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Extranet Use in Supply Chain Management

A case study of three companies

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Acknowledgements

Abstract

The purpose with this thesis is to gain a better understanding of how Extranets are used in supply chain management. This thesis study an Extranet's use in the supply chain, its advantages and its disadvantages. Three different companies are investigated; Tetra Pak Norway, Tine Mejerier and Nen-Produkter; all related to the same Extranet. Since Extranet is a rather new phenomenon, especially in Europe, this thesis is based on both traditional supply chain management and more recent literature. It seems as if this Extranet differs to some extent from what the literature suggest, probably partly because of the already established relationship between the trading partners. Tetra Pak, that is the supplier of this Extranet, seem to some degree see different things in the system than their clients. The Extranet discussed seems, however, to be successful since many positive views were brought to surface, but relatively few negative aspects. This thesis is a qualitative research based on case studies and interviews.

Sammanfattning

Syftet med denna uppsats är att få en ökad förståelse för hur Extranät används i supply chains. Denna undersökning studerar ett Extranäts användning i supply chain, dess fördelar och dess nackdelar. Tre olika företag undersöktes; Tetra Pak Norge, Tine Mejerier och Nen-Produkter; alla knutna till samma Extranät. Eftersom Extranät är ett relativt nytt område, särskilt i Europa, så är denna uppsats baserad både på traditionell supply chain teori och mer modern litteratur. Det verkar som om det undersökta Extranätet skiljer sig något från vad litteraturen föreslår, troligen delvis på grund av redan existerande relationer mellan parterna. Tetra Pak, som tillhandahåller detta Extranät, ser också till viss del andra saker i systemet än deras kunder. Detta Extranät är framgångsrikt eftersom många positiva åsikter kom fram men relativt få negativa. Denna uppsats är kvalitativ och är uppbyggd av fallstudier och intervjuer.

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1. INTRODUCTION

Commerce between companies has been conducted for centuries. With the entrance of electronically means of communicating such as the Internet, commerce is though said to have changed. But in what way has it changed and why? We have now entered the new economy, where traditional ways of looking at companies are continuously altered. In this new era of commerce, we have chosen to put our interest and deepen our knowledge. Business to business (B2B) electronic commerce (EC, e-commerce) has been conducted since the late 1960s but has evolved drastically with the increased popularity of the Internet as will be explained through out this thesis.

The idea for companies to make business with other companies over a network occurred in the beginning in private networks but with the growth and increased popularity of the Internet the shift has turned towards the usage of a public network. (Hamill, 1997) The benefits of the public network outnumber the benefit of the private network and have created a renaissance in the field of B2B electronic commerce.

The reason for investigating B2B is because it will increase in importance in the future and contribute to the ongoing development of the Internet based economy often referred to as the new economy. (Swatman and Chan, 2000, Maloney, 1999) As figure 1.1 indicates electronic commerce is estimated to grow massively and will contribute to $1500 billions of the total trading between companies in the world by 2004 (Cohen, 1999).
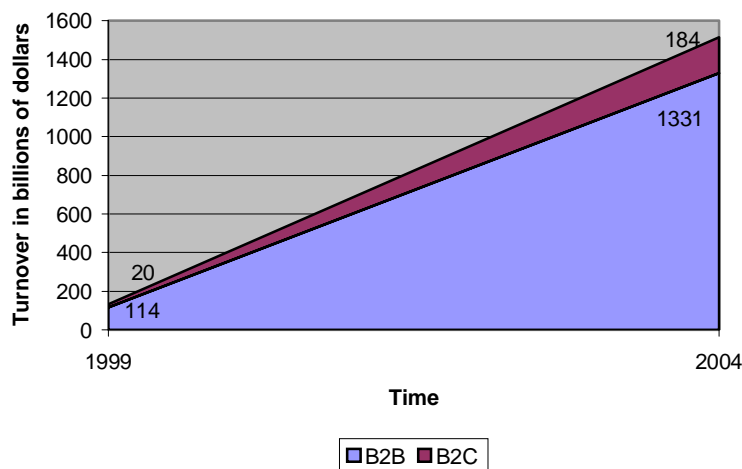
FIGURE 1.1 THE ESTIMATED GROWTH OF B2B AND B2C IN THE US, FORRESTER RESEARCH, 1999 (COHEN, 1999)

Clearly, e-commerce is making an impact on the ways that trading activities are being conducted. Much of the early literature on this subject was very speculative (Davis and Botkin, 1999; Aston and Schwarz, 1992; Tapscott and Caston, 1993). However, the growth of e-commerce has enabled more observations to be made of the use of e-commerce by organisations (Cronin, 1994; Tapscott, 1995; Lloyd and Boyle, 1998). The literature is on the whole very enthusiastic about the benefits and excited about the prospects.

One area where B2B will have significant impact is in the management of supply chain. According to Skjoett-Larsen (2000) the focus of companies will be changed from internal efficiency in the logistics to external relations between the parties in the total supply chain. In other words Skjoett-Larsen argues that the largest potential for improvements is not found inside a company, but rather in the interfaces between independent companies in the supply chain. The enhanced competition in the market place is forcing companies to consider strategies that reduce costs, and time constrains (Batchelor, 1997; Ericsson, 2000). According to Benjamin et al. (1986) electronic commerce will reduce the cost of integrating customers and their suppliers. In order to cope with the competition companies are therefore looking for adopting more collaborative relations with their key suppliers, this in order to save time and money (McIvor et al., 2000).

Clearly B2B is influencing the supply chain management, and it is also in this area where we will put our interest. Hence, in order to grasp what is happening at the present in the field of B2B we believe it is important to understand what has happened in the history. We are therefore going to present a brief history of B2B that will end up in an in-depth description of the latest way of conducting electronic commerce between companies over the Internet, namely the Extranet. (Ratnasingham, 1998). After exposing the reader to the history of B2B we will deepen our focus of its impact in supply chain management presented in the problem discussion.

1.1. BACKGROUND

The idea of business to business electronic commerce is to connect suppliers, purchasers and retailers in an easy way, grasping the benefits associated with electronic commerce. According to Galle and Min (1999) B2B is "an inter-organisational information system that is intended to facilitate business-to-business electronic communication, information exchange and transaction support through a web of either public access or private networks".

As explained in the introduction, electronic commerce is becoming increasingly popular which stems from the benefit associated with it. Some of the benefits of implementing an electronic commerce system is that the supply chain efficiency improves when information about product availability, inventory level, transportation level and/or production requirements is made available in real time. (Raddstaak and Ketelaar, 1998).

Other benefits, associated with the implementation of an e-commerce system, is illustrated in a study made by Kearney (1999) demonstrating that companies are losing billions of dollars each year because of bad routines, domestic thinking when selecting suppliers and lack of grasping the opportunities of B2B e-commerce. The same study found that companies lowers transactions cost, time and price by implementing B2B (figure 1.2). (Ericsson, 2000)
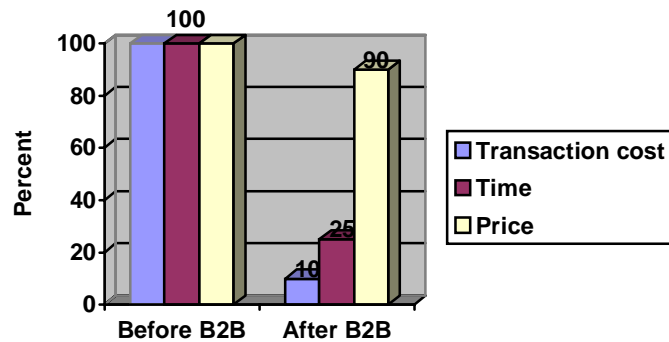
FIGURE 1.2 THE CHANGE IN PRICE, TIME FROM PURCHASE TO DELIVERY AND TRANSACTION COST BY IMPLEMENTING B2B E-COMMERCE (KEARNEY, 2000, CITED IN ERICSSON, 2000)

The actual savings varies between industries and certain industries benefits more then other depending on the importance of purchase in that industry. In general though, the cost of transportation can be diminished and the barriers of long distances reduced in any industry. (Fraedrich and Cherrry, 1993)

Not only can the company reduce time and distance and create a slimmer supply chain by implementing Extranet, the collaborative planning among supply chain partners is made possible. Essential information can be shared concerning demand and production having the affect of speeding up research and development (R&D) and delivering the right product at the right time and right price. (Karoway, 1997) Electronic commerce effectively links customer demand information to supply chain functions such as distribution and manufacturing and subsequently facilitate demand-driven (pull strategy) supply chain operations. (Kalakota and Whinston, 1997, and Zikmund and D'amico, 1995). Despite the benefits of implementing e-commerce as a purchasing tool, some hurdles are holding it back, these includes for example security and legal issues. (Galle and Min, 1999).

