once per month information about past sales is transmitted from
retailers’ stores directly to Pärsons. Furthermore, a regular contact on store level is also kept
by Pärsons 12 sales representatives. To summarize, the manufacturer has established an
automatic and standardized information exchange on daily basis only with retailers’
distribution centers and not directly with retailers’ stores.

Suddenly increased demand is possible to handle through additional personnel and over time
work. The last five to six years has Pärsons focused on producing the right quantity of
products at the right time. As a result, very few back-order or stock-outs have been
experienced.

The availability and the quality of information received from retailers’ distribution centers has
been significantly improved the last three or four years. The faster information flow enabled
achievement of shorter lead times and better demand forecasts between all partners in the
supply chains. It is too expensive to have empty shelves at stores. The type of products
delivered by Pärsons and cca 40 others manufacturers is recognized by retailers as an
attractive product group as large quantities are sold and thus a rather high profit margins can
be obtained. Thus, the retailers have understood that it is crucial to provide information
throughout the entire supply chains as well as Pärsons and other members also communicate
information to retailers. Nowadays, at retailers’ store level orders are placed based on the POS
data and inventory buffer level and not on subjective judgment as it was done before.

System for information integration
Pärsons is in regular contact (weekly or monthly) with retailers on central level. It means that
Pärsons sales manager meet retailers’ sales managers and discuss schedules for future
campaigns one year ahead which is later specified more precisely on weekly basis. Future
demand forecast at retailers’ distribution centers level both for longer and shorter period of
time is also discuss together with Pärsons. The information about competitors planned
campaigns at retailers’ store is, however, confidential.

Information about sales (POS) data is not directly sent to the manufacturer on daily basis only
once per month. This fact leads to time delay about 24 hours before the information reach the
manufacturer in form of order placed by retailers’ distribution centers through EDI systems on daily basis. Furthermore, as a consequence a inventory buffer at retailers’ distribution centers is required. Pärsons see the opportunity of getting access to POS data for making the delivery process faster. However, Svensson pointed out that it is important in order to contribute from this type of information to analyze the data correctly.

Gaps in information integration between retailers and Pärsons Sverige AB
For information sharing between Pärsons and retailers’ distribution centers an EDI system is used. It was the retailers that have decided what type of system for information sharing will be used with all the manufacturers. Thus, there have not been experienced any compatibility problems of the systems.

4.2.2 Consequences of gaps in information integration for Pärsons Sverige AB
During Pärsons campaigns at retailers’ stores which are one week long, the deliveries to stores are evenly dispersed in five days during the whole week. Doing so allows for making use of production and distribution capacity more effectively.

It has never happened that the retailers’ distribution centers decide on free returns and order cancellation. The quantities that have been ordered are accepted. On the other hand, it has occurred that the retailers’ distribution centers increased the placed order afterwards with short notice to the manufacturer. This has impact on the inventory buffer at all partners in the supply chains.

4.2.3 How to alleviate gaps in information integration at Pärsons Sverige AB

Integrated food retail supply chain
The production at Pärsons is planned weekly based on the orders and prognoses received from retailers’ distribution centers as well as on the Pärsons prescheduled campaigns at retailers’ stores. Furthermore, into the consideration when production and deliveries are planned have to be taken seasonal trends and variations which can be anticipated from the past demand and order statistics available at Pärsons. The supply chain needs to be fast as the durability of their products is limited. Furthermore, Pärsons has established various deadlines for receiving orders from retailers’ distribution centers in order to be able deliver the order at 6am the next
day. To achieve service level that has been set up at 98 per cent towards retailers’ distribution centers, an internal quality program has been established to assure that the goal will be fulfilled.

**Information integration systems**

Based on the information provided by Kent Svensson, the following Figure 4.4 represents information integration system within the supply chain the Pärsons Sverige AB is part of. The supply chain is initiated by end-customer demand at the retailers’ store. If the ROP is reached an order is automatically placed through EDI system at the retailers’ distribution center. Here, the order is delivered to store or an order is placed at Pärsons if inventory buffer has got to ROP. After that, Pärsons delivers products to the retailers’ distribution center. First in/last out method is applied for managing inventory buffer at the distribution center. Products are then delivered to the retailers’ store. Additionally, demand forecast for ordinary deliveries as well as demand forecast for campaign with Pärsons are discussed between the retailers’ representatives and the manufacturer. Once a month the past POS data from the retailers’ store are provided to Pärsons, otherwise it is only orders that are automatically transmitted through EDI system between members of the supply chain.

![Figure 4.4: Information integration system between retailers’ store, retailers’ distribution center and Pärsons Sverige AB](image)

The following Figure 4.5 summarizes empirical evidence collected at Pärsons Sverige AB.
### 4.2.1 Gaps in information integration at Pärsons Sverige AB

**Methods of managing food retail supply chain**
- Self-distributing retailers:
  - Owns distribution centers for their stores
  - Purchase directly from Pärsons

**Information integration between retailers’ distribution centers and Pärsons Sverige AB**
- Make to order
- Seasonal trends and variations, however, demand is predictable and stable
- Rich historical order statistics
- Inventory buffer to smooth production: used mainly for products with long durability
- 98% service level at retailers’ distribution centers to eliminate stock-outs
- Demand peaks solved through overtime work
- Higher demand than supply: existing quantities are divided between retailers’ distribution centers
- Information accessibility is in interest of all supply chain members
- Information is transmitted in an automatic and standardized manner
- Information about end-customer preferences is provided by retailers’ distribution centers
- Pärsons has only a limited contact with stores through sales representatives

**Information sharing between retailers’ distribution centers, stores and Pärsons Sverige AB**
- Demand is known
- Production capacity flexible
- Minimal information sharing: transactional information
- Partial information sharing: operational information (Inventory levels at retailers’ distribution centers are unknown for Pärsons, only at new products)
- Near-complete information sharing: strategic information (POS are available only once a month retroactively)
- Daily information on retailers’ distribution centers level
- Pärsons is able to capture and use the information, pro-activity to get information is crucial

**System for information integration**
- Pärsons has regular contact with retailers on central level
- Schedule for future campaign is planned jointly
- Demand forecast for longer and shorter period of time is discussed
- POS data are not directly sent to Pärsons, only available for the previous month
- Pärsons receives orders from retailers

**Gaps in information integration between retailers and Pärsons Sverige AB**
- EDI is used for information sharing between Pärsons and all retailers
- Compatibility of hardware and software between Pärsons and retailers
- Retailers have initiated implementation of an identical EDI system between all members
### 4.2.2 Consequences of gaps in information integration for Pärsons Sverige AB

- Information asymmetry between Pärsons and retailers
- **Demand distortion – The Bullwhip effect:**
  - Demand signal processing: Pärsons receives order instead of POS data
  - Rationing game: free returns and order cancellations have never been experienced; changes in order quantities up with short notice
  - Price variations: during Pärsons promotions deliveries are dispersed evenly

### 4.2.3 How to alleviate gaps in information integration at Pärsons Sverige AB?

**Integrated food retail supply chains**
- Pärsons production and distribution is coordinated through information flow
- Internal quality program at Pärsons
- Partnership between supply chain partners
- Pärsons have access to business planning, forecasting, POS data (monthly), inventory level at retailers’ distribution centers (only for new products)
- Faster respond to customer demand

**Information Integration Systems**
- Pärsons have access POS only once a moth
- Retailers still place orders with manufacturers
- Retailers and Pärsons jointly plan campaigns and discuss demand forecasts
- Pärsons receive from retailers’ distribution centers inventory levels only for new products

*Figure 4.5: Summary of the empirical evidence form Pärsons Sverige AB*
4.3. Case company C – KLS Ugglarps AB

**General information**

KLS KLS Ugglarps AB is a second largest slaughterhouse in Sweden with production sites in KLS Ugglarps outside Trelleborg and in Kalmar. The company’s annual sales are about 1.5 milliard SEK and slaughter approximately 500 000 pigs, 52 000 cattle and 20 000 sheep. KLS KLS Ugglarps AB has 400 employees. Meat originates from Swedish farms and is sold under trademarks such as SmålandsKött and KLS Ugglarps. KLS KLS Ugglarps AB invest offensively to increase the produced volumes as well as to be a long-term and stable business partner. The company is subsidiary fully owned by Danish Crown which is fourth biggest business in Denmark ([www.klsKLS Ugglarps.se](http://www.klsKLS Ugglarps.se), 2010-04-20).

The following information are based on interview conducted 2010-03-29 with Mårten Backgården, sales representatives at KLS Ugglarps.

For the purpose of this thesis, the interview has been conducted with sales representative, Mårten Backgården, at KLS Ugglarps’ AB site in Ugglarp outside Trelleborg. At this site about 250 meat items are produced which comprise of 20 different products of various forms. The facility in Ugglarp focuses only on processing of pork meat items. Their customers are the four major Swedish retailers; such as ICA, Axfood, KF och Bergendahls and also cured meat producers, altogether 100 customers.

4.3.1 Gaps in information integration at KLS Ugglarps AB

**Method of managing food retail supply chain**

KLS Ugglarps deliver their products to ICA, Axfood, KF retailers’ distribution centers. Bergendahls is the only retailer there KLS Ugglarps delivers products directly to 10 stores. For products distribution third part logistics provider Schenker is contracted. Generally, the products are delivered to the retailers’ distribution centers every second day. It takes one day to deliver products from KLS Ugglarps to the retailers’ distribution centers where the products are further processed and re-distributed to stores with products of the same type from other meat manufacturers. The lead time needs to be as short as possible as their products has a limited durability (approximately 10 days). KLS Ugglarps has no contact with these stores,
except at Bergenhals, and has no knowledge about to which stores their meat products are delivered from retailers’ distribution centers.