As mentioned previously, companies can conduct commerce in a number of ways over computer nets, developed throughout the years, these are Electronic Data Interchange (EDI), Internet, Intranet, Extranet and E-mail (figure 1.3). (Galle and Min, 1999).

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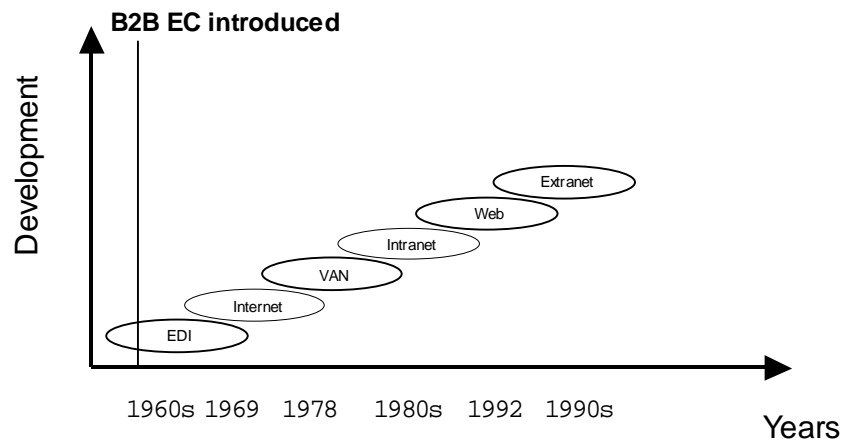
FIGURE 1.3 THE DEVELOPMENT OF THE NEW ECONOMY (ADAPTED FROM PAWAR AND DRIVA, 2000)

1.1.1. The development of B2B e-commerce in an historical perspective

In the 1960s the modem was invented which enabled computers to communicate over a telephone wire. Together with the possibility to connect computers directly (direct wires) the B2B e-commerce was born and the first tumbling steps towards the new economy were taken. The first system that connected companies together enabling company to company commerce was EDI. (Pawar and Driva, 2000) (figure 1.3)

ELECTRONIC DATA INTERCHANGE

EDI is defined as "the computer-to-computer exchange of business documents in a standard, format between and among trading partners." (Emmelhainz, 1990) The system was first developed by the trucking industry in order to facilitate commerce between companies. (Pawar and Driva, 2000). Basically the system consisted of three types of actors. The net provider, the buyer of the goods and services and the supplier of the goods and services. Commonly the EDI consisted of one buyer (hub) that worked as the net provider and a number of suppliers (spokes). (Loshin, 1997)

Actors were now communicating with one another electronically by using computers that were interconnected by direct wires. The system was not connected to the Internet, and was only open for trading partners engaging in electronic commerce with each other. In other words if a new supplier wanted to enter the net, it had to apply for it, wires and software had to be installed etc. Since no infrastructure such as the Internet existed, it could be a costly effort. (Loshin, 1997) Along the way of system development, standards were set in order to enable communication between previously incompatible computers. Although more than six million companies were connected to EDI in North America, only about one hundred thousand were active users in 1996 according to the EDI Group Limited. (Angeles, 2000).

The reasons for EDI being unsuccessful came from the expenses involved with it and the skewed power relationship between the hubs and the spokes. Some hubs used their position influencing

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suppliers at each other, thereby undermining their bargaining positions. EDI was a closed system which meant that it was easier to keep track of whom was using the system and when. Not only the security made the system attractive it also integrated the users to a higher degree. When the benefits of the Intranet became clearer some companies decided to connect their networks to the Internet. (Zwass, 1996) Hanson (2000), provides a theoretical model of the interaction and difference between the public Internet, Intranet and Extranet. Using the model as a basis each area will be explained. (See figure 1.4)
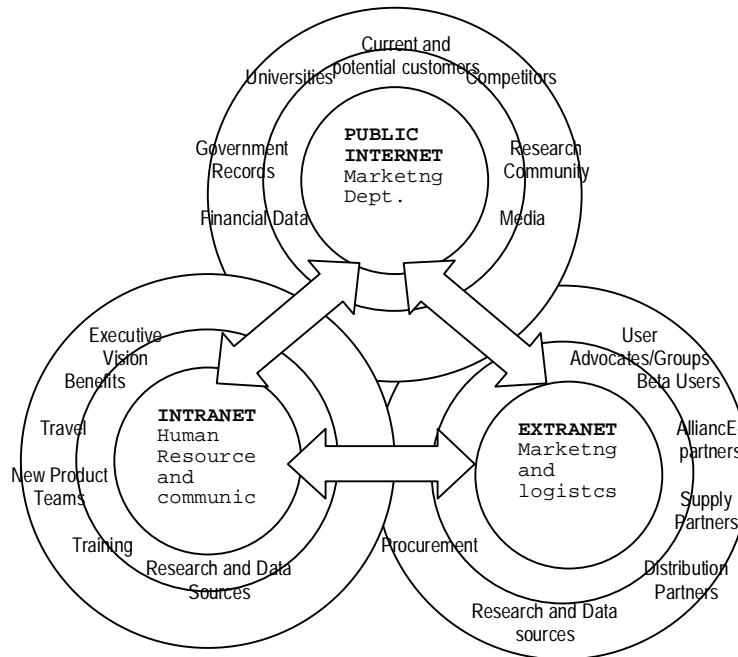
FIGURE 1.4 THE RELATIONSHIP BETWEEN INTRANET, EXTRANET AND INTERNET (HANSON, 2000)

PUBLIC INTERNET

The Internet consists of thousands of connected networks of computers all over the world operating on a standard protocol which allows data to be transferred between otherwise incompatible machines. The word itself means a "network of networks". (Hamill, 1997)

The Internet has its origin in the U.S. Department of Defence and was established in 1969 to provide a communications network for organisations engaged in defence-related research. Some years later researchers in other fields began to establish their own network which was administered by the National Scientific Foundation (NSF). These two individual nets merged, creating the Internet in 1983. Today, the NSF still maintains the network, in corporation with the Internet Architecture Board, and the Internet Network Information Center. ("Internet", Encyclopædia Britannica On-line)

In 1992 the Internet developed into a public media when some students at the University of Illinois created Mosaic, which enabled people to post information and graphics on the Internet. This breakthrough on the Internet led to an increase in usage and Internet entered another stage of

its life cycle. The new economy was founded. Along with the growth of the Internet, companies came to use it as a way of informing customers about their products and services. At first the information was on a one-way basis mainly distributing the information. Eventually the web site became participatory and an interaction between customers and companies was created through two-way communication. Today the Internet has developed into a market place where customer and companies are meeting to make business. (Sterne, 1997)

The Internet is growing with approximately ten percent each month. Commercial use of the Internet is the fastest growing part of World Wide Web and managed properly Internet can be implemented in order to gain competitive advantages in global markets. Many companies are therefore building Internet based strategies to support overall business development. (Hamill, 1997) The prerequisite for this to happen was the construction of a private network of information, or the Intranet.

THE INTRANET

As long as companies have been able to inter-connect their computers, Intranets have existed. Intranet is an internal network, similar to the Internet but smaller, containing databases and data about the company that is accessible only to authorized personal.

In order to explain the Intranet an example from real life will be given. The example given was presented in the international journal of educational management 1998 by McCrohan and Preston, 1998 at page 155.

> "A professor has his browser logged on to the academic faculty Intranet and with the click of a button views a colleague's syllabus. With the click of another button the professor downloads a web page displaying recent class cancellations. The professor then decides to update his or her existing syllabus and posts it for viewing on the academic student Intranet. A student using a lab computer decides to view his or her class's home page on the academic student Intranet and does so with the click of a button on the Netscape browser. All these functions were performed using WWW browsers running on network computers. As such, the operation of Intranets does not require the development of additional networks."

Companies first used their Intranets to improve their internal communication and store company essential information (Loshin, 1997). According to Franklin (1997) the development of Intranet started with a company connecting their computers enabling e-mails and it continued with further development of cooperation between parties in a company. When finally the company decided to expand outside the company boundaries, the open or closed Extranet was created[1]. With the enhanced usage of the Internet the electronic commerce has shifted from the closed, standardized formats used in EDI, to the new e-commerce environment, represented by the Extranet.

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[1] This can be done either by directly connected computers or networks (EDI), or by connecting the Intranet to the Internet (open Extranet). As explained on page 9.

THE EXTRANET

It is important to distinguish between Internet, Intranet and Extranet. Figure 1.4 (p.9) illustrates the relationship and differences between the three.

The Internet can be said to belong to all its users whereas the Intranet solely belongs to the organisation that maintain and uses it. (McCarthy, 1997) The Extranet is though, representing the bridge between the public Internet and the private corporate Intranet where the majority of business activity occurs. "Extranet is a slice of an Intranet that provide a public window into company services or collected data" (Loshin, 1997). One can therefore argue that what is an Intranet for one company is an Extranet for another company as illustrated in figure 1.5.

Intranet
Company
A

Intranet
Company
B

Extranet open for company A and
B, often provided on the Internet
but closed for other companies.
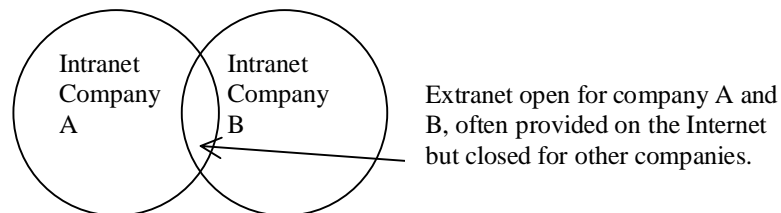
FIGURE 1.5 THE RELATION BETWEEN INTRANET, EXTRANET AND INTERNET (LOSHIN, 1997)

The Extranet comes into function when the Intranet is opened up for external users. (Schwarzwalder, 1999) This can be done either by directly connected computers or networks (EDI), or by connecting the Intranet to the Internet (Extranet). What the companies want to share with external actors and to whom they want to share it therefore depends on the nature of the information and the way the company wants to make business with other companies. If a company is deciding to open up their Intranet by connecting it to the Internet, certain security measurements needs to be implemented.

After the appropriate security systems have been put into function the company has to decide on to what degree the system should be opened for external users, and what each user should be able to access. The accessibility of the Intranet can therefore be divided up into three parts as illustrated in figure 1.6 below. (Loshin, 1997, Desmarais 2000, Gritzalis, Iliadis and Oikonomopoulos 2000, Wex and Forch, 1996)

A

B

C

A   Everybody connected to
the Internet.
B   Parties admitted deeper
excess to information.
C   Only within the company
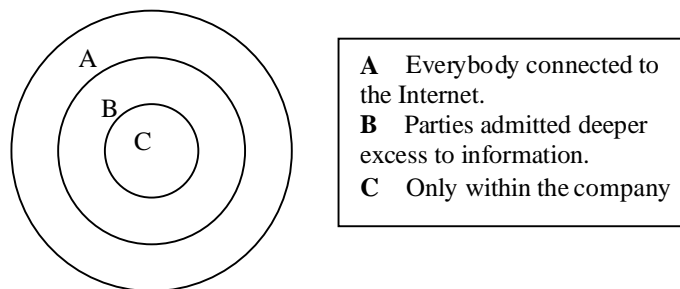
FIGURE 1.6 THE DEGREE OF OPENNESS OF THE INTRANET (LOSHIN, 1997)

To improve the actual understanding of what an Extranet is, an example is presented from real life that correlates to the example given about Intranet.

"A professor accesses the academic faculty Extranet from his or her home computer and performs all the functions described on the Intranet example. An Extranet shares the same user interface and operates similarly to an Intranet. However, a user of an Extranet does not have to be located within the physical confines of the Intranet. The user can access the Extranet from any remote location via the Internet. As such, Intranets tend to be more secure because they are less vulnerable to outside attacks." (McCrohan and Preston, 1998 page 155).

It should be remember though that the core idea of the Extranet for companies is actually to foster relationships between customers, trading partners or employees. The Extranet can therefore be said to function as an infrastructure where parties can settle deals and exchange information or in other words improving the supply chain management. (Loshin, 1997)

While previously having demonstrated the development of B2B from the birth of EDI until the latest innovation of Extranet it is time to further deepen the study purpose.

1.2. PROBLEM DISCUSSION, AND RESEARCH QUESTIONS

Extranet is a rather new study area and we will briefly cover some of the research that has been done, aiming up into discussing Extranet in supply chain management.

Extranet is the latest development of B2B and it is the system most commonly used by companies. Extranet has brought a number of benefits by improving corporate efficiency, data flows and error reductions. It has eliminated the need to re-enter data from paper documents and thus prevents clerical errors and actually reduced the need for personnel involved in orders and accounts processing. The new B2B system has led to faster trading cycle, improved supply chain management and the ability to win new business or retain existing customers. This in turn has led to improvements in business efficiency, and the ability to respond to highly competitive new market entrants; reduced costs for paper and postage; reduction in money tied up in stock; decreased manual processing costs, and improved cash flow. (Anandarajan, Anandarajan, and Wen, 1998)

So far, prior research on B2B has focused on the evaluation of its operating benefits and has not identified factors which may have a significant impact on trading decisions (e.g. Emmelhainz, 1990, Carbone, 1995, and Gupta, 1997). Fraser, Fraser and McDonald (2000) present a theoretical framework that outlines the advantages and disadvantages with the use of Extranet. The study found out the importance for companies to be one step ahead of competition when developing Extranets. A number of researches have been carried out examining how Extranet has been implemented by companies and the factors affecting it.

In a study conducted by Chang and Swatman (2000) it was found out that the major driving forces for implementing EDI differed from the one of Extranet. Companies were adopting EDI to achieve savings and improve efficiency, whereas implementation of Extranet came to be driven by a desire for greater supplier involvement and customer services. The reason for choosing Extranet as a study area rather then EDI is therefore obvious.

Studies by Frost (1998) and Flanagan (1997), examined the extent to which Extranets have been adopted and used by companies (Tapscott, 1995). Clearly it is not easy to implement changes in organisations, as for example the introduction of Extranet. Pawar and Driva (2000) therefore argued that managers needs a guide to support them in implementing technical changes such as Extranet in their organisation. The guide (framework) presented was based on a number of studies made throughout the years by Twigg and Voss (1992), Rhodes and Wield (1994), Hyclak and Kolchin (1986) all covering areas of how technological changes are adopted by a company. The framework was developed at the University of Nottingham and tested in a variety of settings in European manufacturing organisations such as presented by Pawar and Driva (1997, 1999).

Many other aspects of Extranets have also been covered in previous studies such as security issues (Desmarais 2000, Gritzalis, Iliadis and Oikonomopoulos 2000, Wex and Forch, 2000), managerial implication (Willson, 1997, Ratnasingham, 1998), how Extranets influences trading contacts, and ways of implementation (Pawar and Driva, 2000) among other things. With this as a background, it is obvious that it is a broad area to look at all of all the aspects of Extranets. We are therefore aiming towards deepen our knowledge in a certain area, namely supply chain management (SCM). The reason for this is that changes in the supply chain profoundly affect how companies are interacting with one another. After all, one of the major changes in the inter-organisational process is occurring with the implementation of Extranet (McIvor, Humphreys and Huang, 2000). We will therefore next discuss Extranet in SCM.

SCM is the co-ordination, integration and revenue maximization associated with the flow of products, services, information and money across trading partners. The objective of supply chain systems are multidimensional and include cost minimization, increased levels of service, improved communication among supply chain companies, and increased flexibility in terms of deliver and response time. Before Extranet, the ability of firms to achieve these goals were limited according to Lancioni, Smith, Oliva (2000) which goes together with the argumentation of Chang and Swatman (2000).