**Information integration between retailers and KLS Ugglarps AB**

As the meat products can’t be stocked for longer period of time than one day they had to be made to order. Thus, due to seasonal trends and variations excessive inventory on some items or stock-outs on other can occur. Additionally, for example, ICA, Axfood and KF provide KLS Ugglarps regularly with information regarding orders for the coming week. Doing so, the demand flow evenly distributed during the whole year which enhances production, distribution scheduling and also purchase of raw material. On the other hand, at Bergendahls demand flow is less even as the products are delivered directly to their stores. However, KLS Ugglarps is aware of the seasonal variations as they have rich statistics about orders from previous years.

Due to a limited durability of meat products only one day buffer inventory can be used. Furthermore, capacity is also limited as they have to plan for purchase of raw material (pigs) 12 weeks ahead and there is no way of cancellation the orders towards KLS Ugglarps suppliers of raw material. If the demand at retailers is lower than expected, the overproduction can be deep-frozen and storage for one year at Schenker’s storage in Malmö. The capacity problems are also solved through price adjustments.

Information about end-customers’ trends and preferences is provided by retailers’ distribution centers and also it can be obtain on various meetings with purchasing professionals. According to Backgården, it is mainly KLS Ugglarps which is proactive in communication with retailers in order to obtain as much relevant information as possible. Generally, there is open dialogue between the supply chains partners. If some products increase or decrease their sales, at Bergendahls the information is provided daily to KLS Ugglarps by phone contact. At the other retailers the information is available on weekly basis.

**Information sharing between retailers and KLS Ugglarps AB**

Information about order quantities is communicated on weekly basis with daily deliveries to retailers’ distribution centers or directly to Bergendahls stores. This information is transmitted with ICA and Axfood through EDI and with the others retailers in most of the cases by phone or eventually by email or fax. Prices are negotiated every third week due to frequent changes
in prices for raw material (pigs). Point of sale (POS) data are not available to KLS Ugglarps as they don’t know to which stores their products are re-distributed from retailers’ distribution centers. On the other hand, as KLS Ugglarps products are delivered directly to Bergendahls’ stores the information about order quantities to a particular store are available. But still, it is only information regarding order quantities, not sales data and as such it is not sure how much have been actually sold to end-customers and how much is wastage or loss. Quality specification is determined by retailers and if KLS Ugglarps products do not fulfill the quality requirements’ immediate feedback is received and the products are not invoiced. When there are no quality problems KLS Ugglarps get paid for all products delivered to distribution centers or to stores. The quality problem can also occur during transportation. In that case it is responsibility of the transportation company; however, retailers take always contact with KLS Ugglarps at first place. Furthermore, deliveries are planned beforehand with retailers’ distribution centers as well as with Bergendahls’ stores.

KLS Ugglarps knows that there is buffer inventory at distribution centers; however he is not aware about its levels. According to Backgården, there is no need either for this type of information. KLS Ugglarps is more interested in information about order quantities. Costs transparency is highest towards ICA and Axfood as KLS Ugglarps have to present their costs. At Bergendahls, costs do not to be shown. Information regarding production capacities at manufacturer are usually exchange when some capacity constrains occur. Retailers are always informed by KLS Ugglarps if production disturbances occur so they can purchase the products from other suppliers. Delivery schedule is determined ahead with distribution centers and stores. POS data are not available for KLS Ugglarps. The above mention information is shared on regular basis and the information is both on retailers’ distribution centers level and store level. According to Backgården, information provided by ICA is professional, accurate and they receive a good feedback. The same is valid for Axfood as well. On the other hand, information provided by Bergendahls is less professional, however, it is of great value for KLS Ugglarps as the feedback comes directly from stores and the information captures the end-customer demands and preferences.

**System for information integration**

As demand is considered as relatively stable except some seasonal trends and variations and there is a rich demand statistics from previous years, there is no need to make forecasts for longer period of time together with retailers. Furthermore, production can be plan one week
ahead as they receive weekly orders. Regarding sales of their products, the information received from Bergendahls is valuable as there is direct contact with end-customers. However, they do not obtain information about sales but about order quantities to a particular store. Regarding the others retailers, KLS Ugglarps has no information about sales at store level as they do not know in which stores their products are actually sold. Here, KLS Ugglarps has not exact information about what are the end-customers requirements as there is no direct contact with stores. However, distribution centers give KLS Ugglarps information about actual trends which also can be seen from their orders.

**Gaps in information integration between retailers and KLS Ugglarps AB**

To communicate with retailers’ distribution centers, EDI is used with ICA and Axfood. The other retailers exchange information by phone, mail or fax. According to Backgården, the telephone contact is the most used and also preferable as it allows for direct contact and a more personal relation can be developed between partners. The phone contact also contributes to more flexible managing of production flow which is crucial as the durability of their products is limited.

**4.3.2 Consequences of gaps in information integration for KLS Ugglarps AB**

KLS Ugglarps does not offer any price discount to the big retailers’ distribution centers as the price is already negotiated for in advanced determined quantity. Another reason is that there is no direct contact with retailers’ stores. KLS Ugglarps sales representatives have also contact with a few small wholesalers who are offered price discounts. At Bergendahls, price discounts are offered as there is direct contact with stores. Here, if surplus of some products occur KLS Ugglarps can offer to lower the price for that particular products.

Returns of products are quite common. The reason is often quality problems or damages occurred during transportation to the retailers’ distribution centers or to the stores. KLS Ugglarps receive discrepancy report. After the goods have been inspected, usually, no payment for the damaged products is invoiced. It also can happen that retailers increased their orders out of the ordinary weekly order quantities with short notice to the manufacturer. In that case, KLS Ugglarps try to find solution through negotiation with other retailers or customers if they are willing to lower their quantities or not.
4.3.3 How to alleviate gaps in information integration at KLS Ugglarps AB

**Integrated food retail supply chain**
KLS Ugglarps orders raw material (pigs) for a period of 12 weeks at suppliers. The raw material flow is even and cannot be stopped. The production is planned weekly as they receive orders from retailers’ distribution centers and stores on a weekly basis. Into the consideration are also taken seasonal trends and variation which can be anticipated from order statistics available at KLS Ugglarps. Daily 820 pigs are slaughtered and a certain quantity of meat is produced. What is not sold immediately is deep-frozen and stored at Schenker’s storage. The production capacity is thus quite limited due to nature of the raw material.

**Information integration systems**
Based on the information provided by Märten Backgården, the following Figure 4.6 represents information integration system between KLS Ugglarps AB, retailers’ distribution centers and stores. The information flow and the physical flow is initiated by end-customer demand at the retailers’ store. At ICA, Axfood and KF, the demand information goes first to the retailers’ distribution centers and then further to KLS Ugglarps in the form of orders. KLS Ugglarps deliver their products to distribution centers and they are further re-distributed with products from other manufacturers to stores. KLS Ugglarps has no contact with stores at these retailers and has no knowledge about in what stores are their products actually sold. KLS Ugglarps receive only orders and information about demand trends from distribution centers. POS data are not available. On the other hand, situation is different at Bergendahls. Here, KLS Ugglarps deliver products directly to the Bergendahls’ stores and has thus direct contact with end-customers. Yet, even here KLS Ugglarps receive no POS data but only orders. Additionally, he has better information about inventory levels at Bergendahls’ stores and end-customer requirements, trends and preferences, in contrary to the other retailers. To exchange information, EDI system is used with ICA and Axfood. With other retailers, communication is conducted mainly by phone and also by e-mail and fax.
The following Figure 4.7 summarizes the empirical evidence gathered at KLS Ugglarps AB.
4.3.1 Gaps in information integration at KLS Ugglarps AB

Methods of managing food retail supply chain

- **Self-distributing retailers:**
  - Owns distribution centers for their stores
  - Purchase directly from KLS Ugglarps AB
- **Third party wholesalers:**
  - Buy products from KLS Ugglarps and resell to retailers
- **Direct Store Delivery (DSD):**
  - KLS Ugglarps delivers directly to stores

Information integration between retailers and KLS Ugglarps AB

- Make to order due to limited durability
- Only one day inventory buffers can be used to smooth product flow
- Overproduction is stocked at third-party logistics provider’s storage
- Seasonal trends and variations, however, demand is predictable and stable
- Retailers (ICA, Axfood and KF) communicate consumer demand trends and weekly orders
- Bergendahls provide demand trends and sales information daily, however, no POS data
- Excessive inventory, stock-outs can occur
- Pro-activity of KLS Ugglarps to get all relevant information, open dialogue

Information sharing between retailers and KLS Ugglarps AB

- Demand is known
- Production capacity is restricted due to nature of raw material used
- **Minimal information sharing:** transactional information
- **Partial information sharing:** operational information (except of inventory buffer at retailers’ distribution centers)
- **Near-complete information sharing:** strategic information (except of POS data and real-time demand)
- Information is provided at ICA, Axfod and KF on distribution centers level and at Bergendahls on store level
- Information is provided regularly
- KLS Ugglarps is able to capture and use the information, however, production capacity is limited

System for information integration

- KLS Ugglarps receives weekly order from retailers
- POS data and sales are not transmitted to KLS Ugglarps from retailers’ distribution centers
- Sales information from Bergendahls’ stores are valuable due to direct contact with end-customer, however, no real-time demand or POS are provided
- Stable demand – no need to jointly forecast demand with retailers

Gaps in information integration between retailers/wholesalers and manufacturers

- Compatibility of hardware and software between KLS Ugglarps and retailers
- EDI used in communication with ICA and Axfod, with others phone, e-mail or fax
### 4.3.2 Consequences of gaps in information integration for KLS Ugglarps AB

- Information symmetry between KLS Ugglarps and Bergendahls’ stores
- Information asymmetry between KLS Ugglarps and other retailers (ICA, Axfood)
- *Demand distortion – The Bullwhip effect:*
  - Demand signal processing: KLS Ugglarps receives order instead of POS data
  - Rationing game: returns are quite common, however, there always is reason, for example quality issues, changes in order quantities up with short notice occurs
  - Order batching: KLS Ugglarps offers no volume discounts
  - Price variations: KLS Ugglarps offers price discounts) only to Bergendahls and few small independent wholesalers, for the others price has already been negotiated for pre-determined quantity

### 4.3.3 How to alleviate gaps in information integration at KLS Ugglarps AB?

**Integrated food retail supply chains**

- Production and distribution is coordinated through information flow, however, capacity is restricted due to nature of raw material
- Partnership between supply chain partners
- KLS Ugglarps has access to weekly orders, demand trends and inventory buffer at Bergendahls
- Weekly orders improve production and distribution scheduling
- Faster respond to customer demand

**Information Integration Systems**

- KLS Ugglarps has no access POS data or real-time demand
- Retailers place orders with KLS Ugglarps
- Retailers provide KLS Ugglarps information about demand trends and customer preferences
- KLS Ugglarps has information about inventory buffer only form Bergendahls as the contact is on store level. In contrary, the other retailers do not provide inventory information

*Figure 4.7: Summary of the empirical evidence from KLS Ugglarps AB*
5. Analysis

In this chapter analysis of the empirical evidence collected from three case companies will be conducted. Firstly, cross-case analysis method will be applied. As a result, a table will be developed comprising of the case companies and of the data categories related to the research questions. Secondly, pattern matching method will be used to compare the empirical evidence from the cases with the developed theoretical framework.

The following Figure 5.1 illustrates the way the analysis will be conducted. Firstly, cross-case analysis (I.) will be used. It allows revealing similarities and differences among the cases. Secondly, pattern matching (II.) will be conducted. Doing so enhances identifying and analyzing alternative patterns that can explain the issue of information integration, specifically, gaps in information integration, and their consequences for manufacturers as well as ways of alleviating these gaps.

![Figure 5.1: Relation between research questions, empirical evidence and theory](image-url)

Information integration between retailers and manufacturers in Swedish food retail supply chains
5.1 Cross-case analysis

5.1.1 Gaps in information integration from manufacturers’ perspective

Methods of managing food retail supply chains
Lundachark’s has annual sales about 12 million SEK. Their products are delivered by their own truck directly to stores and in four cases placed directly on shelves. This is possible as their customers (stores) are located in Southwest Sweden. While Pärsons, with annual sales about 800 million SEK, delivers their products to retailers’ distribution centers as it is more efficient since their customers’ customers (stores) are located around Sweden and Denmark. Thus their contact with stores is only limited. Pärsons carries out the distribution through third part logistics provider. In case of KLS Ugglarps, with annual sales about 1,5 milliard SEK, there is a combination of three types of delivery methods; deliveries directly to retailers’ distribution centers, deliveries to few independent small wholesalers as well as to stores. However, the main part of KLS Ugglarps products is delivered to retailers’ distribution centers. All three companies strive to achieve as short lead time as possible from production to stores or to retailers’ distribution centers as the durability of their products is limited.

Information integration between retailers and manufacturers
In all three cases, the products are made to order as their durability is very short (from ten days up to four weeks). However, some of the Pärsons products with longer durability and longer production time can be stored to be able guarantee short lead times to retailers’ distribution centers. In case of KLS Ugglarps overproduction can be deep-frozen and stored as their production capacity is dependent on the nature of raw material which has to be booked 12 weeks ahead and the flow can’t be stopped. Buffer inventory is commonly not used for smoothing production during demand peaks in any of the case companies or only in very limited range due to limited durability of products. Instead, to sufficiently react on demand peaks additional personnel is hired or current personnel work overtime. In case of KLS Ugglarps, the nature of raw material does not allow solving capacity problems during demand peaks with additional personnel or overtime work and thus an excessive inventory on some items or stock-outs on others can occur. This can be alleviated through price adjustments. On the other hand, despite of seasonal trends and variations demand can be considered in all studied cases as predictable and known due to rich historical order statistics.
This fact allows for production planning before demand peaks actually occur and thus possible stock-outs can be eliminated.

Lundachark receives information about end-customer demand trends and preferences directly from stores while Pärsons gets this information from retailers’ distribution centers. To KLS Ugglarps, this information is provided both from retailers’ distribution centers (ICA, Axfood and KF) and from stores (Bergendahls). Generally, the information regarding end-customer demand trends and preferences is provided on the level in supply chain the manufacturer has direct contact with. Furthermore, even if there is partnership between the supply chain members and they are aware of the importance of information accessibility for all supply chain members, still the manufacturers have to be very proactive in contacting their downstream partners when searching information.

**Information sharing between retailers and manufacturers**

In all three cases the demand is known or is predictable due to regular contact with retailers’ distribution centers or stores and also due to rich order statistics available. Production capacity is flexible mainly at Lundachark and Pärsons while KLS Ugglarps’ production capacity is restricted due to nature of the raw material used.

At Lundachark orders are placed by phone with retail stores one or two times a week. At the same time, Lundachark gets information about inventory buffer in shelves at stores. On the other hand, Pärsons receives information about order quantities through EDI system on daily basis. To KLS Ugglarps weekly orders from ICA and Axfood are transmitted through EDI while KF and Bergendahls use phone contact. Lundachark determines prices and no negotiation with retailers takes place as their products are well known and sought-after in Lund region. Pärsons also determines prices, however, the final price needs to be negotiated with retailers’ purchaser. Pärsons have to compete with approximately 40 other manufacturers supplying the same type of products. The situation at KLS Ugglarps is different. The prices are negotiated with retailers every third week due to frequent changes in raw material price. Lundachark is informed about their sales as the contact with stores is very frequent. At Pärsons it is 12 sales representatives that have direct contact on store level and thus they are informed about sales of Pärsons’ products. However, this information exchange is not frequent. Another source of sales information is POS data which are transmitted once a month directly from stores to Pärsons retroactively. The situation is similar at KLS Ugglarps.
data are not available as it is difficult to track in which stores their products are sold. On the other hand at Bergendahls stores the situation is better. Here due to direct contact the information about sales can be obtained and also the order quantities to each store can serve as rough estimate of how much it has been actually sold. However, the POS are not provided to KLS Ugglarps here either. At Lundachark delivery specification are agreed upon with stores when order is placed. Delivery takes place one day after an order has been received. The situation is different at Pärsons as here a pre-determined delivery plan is followed consisting of information about how many day per week deliveries should take place. It is retailers’ distribution centers that decide on delivery schedule. The same situation is at KLS Ugglarps. Deliveries are planned beforehand with both retailers’ distribution centers and with Bergendahls’ stores.

Lundachark determines inventory levels at stores from own data base about previous orders quantities and combine it with verbal information received from stores. In contrary, Pärsons has no information about inventory buffer levels at retailers’ distribution centers. For Pärsons this information is considered to be unnecessary. On the other hand, at new products the access to this type of information is crucial as it is useful for their production planning. Similarly, KLS Ugglarps has no information about inventory buffer at retailers’ distribution centers as it is not considered as necessary information. Both Pärsons and KLS Ugglarps are more interested in information about order quantities rather than in inventory levels. At Lundachark, costs are determined without negotiation or cost control from retailers. The situation is different at Pärsons. As the final price has to be negotiated with retailers’ representatives the cost level is than derived from it. Another approach is used at KLS Ugglarps as they need present their costs to retailers. The highest transparency is towards ICA and Axfood. At Bergendahls, costs do not need to be shown. Furthermore, at Lundachark and Pärsons information about production and transportation capacities as well as lead times are known to retailers. While at KLS Ugglarps this information is usually exchanged when some capacity constraints occur.

None of the three case companies have access to point of sales (POS) information or real-time demand information. It is only Pärsons who receives the POS data from stores once per month retroactively. Regarding the quality, reliability and accuracy of information received, all three case companies are satisfied. Kent Svensson at Pärsons has pointed out that the availability and the quality of information provided by retailers has been significantly improved the last
three or four years. Mårten Backgården at KLS Ugglarps considers the information transmitted through EDI system from retailers’ distribution centers as very professional and accurate. Information provided by phone or through personal contact is less professional, however, it is of great value for KLS Ugglarps as it comes directly from stores and the information captures the end-customer demands and requirements. Furthermore, the personal contact is preferred to automatic and standardized way of information exchange.

Lundachark and Pärsons have very good capability to capture and use information for their production and distribution planning. KLS Ugglarps ability to use information is restricted due to nature of the raw material used.

System for information integration
Lundachark and KLS Ugglarps forecast future demand independently on retailers with help of historical order statistics and regular personal contact with retailers. While Pärsons plan schedule for future campaigns as well as demand forecast for longer and shorter period of time jointly with retailers’ representatives. Each of the three case companies receives only orders from retailers; no POS data are transmitted frequently.

Gaps in information integration
The way of transmitting information differs from case to case. At Lundachark, information is solely obtained from stores through phone and personal contact on regular basis. Orders are placed by phone and if it has been estimated that future sales will be higher than the actual real sales, the next delivery will be lower to level out the inventory buffer at store. To invest in expensive EDI system is not reasonable due to the small-scaled size of the company. These types of contacts proved to work very well and serve the purpose of getting relevant information for their business.

On the other hand, Pärsons way of information exchange with retailers’ distribution centers are fully automatic and standardized. The EDI system is used in communication with all retailers and thus compatibility of systems is achieved. The process of information exchange is initiated when predetermined re-order point (ROP) at point of sales has been reached. A new order is automatically placed at retailers’ distribution center. Even here there is a pre-determined ROP. When the ROP is reached an order is automatically sent to Pärsons. The
EDI system needs to be combined with regular manual checks of inventory buffer status. Doing so, decreases wastage resulting from ordering more goods then necessary.