Optimising supply chain activities is critical to all industries since it saves money and increases revenues. (Arbor, 2000) Suppliers and customers cannot be treated in isolation. They are interrelated and must therefore be managed together to gain success for both parts. Information flows, (both internal and external), new product co-ordination and staff development are examples of what influences the supply chain strategy. Global networks (such as Internet, Extranet) have for long been discussed as a source of success in a world with increased competition, but it has never been more valid than today. (Spekman, Kamauff, and Myhr, 1998)

The use of the Extranet in SCM is a relatively recent phenomenon. There have been few, if any studies done on the use of the Extranet in SCM. The principal literature support comes from the descriptions of project of companies, on how they have utilized the Extranet in the management of their individual supply chains. (Lancioni, Smith, Oliva, 2000). Pawar and Driva (2000) has explored the effect of implementing Extranet in the supply chain. The study shows evidence that companies reduce operating costs and improves profit margins by the implementation of an Extranet. A core issue for a firm considering to implement an Extranet is to look at and understand the reasons for doing so. It will therefore be interesting to look into the advantages and disadvantages for SCM with the implementation of Extranet. A number of researches have been made in this area which creates a firm base to work from. Andarjan, Andarjan and Wen

(1998), Pfaffenberg (1998) and Holme (1998) among others all discuss advantages and disadvantages with Extranets.

A study made by Moore (1998) addressed the importance of Extranet in improving supply chain management. The author argued that organisations should take a look at the entire supply chain and identify areas for revolutionary or evolutionary change. Successful SCM is dependent on trust in-between the parties involved. Spekman, Kamauff, and Myhr (1998) argues that previously, trading partners held arm's length distance from one another, that there were a lack of trust, there were a win-lose situation, price and short term were in focus and that there were a reluctance to share information. Extranet gives the possibility to shift trading partners quicker than what was possible without this technique. This, in turn, makes the managing of the supply chain crucial for the success of an organisation and therefore very interesting to study (Saunders, 1994).

Information and communication technology such as Extranet therefore causes the need to rethink the business strategies and the use of technology and relations with trading partners. The new technology decreases the time and energy required for trade which decreases the friction between trading partners. This leads to a decrease in the number of partners since the search for the optimal source becomes less important. The best technology is decided upon with respect to the industries buying practices and the company's own relative power within the supply chain. (Saunders, 1994, Cross, 2000, and Spekman, Kamauff, and Myhr, 1998)

Some of the strategically implications for managers implementing B2B systems were researched by Ström (1997), and Min and Galle (1999). Both studies argued among other things, that larger firms with greater annual purchasing volume and workforce size are more inclined to mandate the use of EC as an important part of an on-going business relationship with their suppliers than their smaller counterparts. Although the benefits of Extranet are the same regardless of whom having implemented it, Extranets vary in nature, size of audience, sophistication, cost of technology and the extent of external penetration of internal network resources. (Pfaffenberg, 1998) Based on these studies and arguments we are aiming to collect data from large companies.

1.2.1. Purpose and research questions
Based on the problem discussion keeping in mind the lack of previous research the purpose of the study is ***to gain a better understanding of how Extranets are used in supply chains.***

RQ1 How can the use of Extranets in supply chain management be described?
RQ2 How can the advantages/benefits of Extranet use within a supply chain be described?
RQ3 How can the disadvantages/risks of Extranet use within a supply chain be described?

1.2.2. Demarcation
We are going to explore on these questions by looking at Extranet from both the selling and the purchasing company's point of view. We think that in this way we can find both positive and negative things with an Extranet that the other part in the supply chain have not thought of. We will also be able to find out where and hopefully why, they agree on some points if this proves to be the case. This is interesting not only for us, but also for the members of the supply chain in our opinion.

1.3 DISPOSITION OF THE THESIS

To provide the reader with an overview of the disposition of this thesis, a brief presentation of the chapters will next be given. We have given the introduction to the area that is to be studied; the following chapters will be:

2. Literature review; where previous studies within the area of interest will be brought up.

3. Methodology; this is where the research process will be described.

4. Data presentation; where the interviews conducted will be presented.

5. Analysis; which is done both by a within case analysis, and a cross case analysis. I.e. the companies studied will be compared with both the theory *and* with one another.

6. Findings and conclusions; where the results are presented, following the structure of the research questions.

7. Bibliography; where all information of the sources used in this thesis can be found.

2. LITERATURE REVIEW

The literature review is organised after each research question starting with the description of the Extranet in SCM.

2.1. DESCRIPTION OF THE EXTRANET IN SCM

How Extranet is used in supply chain management is a relevant question according to the argumentation in the problem discussion. Before we can explore on the question it is though important to clarify what SCM is and how it works. After that is done a description of how Extranet has been used in SCM will be conducted.

2.1.1. Supply chain management

Supply chain management is the co-ordination, integration and revenue maximisation associated with the flow of products, services, information and money across trading partners. (Arbor, 2000) There are very few raw materials that have the same ownership of a good from the source, to the time they are sold to the end customer. Most likely the material pass through a number of companies whose role may be to transform, store or move material. (Berry and Towill, 1992). In essence a supply chain is a network of processing cells with the following characteristics: Supply, transformation and demand (Davis, 1993). (See figure 2.1)
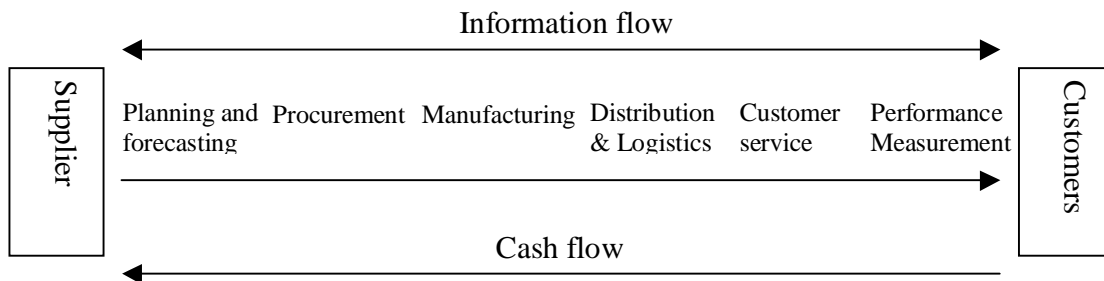
FIGURE 2.1 THE SUPPLY CHAIN (SPEKMAN, KAMAUFF AND MYHR, 1998)

Optimising supply chain activities is critical to all industries since it saves money and increases revenues. (Arbor, 2000) According to Spekman, Kamauff, and Myhr (1998) suppliers and customers cannot be treated in isolation since they are interrelated and therefore must be managed together to gain success for both parts. Information flows, new product co-ordination and staff developments are examples of what influences the supply chain strategy.

The supply chain takes an integrated, holistic approach to logistics management. It can be seen as a loop that starts and ends with the customer. Through the loop flows all materials, finished goods, information and transactions. In the last few years, the supply chain concept has been realised through advances in information technology. This has made electronic communication cheaper. The main barrier that remains to full supply chain integration is about to disappear (Pawar and Driva, 2000)

Since the aim of SCM is to improve the co-ordination, integration and revenue maximisation it is important to look at how each part of the supply chain is fulfilling its SCM objective.

Porter developed in 1985 the value chain. This is a framework for companies to critically analyse their activities for the purpose of realising competitive advantage. In essence the value chain desegregates a firm into its strategically relevant activities in order to understand the behaviour of costs for the purpose of control and more effective management. The concept is based on the premise that every firm is a collection of activities that are performed to design, produce, market, deliver, and support its product. Porter also derives the concept of "margin" which is the difference between total value and the collective cost of performing the value activities. (Anandarajan, Anandarajan, and Wen, 1998)

The Value Chain can therefore be said to be a tool that can be used by an organisation to find ways to create more customer value. There are many activities performed in a company before selling a product. Design, marketing, delivery and support of the product are just a few steps to consider. The Value Chain identifies five primary activities and four support activities that all are relevant in creating value. (Kotler, 1997) (See figure 2.2)
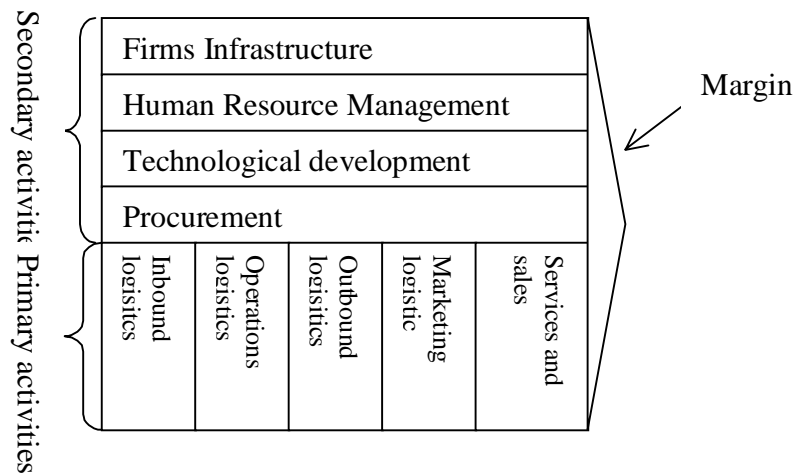
FIGURE 2.2 THE VALUE CHAIN (KOTLER, 1997)