KLS Ugglarps uses EDI for information exchange with ICA’s, Axfood’s retailers’ distribution centers while with KF’s and Bergendahls the communication is conducted by phone, e-mail or fax. The contact with Bergendahls is on store level and the number of stores they deliver their products is limited to 10 while with the other retailers the contact is only on retailers’ distribution level as KLS Ugglarps does not know which stores their products are actually delivered to. KLS Ugglarps prefer the phone contact on stores level, as it is in case of Bergendahls, to EDI contact on the retailers’ distribution center level since they get direct feedback about the end-customers requirements.

5.1.2 Consequences of gaps in information integration for manufacturers

Transactional costs/ Information asymmetry
Lundachark receives information on the store level which gives the manufacturer better picture about end-customer demand and preferences. Lundachark is in regular contact with stores so they are informed about the supply. On the other hand, Pärsons does not have access to demand information on store level, however, the retailer have sufficient information about supply from the manufacturer. KLS Ugglarps have experience of both. Information is received on store level and on retailers’ distribution center level. The latest does not give the manufacturer any information about end-customer demand as KLS Ugglarps does not known which stores their products are actually delivered to from retailers’ distribution centers.

Demand distortion – The Bullwhip effect
In all three cases, the manufacturers receive orders from retailers and no POS data with exception of Pärsons who obtains sales data from retailers’ stores once a month retroactively. Free returns or order cancellations have never been experienced by Lundachark and Pärsons, however, at KLS Ugglarps returns of their products are quite common mainly due to quality issues or as result of damages during transportation from the manufacturer to the retailer. Furthermore, Pärsons and KLS Ugglarps have experienced that retailers increase their order quantities with short notice. Both manufacturers try to find solution and fulfill such retailers’ requirements if they can. In Pärsons case it has impact on inventory buffer at all partners.
within supply chains. KLS Ugglarps negotiates with other retailers or customers if they are willing to lower their weekly order quantities or not.

None of the case companies offer volume discounts to retailers, however, price discounts during demonstrations or campaigns organized by the manufacturers at retailers’ stores are common for Lundachark and Pärsons. Lundachark organizes only one demonstration of its products per week otherwise disturbances in production and distribution would occur. On the other hand, Pärsons plans ahead with retailers’ representatives campaigns for the coming year. Deliveries are then evenly dispersed on each day for the duration of the campaign. The situation is different at KLS Ugglarp. Here, no demonstrations are organized, nevertheless, price discounts are offered to few small independent wholesalers and to Bergendahls’ stores. The reason for price discounts is often surplus of some products. In contrary, KLS Ugglarps does not offer any additional price discounts to retailers’ distribution centers as the price has already been negotiated for a pre-determined quantity.

5.1.3 How to alleviate the gaps in information integration at manufacturers

Integrated food retail supply chains
At all three case companies, information from retailers is incorporated in production and distribution planning. KLS Ugglarps’ production and distribution planning is more efficient due to weekly orders received from retailers. On the other hand, capacity is restricted due to nature of raw material. Furthermore, Pärsons has implemented an internal quality program to achieve 98 per cent service level at retailers’ distribution centers. Generally, relations between the manufacturers and retailers can be characterized as very good with regular contact which allows fast respond to customer demand.

Information integration systems
For the three case companies is in common that they have no access to POS data or real-time demand from stores. Pärsons receives POS data, however, only once a month retroactively. Furthermore, all case companies receive orders from retailers either by phone (in case of Lundachark and partly KLS Ugglarps) or through EDI system (in case of Pärsons and KLS Ugglarps). Additionally, Lundachark and Pärsons discuss with retailers anticipated future demand and campaigns, however, Lundachark and KLS Ugglarps forecast demand
independently on retailers. All three case companies have access to information about end-
customer demand trends and preferences. Regarding information about inventory buffer, the
situation is different from case to case. Lundachark gets this information through personal
contact at store level and it also is derived from own data base about previous orders
quantities delivered to particular store. Parsons considers that it is only relevant to be
informed about inventory buffer for new products at retailers’ distribution centers. KLS
Ugglarps also consider that information about inventory buffer at retailers’ distribution
centers is not relevant or necessary since they do not know which stores their products are
actually delivered to. On the other hand, inventory buffer at Bergendahls’ stores is of greater
value since here they have direct contact with end-customer.

5.1.4 Summary of the cross-case analysis

The following Figure 5.2 summarizes the main similarities and differences among the three
cases in terms of gaps in information integration, their consequences for manufacturers and
way of alleviating them. Based on the empirical evidence from the three case companies, an
important finding that has been made is that the Swedish retailers are willing to provide
information to the manufacturers. But still it is the manufacturers who have to be proactive
and initiate the contact with the retailers to get the information they need.

Generally, it can be seen that there are many similarities among the case companies in terms
of gaps in information integration, their consequences and way to alleviate them. All the case
companies receive approximately the same type of information from retailers either on the
store level or on the retailers’ distribution centers level. What characterized the case
companies in terms of information shared is that none POS data are provided to the
manufacturers. On the other hand, the differences identified depends mainly on factors; such
as company’s size and nature of the raw material used.

Specifically, the small size of the company in case of Lundachark leads to some gaps in how
information is provided to the manufacturer. Information are mainly exchanged verbally
which can result into problems with reliability and accuracy. Consequences are higher
transactional costs as Lundachark can’t take advantages of the standardized, instantaneous
and automatic way in information sharing enabled by EDI system which is used by majority
of retailers in their communication with manufacturers. Taking into the consideration the fact that Lundachark has currently no intention to expand the investment in the EDI system seems not to be reasonable. Furthermore, the absence of an automatic system for information sharing is, in case of Lundachark, replaced by their strong proactivity and very good personal contact with retailers’ stores so they have no problems to obtain information necessary for their production and distribution planning.

In the case of Pärsons, annual size of 800 million SEK allowed for investment into EDI system, in contrary to Lundachark. However, despite of the information symmetry and thus low transactional costs information such as inventory buffer at retailers and POS data are not transmitted from retailers to Pärsons regularly. Furthermore, Pärsons has very limited contact on the store level. The information from stores is first transmitted to retailers’ distribution centers and then supplied to Pärsons. This fact can lead to demand distortion and slower reaction to end-customer demand.

KLS Ugglarps differs from the previous case companies as its production capacity is dependent on the flow of raw material that needs to be booked 12 weeks ahead. The flow is stable and can’t be stopped. Demand peaks can’t be solved, as in the previous cases, through additional personal or overtime work but through price adjustments. Thus, even if they have access to sufficient information from retailers that enables production and transportation planning KLS Ugglarps ability to react flexibly is limited. As a result, an overproduction is thus deep-frozen and stored at third part logistics providers’ stock. Furthermore, stock-outs can occur.

In contrary to Lundachark and Pärsons, KLS Ugglarps has experience both with direct contact on store level and on retailers’ distribution centers level. The communication with stores is carried out by phone while the contact with retailers’ distribution centers is fully automatic and standardized through EDI system. Comparing these two ways of providing information in terms of reliability and accuracy, the EDI alternative is considered by KLS Ugglarps as very professional and accurate. On the other hand, the phone alternative as way of information sharing is preferred to the EDI system by KLS Ugglarps. The reason is that it allows for more personal contact compared to the EDI system. Furthermore, the contact on the store level is considered as more valuable as it enabled to get direct information about end-customer demands and preferences as well as feedback.
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<th>Lundachark AB (annual sales 12 MSEk)</th>
<th>Pärsons Sverige AB (annual sales 800 MSEk)</th>
<th>KLS Ugglarps AB (annual sales 1500 MSEk)</th>
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</thead>
<tbody>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Deliveries/ mode</td>
<td>- deliveries to stores</td>
<td>- deliveries to retailers distribution center</td>
<td>- deliveries to retailers distribution center, small independent wholesalers and stores, third part logistics company</td>
</tr>
<tr>
<td></td>
<td>- own truck</td>
<td>- third part logistics company</td>
<td></td>
</tr>
<tr>
<td><strong>Information integration</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Inventory buffer</td>
<td>- made to order</td>
<td>- made to order</td>
<td>- made to order</td>
</tr>
<tr>
<td></td>
<td>- no inventory buffer at Lundachark</td>
<td>- limited inventory buffer at Pärsons</td>
<td>- no inventory buffer at KLS Ugglarps</td>
</tr>
<tr>
<td>• Production capacity</td>
<td>- flexible</td>
<td>- flexible</td>
<td>- limited flexibility</td>
</tr>
<tr>
<td></td>
<td>- additional personnel, overtime work</td>
<td>- additional personnel, overtime work</td>
<td>- price adjustments</td>
</tr>
<tr>
<td>• Demand peaks</td>
<td>- predictable, seasonal trends/ variations</td>
<td>- predictable, seasonal trends/ variations</td>
<td>- predictable, seasonal trends/ variations</td>
</tr>
<tr>
<td>• Demand</td>
<td>- received from stores</td>
<td>- from retailers distribution center</td>
<td>- from retailers distribution center/store</td>
</tr>
<tr>
<td>• End-customer trends</td>
<td>- partnership</td>
<td>- partnership</td>
<td>- partnership</td>
</tr>
<tr>
<td>• Relations within SC</td>
<td>- manufacturers proactivity</td>
<td>- manufacturers proactivity</td>
<td>- manufacturers proactivity</td>
</tr>
<tr>
<td><strong>Information sharing</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Order quantities</td>
<td>- by phone</td>
<td>- through EDI</td>
<td>- EDI, phone, e-mail, fax</td>
</tr>
<tr>
<td>• Price</td>
<td>- no negotiation</td>
<td>- negotiation</td>
<td>- negotiation</td>
</tr>
<tr>
<td>• Sales</td>
<td>- by phone, frequent personal contact</td>
<td>- less often by 12 sales representatives</td>
<td>- personal contact at Bergendahls store</td>
</tr>
<tr>
<td>• Delivery specification</td>
<td>- agreed upon with stores</td>
<td>- pre-determined delivery plan</td>
<td>- pre-determined delivery plan</td>
</tr>
<tr>
<td>• Retailer inventory buffer</td>
<td>- own database, statistics, verbal info</td>
<td>- no information, only for new products</td>
<td>- no information</td>
</tr>
<tr>
<td>• Costs</td>
<td>- no cost control</td>
<td>- cost control</td>
<td>- cost control/ no cost control</td>
</tr>
<tr>
<td>• Production capacity</td>
<td>- known to retailers</td>
<td>- known to retailers</td>
<td>- only when capacity constrains</td>
</tr>
<tr>
<td>• POS data</td>
<td>- no access</td>
<td>- access only once/month retroactively</td>
<td>- no access</td>
</tr>
<tr>
<td>• Capture and use info</td>
<td>- very good capability</td>
<td>- very good capability</td>
<td>- very good, however, production capacity is limited</td>
</tr>
<tr>
<td><strong>System for Information Integration</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Demand forecasting</td>
<td>- independently on retailers</td>
<td>- jointly with retailers’ representatives</td>
<td>- independently on retailers</td>
</tr>
<tr>
<td>• Orders from retailers</td>
<td>- yes</td>
<td>- yes</td>
<td>- yes</td>
</tr>
<tr>
<td><strong>Gaps in information integration</strong></td>
<td>- through personal contact, by phone, no EDI due to manufacturer’s size</td>
<td>- EDI</td>
<td>- EDI + phone, e-mail, fax</td>
</tr>
</tbody>
</table>