One of the primary activities is inbound logistics, where materials are brought into the organisation. Operation logistics is converting this material into final products. Outbound logistics is, as the name suggests, when the final products are delivered. The marketing of the product is the next step in the primary activities and the final one is service and sales of the product. (Ibid)

The supportive activities are firm infrastructure, human resource management, technological development, and procurement. Procurement is the purchasing of various inputs for each primary activity. The infrastructure support activity covers the costs of for example management, planning, finance, accounting and legal affairs. These are costs from all the primary and support activities. (Ibid)

The firm must examine costs and performances in all the value creating activities and to look for ways to improve it. Competitors can also be evaluated as benchmarks to find out possibilities for competitive advantages. The co-ordination of the different activities is of the utmost importance for the success of the organisation. More emphasis must be placed on the smooth management of core business processes. These often involve cross-functional activities and include new-product realization process, inventory management process, order-to-remittance process, and customer service process. Strong companies are those that develop superior capabilities in managing these core processes. (Ibid)

The traditional view of supply chain management is to influence the supply chain to achieve the lowest initial purchase price while assuring supply. Companies in the supply chain are often operating under competition and the fundamental assumption is therefore that trading partners are interchangeable and will take advantage if they become too important. (Spekman, Kamauff, Myhr, 1998)

SCM can be used to develop competitive advantage by reducing investment without sacrificing customer satisfaction. (Lee and Billington, 1992). Supply chain partners openly share information that facilitates their ability to meet end users needs. Companies have for long addressed the importance of having a good relationship with its largest customers. According to Helper (1991) a sustainable supply chain strategy should not only focus downstream but also upstream. It is important to build close ties to key suppliers as well. Global networks have for long been discussed as a source of success in a world with increased competition, but it has never been more valid than today. (Spekman, Kamauff, and Myhr, 1998)

VALUE DELIVERY NETWORK

To be successful, the firm needs to look into the value chains of suppliers, distributors and customers to find competitive advantages (Czinkota and Ronkainen, 1998). By Extranet, this can for example be used to direct orders when the stocks fall below a certain level. In a quick response system like this, the goods are pulled by demand rather than pushed by supply and this lower the need of stocks. The quality of the marketing network is essential for the competitive status of the organisation (Ibid).

Early adopters of Extranets viewed implementation as a method to gain competitive advantage over other firms. However, as more competitors adopt Extranets, the system has now become less effective as a strategic tool and more a "way of doing business" to remain competitive. (Anandarajan, Anandarajan, and Wen, 1998)

Communication technology has for long been central to the operation of a company's supply chain and the majority of businesses have now started to use electronic commerce to some degree. Applications include, for example, e-mail, the Internet, EDI and Extranet. There are three main components that must be addressed before any electronic trading can take place. These are standards, translation software and communication infrastructure. The standards define the techniques for structuring data in electronic messages to enable both ends to understand the transactions. Translation software is the translation of messages, and the communication infrastructure enables a flow of information between trading partners. The last mentioned could

be discs, tapes or by using third-party network operator. To date, e-commerce has been mostly used among large organisations and their contacts with suppliers. However, in the last few years, e-commerce has grown as a core business of many other groups as well. There is a tendency for e-commerce to be used more for sales, invoicing and receipts than for part ordering, materials scheduling and delivery. (Pawar and Driva, 2000)

The physical structure of supply chains differs. The complexity differs and so does the number of stages and diversity of participants at each supply chain stage. It is very tempting to copy other people's success, but this can often be a mistake since the circumstances do not remain static. There is therefore no best way to gain success when conducting business. (Cox, 1999) Companies, especially those actives in traditional business areas, are reluctant to change over their logistics activities into a primarily electronic format, despite the many documented successes. Changes demand great changes that are very costly, even if profits and savings can be done in the long run. Supply chain management is about changing the culture, not only internally, but also externally with trading partners, nationally with institutions and internationally with the supply chains. (Pawar and Driva, 2000)

It is widely recognised that information is a key issue of any public or commercial organisation. The management of the supply chain information grows in importance with the growth of information flow. Companies must maximise the use of existing information as well as they need to access more information. It is important to remember that the complexity increases with more information available. The major problems with managing heterogeneous information in organisations are insufficient understanding of the data, lack of facilities for maintaining information resources, and difficulty in organising ad hoc processing. In the information-demanding environment described, enterprises will have to react rapidly to incoming events and will not have the luxury to which they were previously accustomed. Internet-based working environments will be followed by Intranet/Extranet to create, maintain and analyse information. (Walsh and Koumpis, 1998)

Even though the supply chain theories have limitations, it is a powerful tool in that it provides insight into the push and pull in the chain of suppliers, distributors and customers. The key for future must be the development of a proper understanding of the structural properties of supply chains, and of the most effective ways of leveraging ownership and control in the supply chain. (Cox, 1999)

EXTRANET AND SUPPLY CHAIN MANAGEMENT

How Internet influences the value added in the process of product development to every part in the value chain is looked upon by Lancaster and Walters (1999). Their study concludes that it is only by pursuing a logical approach to the integration of information management into the strategy process that firms can become effective, world-class competitors. The studies concerning supply chain and value chain shows evidence that companies reduce operating costs and improve profit margins by the implementation of an Extranet. A study made by Moore (1998) addressed the importance of Extranet in improving supply chain management. The authors also argued that organisations, and in particular managers, should take a look at the entire supply chain and identify areas for revolutionary or evolutionary change.

Effective supply-chain management is essential for a successful company. SCM can reach beyond the boundaries of a single company to share that information between suppliers, manufacturers, distributors and retailers. (Graham and Hardaker 2000) This is where Internet or Extranet plays an important role.

According to Graham and Hardaker (2000) companies can by Extranet target new market by offering low entry costs, relatively minimal complexity with more flexibility and a convenient way in transacting business. By outsourcing and forming strategic alliances companies provide an impetus to support the sharing of supplier, customer and corporate information, that was once proprietary with competitors and other cross industry players. The authors further argues that business are acting in an environment where sharing information among all participants is driving fundamental changes in the interaction, business practices, and operations of everyone involved. For example "the big three" automaker in the USA, launching the automotive network exchange to further understand the impending effects of electronic business communities. "The potential result will be a lower cost structure for the entire auto industry in which all participants will benefit. At the same time, such benefits will greatly modify the competitive strategies and interaction among all participants." (Graham and Hardaker, 2000 s 287)

The Web gives all suppliers in a supply chain the opportunity to identify and co-ordinate data transfers with each other. (Graham and Hardaker, 2000) It is proposed that, with marketspace reconfiguring the traditional value proposition, SCM needs to manage the organisational complexity of adopting a dynamic mix and emphasis between content, context and infrastructure.

The process of innovation with the adoption of an integrated approach throughout the supply chain, requires a trade off between autonomy and control, of which the balance decided upon is unique to partner relationships. The organisational challenge of reaching an acceptable balance between autonomy and control is probably best achieved by the idea of subtle control (Shrivastava and Souder, 1987).

The players must have access to a wide range of external technological services in order to operate effectively. Integration along the supply chain in the virtual market can be viewed as being a mix of both formal and loose integration mechanisms, similar to the Internet infrastructure. It is though important to remember that B2B include organisations operating solely in marketspace and also those with a mix between the traditional marketplace and marketspace. (Ibid)

2.1.2. How is Extranet used in SCM?
According to Lancioni, Smith and Oliva (2000) Extranet can be used in SCM in many different ways explained in table 2.1 on the next page.

TABLE 2.1 HOW EXTRANET CAN BE USED IN SCM

How Extranet can be used in SCM according to Lancioni, Smith and Oliva (2000)
❑ On-line vendor catalogs from which buyers can find, select, and order items directly from suppliers without any human contact
❑ The ability to track shipments and equipment using a wide variety of modes including truck, rail, and air transport
❑ The ability to contact vendors or buyers regarding customer service problems from late deliveries, stock-outs, alterations in scheduled shipment dates, late arrivals, and a wide variety of other service issues
❑ The ability to reserve space in public warehouses for anticipated deliveries to market locations
❑ The ability to schedule outbound shipments from private and public distribution centers on a 24 hours basis
❑ The ability to provide 7 days/24 hour worldwide customer service
❑ The ability to receive orders from international customers
❑ The ability to check the status of orders placed with vendors
❑ The ability to notify vendors of changes in configurations in products that are produced to order
❑ The ability to pay invoices electronically and to check outstanding debit balances
❑ The ability to directly communicate with vendors, customer etc. regarding supply issues on a 7/24 basis via e-mail
❑ The ability to be more responsive to customer service problems
❑ The ability to schedule pickups and deliveries
❑ The ability to reduce service costs and response time.

Source; Lancioni, Smith and Oliva (2000)

2.2. THE ADVANTAGES OF EXTRANET USE IN SCM

A number of researches have been made in this area which creates a firm base to work from. Anandarajan, Anandarajan and Wen (1998), Pfaffenberg (1998) and Holme (1998) among others all discuss advantages with Extranets. The authors mention for example cost savings, time reduction, faster communication, reliability and accuracy and improved corporation and customer service. In table 2.2 the various advantages of Extranet in SCM is illustrated followed by a discussion.

TABLE 2.2. THE ADVANTAGES OF EXTRANET IN SCM

Advantages of Extranet in SCM
Cost savings
Time reduction
Improved corporation
Improved customer service
Faster communication
Reliability and Accuracy

Source; Own construction

2.2.1. Cost savings

According to Anandarajan, Anandarajan and Wen (1998), Pawar and Driva (2000) and Pfaffenberger (1998) the implementation of Extranet will reduce cost. Cost savings come to a large extent from that electronic integration result in more consolidation and the use of a smaller number of suppliers. This means less time and paper work associated with co-ordinating and dealing with suppliers. There is also a significant reduction in costs related to purchasing and warehousing, material handling, scheduling, and sales promotion. As explained, the Extranet enables physical distribution networks to be simplified and the product to move directly from the supplier to the purchasing company. In other words the supply chain is affected.

The company can obtain significant cost savings due to the elimination of many middle parties that they no longer have to deal with. A shared database between partners is also a cost reducer since it reduces relevant costs of market research. (Anandarajan, Anandarajan and Wen, 1998) In the last few years, the supply chain concept has been realised through advances in information technology. This has made electronic communication cheaper. (Pawar and Driva 2000)

The Extranet has the ability to replace telephone, personal meeting and fax machines. (Hurme, 1998) According to Burt and Felix (1997), the return of investment (ROI) for an Extranet is between two hundred and one thousand percent. ROI is though something that is hard to measure since the concept of Extranet involves both hard and soft costs. Hard cost is money, whereas soft cost is intangible and involves time and ease to use. By implementing an open system the cost is low and little training of the employees is required since it is integrated into users routine. The Extranet also increases speed and effectiveness of sharing information. Employees can work at home or from remote places when traveling. (Covil, 1998)

The Extranet is used by industries to obtain competitive advantages. The usage improves the communication between business partners and reduces the costs when unnecessary middlemen are eliminated. Companies can offer improved services. (Holme, 1998)

2.2.2. Time reduction

In addition to cost reduction the Extranet also impacts the order cycle time between the producing company and its customers. A reduction in purchasing time allows for smaller orders to be placed more often resulting in lower inventory costs. (Anandarajan, Anandarajan and Wen, 1998) With Extranet, savings can be made along the entire supply chain. Timesaving can be made since paper handling is more time consuming than electronic transmissions. (Pfaffenberg, 1998) The Internet has the potential to accomplish a key goal of supply chain management, which is to cut "cycle time", not in incremental steps, but in broad swaths, by completely cutting out queue time, move time, and other aspects of costs and waste. The Extranet broadcasts simultaneously and not serially to all points in the supply chain, thus speeding up coordination among trading partners directly involved in specific transactions.

2.2.3. Improved corporation

According to Graham and Hardaker (2000), Fraser, Fraser, McDonald (2000), Holme (1998), Anandarajan, Anandarajan, and Wen (1998) and McIvor et al. (1997), Extranet improves

corporation in supply chain. The Extranet can be used by companies to obtain competitive advantages and improves the communication between business partners among other things.

The actual benefits of Extranets have had the affect of increased usage of electronic medias in corporation and commerce between companies. The co-operation involves product development, production, logistic as well as finance. (Holme, 1998) The Extranet can be used to provide the partners with information, improve the supply chain management (e.g. Just In Time), link the business partners tighter to the organisation, build a knowledge pool and create an intellectual network. (Pfaffenberger, 1998). Extranets may result in single source sales channels. Single source implies shared databases between companies who can use this common database for tracking customers. This will reduce not only the cost but improve the communication. (Anandarajan, Anandarajan, and Wen, 1998) Companies are pursuing more intensive and interactive relationships with their suppliers, collaborating in new product development, integrating key business processes and information sharing on a range of issues (McIvor et al., 1997). With an improved communication in the development process time can be saved, and the best solutions can be reached quicker, when key information can be shared more easily. (Franklin and May 1997)

Saunders (1994) and Spekman, Kamauff, and Myhr (1998) argues that previously, trading partners had distance from one another and that there were a lack of trust causing not sharing information with each other. The author argues that more recently, communication has risen between trading partners, co-operation and trust is in focus and the organisations are more willing to share information with trading partners. This shift leads to increased importance to manage the supply chain.

In a study made by Hsu (1999) the impact of Extranet on the interaction between manufacturing and marketing was looked upon. The research found that Extranet improves the interaction between manufacturer and marketing. The fact is that Extranets enable remote and internal users to interact in order to design, plan and market products or services. (Pfaffenberg, 1998)

With an improved communication in the development process time can be saved, and the best solutions can be reached quicker, when key information can be shared easier. (Franklin and May 1997) Internet will according to Manning (1998) be used to a higher extent in the future for integration between industries and litigation will soon become standard procedure. The impact of e-commerce on the business-to-business sector is already manifesting itself in a number of different ways. However, the future will bring more dialogue between business and consumer on a number of levels within the supply chain that results in an even greater need to harness the benefits e-commerce can bring. (Fraser, Fraser and McDonald, 2000)

2.2.4. Improved customer service

Anandarajan, Anandarajan, and Wen (1998), Evans and King (1999) and Lancioni, Smith and Oliva (2000) address that the customer service for the participants in the supply chain improves with the implementation of Extranet. Extranet provides improved Customer service by giving greater access to information and decreased lead times. Orders can be processed quickly and shipments scheduled accurately. (Anandarajan, Anandarajan, and Wen, 1998).

The Extranet allows for the incorporation of more timely and accurate data into the company's planning and control system. Feedback mechanisms to report problems or complaints about purchased clothing or any related questions should be automatically forwardable to a corresponding web-based conference and these requests can then be managed throughout the Extranet to a point of resolution. Extranets allow for the effective management of multiple vendors, contractors and other contributors to the production process. In addition to reducing the number of suppliers, the Extranet reduced the costs of co-ordinating with suppliers. (Anandarajan, Anandarajan, and Wen, 1998)

The channel support, accessed by passwords, can strengthen the relationship with trading partners due to increased possibilities to check and place orders among other things. Global reach means that it is easier to cope with the increased need for relationship building. Extranet gives the customers 24 hours-a-day access, updated information and more focused target marketing efforts. (Evans and King, 1999).

2.2.5. *Faster communication*
Faster communication is another advantages of introducing e-commerce. According to Pawar and Driva (2000) it is clear that the greatest benefit seen through Extranet implementation is faster transactions. This is due to times being reduced and from better cash flow management. Debtors can be invoiced far quicker and more accurately using e-commerce. Experts observing B2B in general and Extranet in particular, call it frictionless, because no faxes, phone calls or paper bureaucracy plug the communication channels. (Maloney, 1999).

2.2.6. *Reliability and Accuracy*
According to Pawar and Driva (2000) the chance of documents being lost with Extranet is getting lower as well as printing and re-keying errors to occur.