Information integration between retailers and manufacturers in Swedish food retail supply chains
### 2. Consequences of gaps in information integration

<table>
<thead>
<tr>
<th>Transactional costs</th>
<th>- Information symmetry</th>
<th>- Information asymmetry</th>
<th>- Information symmetry/ asymmetry</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demand distortion</td>
<td>- no</td>
<td>- no</td>
<td>- returns due to quality issues</td>
</tr>
<tr>
<td>Free returns</td>
<td>- no</td>
<td>- yes</td>
<td>- yes</td>
</tr>
<tr>
<td>Changes in order quantities</td>
<td>- no</td>
<td>- no</td>
<td>- no</td>
</tr>
<tr>
<td>Volume discounts to retailers</td>
<td>- yes (only 1 demo/week due to capacity problems)</td>
<td>- yes (planed one year ahead, evenly dispersed deliveries)</td>
<td>- no demonstrations, price discounts only to Bergendahls</td>
</tr>
<tr>
<td>Price discounts during demonstrations/promotions</td>
<td>- yes (demand forecasting is made independently)</td>
<td>- yes (only for new products)</td>
<td>- no (only at Bergendahls’ stores)</td>
</tr>
</tbody>
</table>

### 3. How to alleviate the gaps in information integration

| Integrated food retail SC            | - yes                   | - yes                   | - yes (restricted production capacity) |
| Information integration systems      | - yes                   | - jointly               | - no info about demand forecasting (done independently) |
| Future demand/promotions             | - yes (demand forecasting is made independently) | - yes                  | - yes                             |
| End-customer trends                  | - yes                   | - yes                  | - no                              |
| Inventory buffer at retailer         | - yes                   | - no (only for new products) | - no (only at Bergendahls’ stores) |

*Figure 5.2 Summary of the cross-case analysis*
5.2 Pattern matching analysis

5.2.1 Gaps in information integration from manufacturers’ perspective

Methods of managing food retail supply chains

According to Kinsey and Ashman (2000) there are three different methods of managing food retail supply chains; (1) self-distributing retailers, (2) third party wholesalers and (3) Direct Store Delivery (DSD). In scope of the three case companies, all three methods of managing food retail supply chains are represented.

Specifically, Direct Store Delivery (DSD) is applied by Lundachark as they deliver their products directly to the stores. However, only in four cases out of 80 stores products are placed on shelves by Lundachark employees. The DSD method enables the manufacturer to get access to real-time information such as POS data and thus streamline the flow of goods, easily monitor their product movements and replenish the shelves so they are always full (Kinsey and Ashman, 2000). Lundachark does not receive POS data. The transmission of real-time information can be complicated as Lundachark is not connected with retailers through the EDI. As result, Lundachark cannot take the full advantage of the DSD method. Additionally, products are in the majority of stores not placed directly on shelves by Lundachark representatives. This fact can affect the ability monitor products movements and manage the inventory at stores in way that shelves are always full.

Pärsons deliver their product to the retailers’ distribution centers to be further re-distributed with other products to the stores. This method is called self-distributing retailers. Doing so, increase efficiency in terms of lower handling costs on its way to the end-customer (Kinsey and Ashman, 2000).

KLS Ugglarps represents two different methods of managing food retail supply chain; such as DSD and Self-distributing retailers. Neither KLS Ugglarps benefits fully from the DSD method as they do not have access to the real-time information such as POS data from the stores. The hinder can be that they are not connected with the stores through EDI system and thus the transmission of this type of information on an automatic and standardized way is difficult.
Information integration between retailers and manufacturers

According to Sabath (1998), traditional food retail supply chains use inventory buffer to smooth the flow of goods through production to response reliably to volatile demand. The weakness of the traditional supply chain is its slow reaction to new demand trends. If a particular product suddenly starts to sell out in stores, replenishment order goes to retailer’s distribution center but not further. First after the minimum inventory level is reached an order is placed with the manufacturer.

Lundachark has direct contact on store level and does not use any inventory buffer. This allows for fast reaction on changes in end-customer demand trends. KLS Ugglarps deliver products both to retailer’s distribution centers and to stores. Only on the store level, KLS Ugglarps has direct contact with end-customer and thus can react fast on end-customer demand trends. Nevertheless, KLS Ugglarp production capacity is less flexible due to nature of the raw material. This fact makes the ability to react on changes in end-customer demand trends limited. Pärsons can be considered as part of the traditional food retail supply chain. Their products are delivered to retailers’ distribution centers and then re-distributed to stores. There is inventory buffer at retailers’ distribution center and also in limited extend at Pärsons. Replenishment order from stores goes first to retailers’ distribution centers and then, when re-order point is reached, further to Pärsons. This can result in decreased forecast accuracy and excessive inventory or stock-outs at the retailers’ distribution centers and the manufacturer as well as slower reaction to new demand trends.

Information sharing between retailers and manufacturers

There are three levels of information sharing between organizations; (1) transactional, where information technology is used to automate the routine transactions, (2) operational, where the operational data are shared only between two nearest partners at each stage in supply chain and (3) strategic, where one company owns the proprietary information while the other members can use the information to gain their strategic benefits (Li et al, 2006). Furthermore, the transactional information can be considered as minimal information sharing since they are public information that can be obtain by searching. Operational information is partial information sharing since the company only uses information from the nearest partner. The strategic information represents near-complete information sharing since it consists of very sensitive information shared among all partners (Li et al, 2006).
All three case companies share information on the transactional level; such as order quantities, prices, sales, product specification, quality and delivery specifications). However, in case of Lundachark and partly KLS Ugglarps, information technology is not used to automate the routine transactions. Information on the operational level; such as inventory levels, costs and schedules, production and transportation capacities and lead times is also shared at all three companies with exception of Pärsons and KLS Ugglarps. Here, information about inventory buffer at retailers’ distribution centers is not shared with the manufacturers. Pärsons receive information about level of inventory buffer only for new products. From information on the strategic level; such as point of sales (POS) data, real-time demand and understanding of market trends only the last type of information is provided by retailers to the case companies. None of the manufacturers receive regularly POS data or real-time demand information. Additionally, all three case companies are engaged in the minimal information sharing and partial information sharing as they all have access to operational information and transactional information with one exception of information about inventory buffer levels. However, from the strategic information, only information about market trends is provided to the manufacturers, thus there is only to some degree the near-complete information sharing.

The benefits from information sharing are influenced by information precision (the level of detail of the shared information) and reliability (the ability of the manufacture to capture and used the shared information (Kulp, 2000). Lundachark have access to information solely on store level while Pärsons only on retailers’ distribution centers level. KLS Ugglarps has experience with information provided on both levels. Lundachark and KLS Ugglarps consider the information provided on the store level as very valuable since it allows for direct contact with end-customers and immediate feedback from them. All three case companies have a very good ability to capture and used shared information. However, KLS Ugglarps due to its restricted production capacity can experience difficulties to fully utilize information provided by retailers.

According to Cachon and Fisher (2000), information sharing has a significant value when demand is unknown, for example, early sales of new products or established products on promotion. Lundachark get information about expected sales during promotions from stores. Pärsons and retailers’ representative plan jointly promotions and expected demand during these promotions. Furthermore, Pärsons receive information about level of inventory buffer at new products from retailers’ distribution centers.
System for information integration

In traditional system, demand is forecasted by manufacturers and retailers independently (Kulp, 2000). Furthermore, the manufacturer receives only orders from retailers (Yao and Dresner, 2008). The three case companies do receive orders from stores or retailers’ distribution centers, however, other information are transmitted as well. So their systems can’t be considered as pure traditional in that sense.

Gaps in information integration

The integration of information systems is beneficial if more food retailers and manufacturers participate in the same or similar system (Kinsey, 2000). Compatibility of the hardware and software is a prerequisite for developing a business relationship. However, smaller businesses have neither enough resources nor the inclination to invest in such systems (Katz and Shapiro, 1994). To induce the smaller businesses to join the network can be solved by sponsoring the network by larger users and thus enable to smaller users a free access to the system. The net gain will still be greater than the costs (Coleman, 2000 cited in Kinsey, 2000).