2.3. THE DISADVANTAGES OF EXTRANET USE IN SCM

The introduction of a new technology such as Extranet gives, as described above, many advantages to the company. Costs can be decreased, the number of partners reduced and it is possibility to shift trading partners quickly among other things. More or less everything in the world has however both advantages and disadvantages. Disadvantages with Extranets are problems with transmission speed, if a low number of accesses are possible at the same time, security, and price differences between markets and sceptical buyers among other things (Evans and King, 1999). Desmarais (2000), Gritzalis, Iliadis and Oikonomopoulos (2000) Wex and Forch (1996), Willson (1997) and Ratnasingham (1998) also discuss disadvantages. These authors put their emphasis mainly on security and legal issues.

There are of course a number of other advantages and disadvantages with Extranet. In table 2.3 major disadvantages of Extranet use in SCM is presented followed by a discussion.

TABLE 2.3 THE DISADVANTAGES OF EXTRANET IN SCM

Disadvantages of Extranet in SCM
Lack of personal contact
Cultural problems
Security issues
Cost of implementation

Source; Own construction

Security remains a barrier to widespread use. Other reservations about adopting e-commerce included; trading partners are not ready, costs, training and personal contact. (Pawar and Driva, 2000). The hurdles of implementing a purchasing system are according to Galle and Min (1999) security and financial problems.

2.3.1. Lack of personal contact

According to Spekman, Kamauff and Myhr (1998) the personal contact between trading partners in the supply chain is changing. The personal contact face to face is getting lower. Extranet lack in personal contact, which has its affect in the need of information. (Amster, 2000 and Franklin, 1997)

2.3.2. Cultural problems

The personal contact get lower with the increased usage of computers, criticizers also argue that it is impersonal. Cultural problems have been found in organisations introducing computer networks. Every coin has two sides and even if time and money can be saved, employees might have to go and previous good relationships may go down in the effort of maximizing profits. (Franklin, 1997)

2.3.3. Security issues

Security remains a barrier to widespread use of Extranet. Security is the main concern when implementing an Extranet. The more vulnerable the information is in the B2B system, the more secure the system should be. Another problem with an open system like Extranet is that information sent over the Internet can pass through a network or router controlled by a business competitor. (Loshin, 1997). It is hard to control who access the system, from where, to where and to what costs. Limitations of performance involved are reliability, scalability, security and perception.

Security is an important factor when implementing an Extranet and it is distinguished as disadvantageous for Extranet. A number of studies have explored security in B2B EC such as Desmarais (2000), Gritzalis, Iliadis and Oikonomopoulos (2000) Wex and Forch, 2000, these study mainly explain different security solutions possible to improve the Extranet protection. Willson (1997) argues that trust towards technology and trading partners is an important factor in improving the security. Ratnasingham (1998) looks further into how trust influences the process of managing the security of an organisation operating in an electronic commerce environment.

2.3.4. Cost of implementation

The drawbacks of the Extranet are associated with the cost of purchasing and implementing the actual system. The main costs can be summarized in hardware costs, software costs, telecommunication costs, training costs and maintenance costs.

Hardware costs consists of mainframe and computer costs. Software costs are costs for the Extranet software, and tools to link this with already existing software. Telecommunication costs are the costs of accessing and using a value-added network. Training costs are related to training employees to change their existing work practices, and maintenance costs are costs linked to salaries of appropriately skilled technology people to maintain the network on a regular basis. There are therefore a lot of costs involved in the startup of an Extranet usage (Anandarajan, Anandarajan, and Wen, 1998).

2.4 CONCEPTUAL FRAMEWORK

According to Miles and Huberman (1994) "a conceptual framework explains either geographically or in a narrative form, the main things to be studied" (p.18). The authors further argue that this can be done after a list of research question has been made. We have listed the research questions in chapter one, and explored on the literature earlier in chapter two. Now we are going to clarify the conceptualisation of each research question following the order of chapter one. Thereafter an emerged frame of reference will be presented in order to show how the research questions fit together.

2.4.1 Description of Extranet in SCM

How Extranet is used in SCM is a study area that can be approach in a number of different ways. However we have decided to use the study by Lancioni, Smith and Oliva (2000) to capitalise on research question 1. (Table 2.4)

TABLE 2.4 HOW EXTRANET CAN BE USED IN SCM

How Extranet can be used in SCM according to Lancioni, Smith and Oliva (2000)
❑ On-line vendor catalogs from which buyers can find, select, and order items directly from suppliers without any human contact
❑ The ability to track shipments and equipment using a wide variety of modes including truck, rail, and air transport
❑ The ability to contact vendors or buyers regarding customer service problems from late deliveries, stock-outs, alterations in scheduled shipment dates, late arrivals, and a wide variety of other service issues
❑ The ability to reserve space in public warehouses for anticipated deliveries to market locations
❑ The ability to schedule outbound shipments from private and public distribution centers on a 24 hours basis
❑ The ability to provide 7 days/24 hour worldwide customer service
❑ The ability to receive orders from international customers
❑ The ability to check the status of orders placed with vendors
❑ The ability to notify vendors of changes in configurations in products that are produced to order
❑ The ability to pay invoices electronically and to check outstanding debit balances
❑ The ability to directly communicate with vendors, customer etc. regarding supply issues on a 7/24 basis via e-mail
❑ The ability to be more responsive to customer service problems
❑ The ability to schedule pickups and deliveries
❑ The ability to reduce service costs and response time

Source; Lancioni, Smith and Oliva (2000)

2.4.2 The advantages of Extranet in SCM

Most research is describing the advantages of Extranet without dealing extensively with the disadvantages. We have therefore found a firm base of studies to support our second research question mainly in Anandarajan, Anandarajan and Wen, (1998), Pawar and Driva (2000), Saunders (1994), Spekman, Kamauff, and Myhr (1998), Holme, (1998), McIvor et al. (1997), (Maloney, 1999), Evans and King (1999) and Pfaffenberger (1998). (Table 2.5)

TABLE 2.5 THE ADVANTAGES OF EXTRANET USE IN SCM

Advantages of Extranet use in SCM
1. Cost saving
❑ Less time and paper work associated with co-ordinating and dealing with suppliers (Anandarajan, Anandarajan and Wen, 1998)
❑ A shared database between partners is a cost reducer since it reduces relevant costs of market research. (Anandarajan, Anandarajan and Wen, 1998)
❑ Extranet reduces costs when unnecessary middlemen are eliminated. (Holme, 1998)
2. Time reduction
❑ Timesaving can be made since paper handling is more time consuming than electronic transmissions. (Pfaffenberg, 1998)
❑ The Extranet is speeding up coordination among trading partners directly involved in specific transactions
3. Improved corporation
❑ Extranet will improve communication through a common database for tracking customers in the supply chain (Anandarajan, Anandarajan, and Wen, 1998)
❑ Companies are, collaborating in new product development, integrating key business processes and cross-functional information sharing on a range of issues. (McIvor et al., 1997)
❑ Co-operation and trust is in focus and the organisations are more willing to share information with trading partners (Saunders 1994 and Spekman, Kamauff, and Myhr 1998)
❑ Extranet enable remote and internal users to interact in order to design, plan and market products or services. (Pfaffenberg, 1998)
4. Improved customer service
❑ Extranet in SCM can be used to improve feedback to customers. (Anandarajan, Anandarajan, and Wen, 1998)
❑ Extranet provides access to information and decreased lead times. (Anandarajan, Anandarajan, and Wen, 1998)
❑ Extranet gives the customers 24 hours-a-day access, updated information and more focused target marketing efforts. (Evans and King, 1999)
5. Faster communication
❑ Extranet improves the communication within the supply chain. (Pawar and Driva, 2000 and Maloney, 1999).
6. Reliability and Accuracy
❑ The chance of documents being lost, printing and re-keying errors to occur is getting lower with Extranet in the SC. Pawar and Driva (2000)

Source: Authors own construction

2.4.3 The disadvantages of Extranet in SCM

The disadvantages of Extranet in SCM are not dealt with to the same extension as the advantages. However we have found some supporting studies that we will use as our base in exploring the research question. (Table 2.6)

TABLE 2.6 THE DISADVANTAGES OF EXTRANET USE IN SCM

Disadvantages of Extranet use in SCM
1. *Lack of personal contact*
❑ Face to face contact is getting less with the introduction of Extranet (Spekman, Kamauff, Myhr, 1998)
2. *Cultural* **problems**
❑ Cultural problems have been found to occur with the introduction of Extranet (Franklin, 1999)
3. *Securiy issues*
❑ Security remains a barrier to widespread use of Extranet.
❑ Trust towards technology and trading partners is an important factor in improving the security. Willson (1997)
4. **Cost of implementation**

Source; Authors own construction

In section 2.4 the theories used were provided in narrative form. The main theories that will be used were therefore brought up in this part of the chapter. The next chapter will provide the reader with how the data were collected. This is the methodology chapter.