Additionally, the more retailers provide their sales data to manufacturers, the better the manufacturer can schedule their production and achieve thus more efficient internal operations and lower price to retailers and to end-customers (Kinsey, 2000).

Pärsons and KLS Ugglarps use the same compatible system for information sharing as the retailers while Lundachark does not. Even if Lundachark is small company and investment in an expensive business-to-business system seems not reasonable, there can be other alternatives supported by the larger users.

None of the case companies receives point-of sales (POS) data from retailers. To have access to this data can lead to improve efficiency of their production lines as they get more precise and immediate picture about the real end-customer demand.

Lau et al. (2008) concluded that the focus of majority of food retail supply chains is on improving their internal processes as well as integration with the wholesale function to better meet expectation of their immediate customers, and less attention is paid to improvement of performance across the supply chains. Furthermore, according to Brege (2007), in the
Swedish food retail supply chains, the retailer-manufacturer integration has not been the main concern. Swedish food retailers maintain adversary relationship in the vertical system. The consequences are then building large inventories within and between organizations.

In contrary to the theory, based on the empirical evidence from three case companies, the Swedish retailers understood that it is in their own interest to provide information to manufacturers. It is too expensive to withhold information as it leads to empty shelves and lost sales. The information integration enables to streamline the product flow from the manufacturer to stores and thus costs are decreased. It is also important to get products to the stores as fast as possible as their durability is limited. Doing so, the products are available to end-customer for longer period of time before date of expire which increases sales.

Clark and Hammond (1997) state that retailers admit that information integration with manufacturers can offer them some savings, but many retailers are doubtful about benefits for their firms in providing additional information for manufacturers. Retailers’ cost reduction of revealing information can be achieved through implementation of IT with appropriate system integration (Chu and Lee, 2006). Additionally, they concluded that some information is more expensive to reveal than others. It is recommended to use the least costly information if they are various types of information serving the same purpose. For example, to share aggregated data is often less costly than to share POS data.

To reduce cost of information sharing, transmission of information in an automatic and standardized manner has been implemented between retailers and Pärsons and KLS Ugglarps. Furthermore, none of the manufacturers receive POS data from retailers, except of Pärsons obtaining this information once per month retroactively. To transmit this data require business-to-business system such as EDI, thus it is impossible for Lundachark to get this information. Additionally, it is important even for those manufacturers such as Pärsons and KLS Ugglarps that use EDI system, to be aware of how this information should be analyzed and incorporated in their internal operational planning. Without these routines the sharing of the POS data would be of low value for the manufacturer and consequently also for the retailer as well.
5.2.2 Consequences of gaps in information integration for manufacturers

Higher transactional and inventory costs

Information asymmetry between the participants in supply chain represents a significant problem. It means that the manufacturers do not have access to perfect demand information; similarly, the retailers do not have sufficient information on supply. It results in inefficiency, uncertainties resulting in higher transactional-processing costs, inventory costs and lower service level (Li et al. 2006).

As Lundachark has direct contact on the store level it allows for getting information about end-customer demand and preferences. Similarly, the manufacturer provides information about supply to retailer on regular basis due to frequent contact. Information symmetry is achieved. On the other hand, Pärsons has only contact on the retailers’ distribution centers level and has no direct information about end-customer demand from stores. This fact leads to information asymmetry. KLS Ugglarps has contact both on retailers’ distribution center level as well as on store level which result into information asymmetry with the first one and into information symmetry with the second one.

Demand distortion – The Bullwhip effect

If the retailer passes along the information to the manufacturer in form of orders instead of retailer’s sales it leads to systematic distortion of demand information. It means that the retailers’ orders do not coincide with actual retail sales. The variance of orders can be larger than variance of sales and the demand distortion increases as one move upstream in supply chain – this is called bullwhip effect. Four source of bullwhip effect are; (1) demand signal processing, (2) rationing game, (3) order batching and (4) price variations (Lee et al., 2004).

Demand signal processing as a source for the Bullwhip effect have been identified at all three manufacturers. The retailers send orders to them based on updated demand forecast instead of POS data representing the true demand. As solution system such as vendor-managed inventory (VMI) or Contiousous Replenishment Programs can be efficient (Crawford, 1994). According to Fisher (1994) cited in Lee et al (2004), shorter replenishment lead times also eliminate the Bullwhip effect. All three manufacturers are aware of importance of short lead times due to limited durability of their products. Thus, they strive to achieve as short replenishment lead times as possible.
Rationing game as another source of the Bullwhip effect in terms of order cancellation or free returns have not been identified at the case companies. On the other hand, Pärsons and KLS Ugglarps have experiences with increased order quantities with short notice. This fact has affect on inventory buffer at all members in case of Pärsons, however, they try to solve the situation by dividing evenly the quantity they have available among retailers. KLS Ugglarps solves the situation by asking other customers to lower temporary their order quantities to be able to cover the suddenly increased order to another customer.

Order batching has not been identified as a source of the Bullwhip effect at the case companies. None of them provide volume discounts to the retailers. On the other hand, price discounts during promotions and demonstrations organized by the manufacturers at stores site are rather common for all three companies. As result, the price variation can lead to the Bullwhip effect due to uneven production, unnecessary inventory expenses and distort demand information during periods of promotions (Lee et al, 2004). The case companies are aware of it and price variation as reason for the Bullwhip effect has not been found at the case companies. Specifically, Lundachark organize only one demonstration per week, otherwise, they would need to build inventory as their production capacity is flexible but limited. Pärsons plan promotions one year ahead jointly with retailers’ representatives. They can handle more promotions per week and deliveries are evenly dispersed during the whole period of the promotion to schedule production and transportation more effectively. KLS Ugglarps do not offer any price discounts to ICA, Axfood and KF as price has already been negotiated with these retailers for a pre-determine volume. Their price discounts are not related to promotion but to surplus of products and they are only organized with few independent wholesalers and Bergendahls’ stores.

5.2.3 How to alleviate gaps in information integration?

Integrated food retail supply chains

According to Sabath (1995), an integrated food retail supply chain is linked organizationally and coordinated with information flows. To facilitate coordination of activities business relationship based on partnership between supply chain members are established. All partners have access to business planning, forecasting, POS data, inventory status and other information necessary to coordinate the product flow.
All the case companies have established relationship based on partnership with the retailers. The retailers provide them information which is incorporated in the manufacturers internal organizational planning. However, not all the manufacturers have access to business planning, forecasting, POS data and inventory status. Specifically, Lundachark has access to inventory status and end-customer demand while forecasting is done independently on retailers. Pärsons is informed about business planning during regular meetings with retailers’ representatives. Forecasting of expected demand and demand during promotions, POS data once per month retroactively, inventory status for new products at retailers’ distribution centers and end-customer trends are available to Pärsons. KLS Ugglarps does not receive any business planning information, forecast is done independently, end-customer trends are available, POS data are not provided and inventory levels at retailers’ distribution center are not transmitted. Reason for the limited amount of provided information from retailers’ distribution centers to KLS Ugglarps is that the retailers (ICA, Axfood and KF) do not inform the manufacturer which stores the products are delivered to. However, the situation is different at Bergendahls stores. Here, KLS Ugglarps has access to end-customer demand and trends, expected sales and inventory levels at stores.

**Information integration systems**

There are five information integration systems; such as (a) Information Integration Sharing (IIS), (b) Continuous Replenishment Planning (CRP), (c) Vendor-Managed Inventory (VMI), (d) Collaborative Planning, Forecasting and Replenishment (CPFR) and (e) Scan-Based Trading (SBT). These systems enable to reengineer supply chain through real-time information sharing as the manufacturer no longer need to monitor end-customer demand through the retailers’ order quantities but determines it directly from the end-customer (Yao and Dresner, 2008). The above mentioned systems require that food supply chain established an EDI system with their suppliers (Kinsey, 2000).

As Lundachark is not connected with stores through EDI system none of the integrated five systems can be currently used. The end-customer demand information is determined form the order quantities received from retailers. Pärsons is already using EDI system so the implementation of one of the integrated system should be possible. Furthermore, as the manufacturer and retailers’ representatives jointly forecast future demand and demand during promotions and strive to streamline replenishment process it could be beneficial to implement CPFR system. However, this system requires that POS data are available to the manufacturer.
as he needs to observe the flow of sales and to adjust the agreed deliveries to maintain the shelves stocked (Blair, 1999 cited in Kinsey, 2000). Visibility of the whole supply chain will be increased as the manufacturers and retailers jointly work to develop sales forecast and agree on acceptable variances (Anthony, 2000). KLS Ugglarps use EDI system with ICA and Axfood. The amount of information shared with these retailers is limited, compared to Pärsons. As the production capacity is less flexible due to nature of the raw material it is not reasonable to implement sophisticated information integration systems as KLS Ugglarps ability to react quickly on demand changes is limited.

The following *Figure 5.3* summarizes the results of pattern matching analysis - comparing of empirical evidence from three case companies with the theoretical framework developed in Chapter 3.
<table>
<thead>
<tr>
<th>Research questions</th>
<th>Lundachark AB (annual sales 12 MSEk)</th>
<th>Pärsons Sverige AB (annual sales 800 MSEk)</th>
<th>KLS Ugglarps AB (annual sales 1500 MSEk)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Gaps in information integration</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Methods of managing SC</strong></td>
<td>DSD (Direct Store Delivery)</td>
<td>Self Distributing Retailers</td>
<td>DSD/Self Distributing Retailers</td>
</tr>
</tbody>
</table>
| **Information Integration** | • no inventory buffer  
• direct contact on store level  
• fast reaction on end-customer demand | • inventory buffer  
• contact of retailers distribution center level  
• order placed after ROP reached  
• slower reaction on demand trends | • no inventory buffer  
• direct contact on store level  
• fast reaction on end-customer demand  
• contact on retailers distribution center level  
• slower reaction on end-customer demand |
| **Information Sharing** | Minimal information sharing:  
• transactional level (no EDI) | Minimal information sharing:  
• transactional level (EDI) | Minimal information sharing:  
• transactional level (no EDI – store level, EDI – retailers distribution center level)  
| Partial information sharing:  
• operational level | Partial information sharing:  
• operational level (inventory buffer at retailers not shared) | Partial information sharing:  
• operational level (inventory buffer not shared) | Partial information sharing:  
• operational level |
| Near-complete information sharing:  
• strategic level (only market trends are shared) | Near-complete information sharing:  
• strategic level (only market trends are shared) | Near-complete information sharing:  
• strategic level (only market trends are shared) | Near-complete information sharing:  
• strategic level (only market trends are shared) |
| Information precision:  
• on store level | Information precision:  
• on retailers distribution center level | Information precision:  
• on retailers distribution center level | Information precision:  
• on store level  
• on retailers distribution center level |
| Reliability:  
• very good | Reliability:  
• very good | Reliability:  
• very good | Reliability:  
• very good but limited |
| **System for Information integration** | Partly traditional: orders instead of POS | Partly traditional: orders instead of POS | Partly traditional: orders instead of POS |
| **Gaps in information integration** | • incompatible system for information sharing  
• no access to POS data  
• retailers do provide information | • compatible system for information sharing  
• no access to POS data  
• retailers do provide information | • compatible system for information sharing  
• no access to POS data  
• retailers do provide information |
### 2. Consequences of demand distortion

<table>
<thead>
<tr>
<th>Information Integration</th>
<th>Information Asymmetry</th>
<th>Information Symmetry &amp; Asymmetry</th>
</tr>
</thead>
<tbody>
<tr>
<td>Information symmetry</td>
<td>Demand distortion:</td>
<td>Demand distortion:</td>
</tr>
<tr>
<td></td>
<td>Demand signal processing</td>
<td>Demand signal processing</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Demand distortion:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Demand signal processing</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Rationing game (changes in order quantities up)</td>
</tr>
</tbody>
</table>

### 3. How to alleviate gaps in information integration

<table>
<thead>
<tr>
<th>Partnership</th>
<th>Information from Retailers is Internally Used</th>
<th>Access to:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Partnership</td>
<td>Inventory status</td>
</tr>
<tr>
<td></td>
<td>Information from retailers is internally used</td>
<td>End-customer demand trends</td>
</tr>
<tr>
<td></td>
<td>Access to:</td>
<td>Business planning</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Forecasting</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Inventory status (only for new products)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>End-customer demand trends</td>
</tr>
<tr>
<td></td>
<td></td>
<td>POS data only 1 x month</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Currently no access to:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Inventory status for all products</td>
</tr>
<tr>
<td></td>
<td></td>
<td>POS data regularly</td>
</tr>
</tbody>
</table>

*Figure: 5.3 Summary of the pattern matching analysis*

<table>
<thead>
<tr>
<th>Information Integration Systems</th>
</tr>
</thead>
<tbody>
<tr>
<td>None EDI</td>
</tr>
<tr>
<td>None information integration system is possible</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Information Integration Systems</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPFR</td>
</tr>
<tr>
<td>(POS data needs to be transmitted)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Information Integration Systems</th>
</tr>
</thead>
<tbody>
<tr>
<td>None advanced information integration system is necessary due to limited production flexibility</td>
</tr>
</tbody>
</table>

Information integration between retailers and manufacturers in Swedish food retail supply chains
6. Conclusion and theoretical contribution

In this chapter the main results related to the three research questions will be highlighted. Furthermore, it will be discussed conflicting findings from previous research and a comparison with outcomes of this thesis will be made. The attempt is to present theoretical contribution to the existing theory.

6.1 Gaps in information integration from manufacturers’ perspective

Based on the empirical evidence collected from three case companies, it has been found that when products are delivered from manufacturers directly to stores, known as Direct Store Delivery method of managing food retail supply chain, the products are usually not placed directly on shelves by the manufacturers’ representatives. Thus, the inventory at stores can’t be monitored and managed by the manufacturers so the shelves are always full. Additionally, the manufacturers who deliver their product directly to stores have no access to real-time demand scanner data or POS data. Only verbal information about sales is provided which can lead to less accuracy and reliability of that information.

Manufacturers who deliver their products to retailers’ distribution centers have often no information about the real-time demand on store level. The reason is that order with manufacturer is placed first after the re-order point (ROP) has been reached at the retailers’ distribution center. This can result in slower reaction on new demand trends.

When manufacturer has direct contact on store level there is often no automatic and standardized way of information sharing such as through EDI system. In the studied case companies the reason often is small size of the manufacturer and thus limited resources to invest in an expensive business to business system or only few customers (stores) the manufacturer has direct contact with.

Manufacturers do not receive information about inventory buffer at retailers’ distribution centers. Retailers are willing to provide this information but manufacturers do not consider it as relevant for their internal organizational planning. Furthermore, strategic information such
as POS data or real-time demand is not shared. Instead all manufacturers receive orders from retailers.

6.2 Consequences of gaps in information integration for manufacturers

Information asymmetry has been identified as consequence of sharing information only on retailers distribution centers level and not on store level. Thus manufacturer has no access to perfect demand information.

As orders sent to manufacturers are based on updated demand forecast instead of providing manufacturer with real-time demand or POS data, manufacturer is not aware of the true demand in the marketplace. As consequence, demand distortion known as Bullwhip effect occurs as result of inaccurate demand signal processing.

6.3 How to alleviate gaps in information integration?

The gaps in information integration between retailers and manufacturers can be alleviated by implementing information integration systems using EDI for automatic and standardized information exchange. The prerequisite for improved efficiency of product flow, faster product replenishment and less inventory buffer is to provide manufacturers with perfect demand information in terms of real-time demand or POS data.

However, it is important to note that small-scaled manufacturers have not sufficient resources to invest in business-to-business IT system and thus they continue to use traditional phone contact. On the other hand, manufacturers that have restricted production capacity due to for example nature of raw material used in production cannot utilize the provided information on very detailed level such as POS data. Thus implementation of sophisticated information integration systems seems not to be reasonable.
6.4 Theoretical contribution

Lau et al. (2008) concluded that the focus of majority of food retail supply chains is on improving their internal processes as well as integration with the wholesale function to better meet expectation of their immediate customers, and less attention is paid to improvement of performance across the supply chains. According to Brege (2007), in the Swedish food retail supply chains, the retailer-manufacturer integration has not been the main concern. Swedish food retailers maintain adversary relationship in the vertical system. The consequences are then building large inventories within and between organizations. The difference between traditional food retail supply chains in Sweden and successful international chains can be found mainly in flow management, encompassing among other aspects of information transparency instead of stockholding.

Furthermore, Clark and Hammond (1997) stated that retailers admit that information integration with manufacturers can offer them some savings, but many retailers are doubtful about benefits for their firms in providing additional information for manufacturers.

The main findings and contribution of this thesis to the existing theory about information integration in Swedish food retail supply chains is the fact that retailers are willing to provide information to manufacturers. In contrary to the above mentioned theory, based on the empirical evidence from three case companies, the Swedish retailers understood that it is in their own interest to provide information to manufacturers. It is too expensive to withhold information as it leads to empty shelves and lost sales. The information integration enables to streamline the product flow from the manufacturer to stores and thus costs are decreased. It is also important to get products to the stores as fast as possible as their durability is limited. Doing so, the products are available to end-customer for longer period of time before date of expire which increases sales.

However, it is important to note that the adversary relationship between Swedish retailers and manufacturers have shifted towards collaborative partnership during the last three or four years. Before that the situation corresponded to findings and conclusions made by Brege (2007).
The following Figure 6.1 illustrates findings that are in conflict with the developed theoretical framework based on previous research. The conflicting findings are highlighted red.

Specifically, consumer demand trends are communicated by retailers to manufacturers. Excessive inventory and stock-outs can occur however in very limited range and only occasionally. Under supply of fastest moving items is also successfully avoided.

Near complete information sharing comprising of exchanging information on strategic level has not been identified as the POS data and real-time demand are not provided by retailers to manufacturers.

Cost of revealing information to manufacturers do not represent hinder for the retailer to share information with manufacturers. The Swedish retailers do want to share information with manufacturers and vice versa as it is important for all members in the supply chain to work more effectively, streamline product flow and most importantly keep shelves in stores always full.

The reason for demand distortion known as Bullwhip effect that has been identified is demand signal processing. Manufacturers receive orders from retailers instead of POS data or real-time demand information.

Finally, the studied case companies are part of integrated food retail supply chains as organizations are linked and coordinated through information flow. The relationship between supply chains members can characterized as a partnership. However, not all partners have access to information about retailers business planning, forecasting, POS data and inventory status.

None of the case companies is currently using a complete version of information integration systems as they are defined. Instead, parts of the systems have been identified between retailers and manufacturers.
### Gaps in information integration from manufacturers perspective

**Methods of managing**

- **Self-distributing retailers:**
  - Owns distribution centers for their stores
  - Purchase directly from manufacturers
- **Third party wholesalers:**
  - Buy products from manufacturers and resell to retailers
- **Direct Store Delivery (DSD):**
  - Manufacturers deliver directly to stores/on shelves

**Information integration in traditional food retail supply chains**

- Use inventory buffers to smooth product flow and response to volatile demand
- **Do not communicate consumer demand trends**
- Slow reaction to new demand trends
- Excessive inventory, stock-outs
- Under supply of fastest moving items

**Information sharing between retailers/wholesalers and manufacturers**

- Is crucial when demand is unknown, volatile
- Is reasonable when production capacity is unrestricted
- **Minimal information sharing:** transactional information
- **Partial information sharing:** operational information
- **Near-complete information sharing:** strategic information
- Information precision (store/warehouse level)
- Information reliability (the ability of manufacturer to capture and use the information)

**Traditional system without information integration**

- Manufacturers receive only orders from retailers

**Gaps in information integration between retailers/wholesalers and manufacturers**

- **Incompatibility of information systems:**
  - Lack of resources to invest in B2B systems
  - Compatibility of hardware and software between manufacturers and retailers
- **Cost of information integration:**
  - Cost of revealing information to manufacturers is a main hinder for information integration
  - If the cost is too large, retailers withhold the demand information
  - If the cost is small, retailers reveal demand information if the demand is high but withhold if the demand is low
  - Implementation of IT systems reduces these costs and encourage retailers to share information
Consequences of gaps in information integration for manufacturers

- **Higher transactional and inventory costs:**
  - Information asymmetry between manufacturers and retailers
- **Demand distortion – The Bullwhip effect:**
  - Demand signal processing: manufacturers receive order instead of sales information which leads to inefficient production scheduling
  - **Rationing game:** retailers can unrestrictedly decide on changes in order quantities, free returns and order cancellations
  - **Order batching:** retailers gain savings through volume discounts which leads to distortion of demand information for the manufacturers
  - **Price variations:** manufacturers promotions (wholesale discounts) disturb production and delivery planning

How to alleviate gaps in information integration?

**Integrated food retail supply chains**

- Organizationally linked
- Coordinated through information flow
- Partnership between supply chain partners
- **All partners have access to business planning, forecasting, POS data, inventory**
- Improved production scheduling, inventory management and products
- Faster respond to customer demand

**Information Integration Systems**

- **f) Integrated Information Sharing (IIS):**
  - Manufacturers have access to real-time customer demand information (POS)
  - Retailers still place orders with manufacturers
- **g) Continuous Replenishment Planning (CRP):**
  - Manufacturers link the replenishment process with retailers
  - Manufacturers and retailers share inventory data
- **h) Vendor-Managed Inventory (VMI):**
  - Manufacturers have permission to manage inventory at retailers´ location
- **i) Collaborative Planning, Forecasting, and Replenishment (CPFR):**
  - Manufacturers and retailers jointly forecast sales, agree on delivery schedule
- **j) Scan-Based Trading (SBT):**
  - Manufacturers delivery direct to store shelves,
  - Products are in possession of manufacturers until they are sold

Figure 6.1: Findings conflicting with theoretical framework
7. Concluding remarks

In order to generalize the presented empirical results beyond this multiple case study a rich theoretical framework has been developed. It has been found that some parts of the presented theory are supported by the empirical evidence while other parts are not. The theory has been tested by interviewing three Swedish manufacturers from meat sector. It would be interesting to replicate the findings by testing the theory in other sectors as well. However, due to limited time frame available this could not have been done in scope of this thesis.

Furthermore, Swedish retailers and wholesalers also should be included in future study in order to get their point of view on the issue of information integration between retailers and manufacturers. Doing so, common problems that hinder more efficient information integration could be identified.
References


Information integration between retailers and manufacturers in Swedish food retail supply chains


Lundachark AB, www.lundachark.se (2010-04-12)
Pärsons Sverige AB, www.parsons.se (2010-04-16)
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Appendix 1: Case study plan

I. Goal: 3 in-depth case study profiles
   a) Research questions:
      1) From manufacturers’ perspective, where are gaps in the information integration between Swedish retailers/wholesalers and manufacturers?
      2) What are consequences of these gaps for manufacturers?
      3) How can be the identified gaps alleviated?
   b) Statement of purpose:
      The purpose is to describe gaps, from the manufacturers’ perspective, in the information integration between Swedish retailers/wholesalers and manufacturers, and analyze what are the consequences of these gaps for manufacturers as well as propose how these gaps can be alleviated.
   c) Unit of analysis:
      Each of the selected meat manufacturers had to be part of the Swedish food retail supply chains.

II. Methodology:
   a) Multiple case design
   b) Research strategy: qualitative
   c) Research techniques: Focused interviews, open-ended interviews
   d) Case study protocol: case study plan, interview guide
   e) Interviewees: 2 sales managers, 1 sales representative
   f) Data analysis: cross-case analysis, pattern matching analysis
   g) Scientific credibility: external validity, reliability, construct validity

III. Theoretical framework
Development of a rich theoretical framework regarding Gaps in information integration in food retail supply chains including methods of managing food retail supply chains, information integration in traditional food retail supply chains, information sharing between retailers and manufacturers, traditional system without information integration, incompatibility of information systems and cost of information integration; Consequences of
gaps such as demand distortion and *How to alleviate the gaps in information integration* such as integrated food retail supply chains and information integration systems.

**III. Data analysis:**

*a) Cross-case analysis:*

To reveal whether the three cases share some similarities in terms of gaps in information integration, their consequences for manufacturers and how the gaps can be alleviated.

*b) Pattern matching analysis:*

To compare empirical evidence with developed theoretical framework to identify and analyze patterns to explain the issue of information integration.

**IV. Time table**

PM0 – Master thesis proposition: 19/1 – 01/2/2010

PM1 – Introduction chapter, literature study, preparing interview questions: 01/2 – 24/2

PM2 – Method chapter, revising PM1, literature study, preparing interview questions: 25/2 – 09/3

PM3 - Theory chapter, revising PM2, conducting interviews: 10/3 – 30/3

PM4 - Empirical findings chapter, sending transcription of interviews back to key informants for revising: 31/3 – 20/4

PM5 - Analysis: 20/4 – 04/5

PM6 – Conclusion, theoretical contribution, concluding remarks, summary: 05/5 – 10/5

Hand-in of the final version: 27/5

Final seminar – presentation of the thesis and objection: 01/6
Appendix 2: Interview guide

Illustrates information integration and related gaps

Illustrates the consequences of the gaps in information integration

Figure 1: Food retail supply chain

General questions about manufacturer:
1) Name and location of the company
2) Number of employees
3) Annual sales
4) Number of customers (retailers)
5) Type of products
6) Interviewee’s position

Specific questions related to information integration between manufacturers and retailers/wholesalers:

Note: * indicates related chapter in the theoretical framework

I. Gaps in information integration (3.1)*

Method of managing food retail supply chain (3.1.1)*
1) Do you deliver directly to:
   - the retailers distribution center
   - the warehouse
   - the store
   - the retailers’ own warehouse
2) How do you distribute your products to retailers/wholesalers?

Information integration in food retail supply chain (3.1.2)*
3) Do you experience that you have excessive inventory on some items while you have stock-outs of others? What is the reason for that?
4) Do you experience volatile demand on some items or is the demand stable?
5) If the demand is volatile, what is the reason?
6) Do you use buffer inventory to smooth production in order to response to the volatile demand? Or do you have alternative solution for that?
7) Do the retailers communicate trends in consumer demand?
8) If some product at retailer increases or decreases its sales, how fast do you get this information (replenishment order) and how?
9) In order to develop products that better meet consumer requirements do you have (or do you need) information about consumer preferences?

**Information sharing between retailers/wholesalers and manufacturers (3.1.3)**

10) What information do you get from retailers/wholesalers, what information do you provide to retailers/wholesalers and what information you agree on together.
- Transactional (order quantities, prices, sales, product specifications, quality and delivery specifications, …)
- Operational (inventory levels, costs and schedules, production and transportation capacities, lead times and shipments, …)
- Strategic (point of sales information, real-time demand, understanding of markets trends, …)

11) How often do you share different categories of information with retailers/wholesalers?
12) How often do you negotiate about price with retailers/wholesalers?
13) Do you have information on regional warehouse level, store level or both levels?
14) Do you have sufficient production capacity to handle suddenly increased demand?
15) What do you think about quality of information received from retailers/wholesalers (is it accurate, reliable and timely …)?

**Systems for information integration (3.1.4)**

16) Do you forecast demand independently on retailer? If yes, what are the consequences for you when it comes to production planning and delivery scheduling?
17) Do you have access to information about sales of your products and inventory at the retailer? If not, what are the consequences for you?
18) Do you receive from retailers/wholesalers POS data or only order or both?

**Gaps in information integration between retailers/wholesalers and manufacturers (3.1.5)**

19) Do you use EDI in communication with retailers/wholesalers? Alternatives?
20) Do you experience problems with compatibility of information integration systems used by you and retailers/wholesalers? If yes, why? Is there any solution?
21) Does the cost for implementation of IT systems for information sharing represent problems for you?

**2. Consequences of gaps in information integration for manufacturers (3.2)**

22) When you offer price discounts to retailer/wholesaler do you sign a contract with them on delivery schedule (e.g. delivery of products in multiple time points evenly dispersed)? If not, what is the alternative solution?
23) Does the retailer decide on changes of order quantities, free returns and order cancellation without consulting you? If yes, what are the consequences for you?

**3. How to alleviate gaps in information integration? (3.3)**

**Integrated food retail supply chain (3.3.1)**

24) How is the information from retailers/wholesalers used in your production, distribution, planning … processes?

**Information integration systems (3.3.2)**

25) Could you please comment on the following five models of collaboration? Does any of them describe your situation
Information and physical goods flow in the Traditional system and the information integration systems IIS, CRP, VMI, CPFR and SBT.

a) Traditional System without information integration

b) Integrated Information Sharing (IIS)

c) Continuous Replenishment Planning (CRP)

d) Vendor-Managed Inventory (VMI)

e) Collaborative Planning, Forecasting, and Replenishment (CPFR)

f) Scan-Based Trading (SBT)

Adapted from: Yao and Dresner (2008, p.362)