3. METHODOLOGY

In this, the fourth chapter, we will describe the research process. Further, the choice of approach will be motivated, and the validity and reliability of this thesis will also be discussed.

3.1. PURPOSE OF RESEARCH

A study can be exploratory, descriptive or explanatory. An exploratory study is made when little is known about the situation, or when no information is available on how similar problems and research issues have been solved in the past. This method is used to develop propositions for further inquiry. Descriptive studies investigate the characteristics of the variables of interest in a situation offering a profile or describing relevant aspects of a phenomenon. Explanatory studies can be used to give competing explanations for the same set of events and to indicate how these explanations could be used in other situations. Explanatory studies often need to be viewed over a longer period of time. (Yin, 1994)

In this research a mixture between exploratory, explanatory and descriptive case study was chosen. The thesis is primarily descriptive. This since we *explore* the phenomenon that is brought up in the purpose, i.e. is *to gain a better understanding of how Extranets are used in supply chains.* We *describe* via the data collected to answer our research questions. These are; *How can the use of Extranets in supply chain management be described? How can the advantages/benefits of Extranet use within a supply chain be described? and How can the disadvantages/risks of Extranet use within a supply chain be described?* We also start to *explain* when answering these research questions.

3.2. OVERALL RESEARCH STRATEGY

The scientific positioning consists here of whether a quantitative or qualitative research has been used. An explanation will be given for why the method chosen was regarded suitable.

There are two different ways in social science to approach a problem, qualitative and quantitative. Qualitative methods are used to study a small sample in depth. A low grade of formalization is used when conducting this type of research and generalizations are not looked for. The researcher wants to create a better understanding of the specific problem studied. Qualitative approach is characterized by the closeness between the source of information and the researcher. If finding scarceness within the questionnaire the researcher can be flexible. Comparison between answers of different units of the research can therefore be difficult. (Holme and Solvang, 1997)

The focus of the quantitative method is to generalise, describe and explain. Quantitative methods are concerned with comparisons and trial and error to find out if the results are valid for all the units that are analysed. A quantitative method is therefore used to put figures on the information gathered and analyse the numerical data. (Wedin and Sandell, 1995)

In this thesis, a qualitative approach is used to fulfil the purpose. This since the purpose is to achieve a deeper understanding of the Extranet implementation and usage. There is also neither a

need, nor is it possible to draw general conclusions and put them into figures from this study. The complexity of the subject studied also causes that a qualitative approach is more suitable than a quantitative one. Further, most of the questions are open-ended, asking for exhaustive answers, which will be used to explain this complex phenomenon.

3.3. STUDY APPROACH

There are five main methods to choose among when conducting a research. These are archival analysis, case study, surveys, history and experiments. Archival analysis is when secondary data is used to investigate something. A problem with secondary data is that it is gathered for another purpose and therefore seldom completely transferable to another study. (Yin, 1994) Therefore this method is not used in this thesis.

A case study is an empirical investigation looking at a contemporary phenomenon within its real-life context. Case study is preferred when examining events where the relevant behaviours cannot be manipulated. A common definition of case study is that it tries to illuminate decisions. Why the decisions were taken, how they were taken, and the results of them are commonly studied. The characteristics of case study are that it is used for cases where the descriptions of a phenomenon are focusing on details and deep descriptions. The possibilities to draw general conclusions to a population from these are therefore very small, if existing. Direct observation and systematic interviewing are often used within this method. (Yin, 1994) This method is used for this research, mostly since no general conclusions are to be drawn. This study is also focusing on deep descriptions.

Survey methods can be used to understand habits, attitudes or characteristics within a population (Yin, 1994). Yin (1994) argues that surveys can be used for descriptions where a relative large number of investigated units are necessary. Since the organisations investigated for this thesis does not represent a population, this method is not an option.

History is used when there is virtually no access or control, i.e. when for example no living person are alive to report what happened (Yin, 1994) This is not the case for this thesis and this method is therefore not used.

When using an experimental research the researcher tries to manipulate the reality in a way so that the problem can be examined. One characteristic of experiments is therefore manipulating of behaviour, i.e. the experiment variable. Effects are thereafter measured at the dependent variable. The experiment can be done in a natural environment or in a laboratory setting. Control is necessary over disturbing elements and this is something that might be very difficult, especially in social science. (Yin, 1994) Since it is difficult to manipulate the reality for this thesis and because of the lack of control over disturbing elements, experimental research is not chosen for this thesis.

3.4. DATA COLLECTION METHODS- SIX SOURCES OF EVIDENCE FOR CASE STUDIES

Yin (1994) presents a useful overview of six sources of evidence when conducting case studies. These are documents, archival records, interviews, direct observation, participant observation, and physical artifacts. Each one of these has different strengths and weaknesses and they are therefore highly complementary. These strengths and weaknesses are presented in table 3.1 below.

TABLE 3.1 SIX SOURCES OF EVIDENCE: STRENGTHS AND WEAKNESSES

Source of evidence	Strengths	Weaknesses
Documentation	*Stable*: can be reviewed repeatedly *Unobtrusive*: not created as a result of the case *Exact*: contains exact names, references, and details of an event *Broad* coverage: long span of time, many events and many settings	*Retrievability*: can be low *Biased selectivity*: if collection is incomplete *Reporting bias*: reflects (unknown) bias of author *Access*: may be deliberately blocked
Archival records	(Same as above for documentation) Precise and quantitative	(Same as above for documentation) Accessibility due to privacy reasons
Interviews	*Targeted*: focuses directly on case study topic *Insightful*: provides perceived causal inferences	Bias due to poorly constructed questionnaires Response bias Inaccuracies due to poor recall *Reflexivity*: Interviewee gives what interviewer wants to hear
Direct observation	*Reality*: covers events in real time Contextual: covers context of event	Time consuming *Selectivity*: unless broad coverage *Reflexivity*: event may proceed differently because it is being observed *Cost*: hours needed by human observers
Participant observation	(Same as for direct observation) Insightful into interpersonal behaviour and motives	(Same as for direct observation) Bias due to investigator's manipulation of events
Physical artifacts	Insightful into cultural features Insightful into technical operations	Selectivity Availability

Source: Yin (1994), p.80

In this study, archival records are excluded since it is a precise and a quantitative tool. All types of observation has also not been used, mainly because of that it is time consuming and costly, but also since an Extranet is difficult to observe in a proper way to reach the purpose of this study. Since we do not need to look into cultural features and technical operations, physical artifacts are also excluded.

Yin (1994) argues that there are many types of interviews. They can be open-ended, focused, or structured. In open-ended interviews, the interviews do not follow any structured questions. The respondent act more like an informant, providing the researcher with information. In focused interviews, a respondent is interviewed for a short period of time, for example an hour. The questions are open-ended, but they follow a case study protocol. In structured interviews the questions are clearly structured and goes in line with a formal survey. (Yin, 1994)

This study is based on focused interviews since we had questions that needed to be answered in order to obtain data to answer our research questions. The interviews were open-ended to obtain possibilities for probing, extensive answers and flexibility. Documentation was used as a

complement to the interviews conducted. The information gathered was gained mainly from the organisations websites and used for the description of the company background. Documentation is stable and can be re-examined over and over again which is an advantage according to Yin (1994).

3.5. THE INTERVIEW

Yin (1994) argues that a researcher can avoid pitfalls with relying on one source. To do this, two interviews at each organisation investigated were conducted.

Telephone interviews were chosen for the data collection in this thesis mostly because it is a relative inexpensive and quick way to gather primary data. The information asked for is also quite straightforward, does not consist of sensitive material, and the potential bias is low. The low potential bias comes from the fact that there is no risk that the information gathered can be used against the organisations investigated since they have already implemented Extranets and therefore have competitive advantages. Flexibility is possible and the control of who the respondent is, is also good in telephone interviews, and these were other reasons for why this method was chosen.

One direct interview was however conducted. This was the first interview, the one with Olof Wijk, e-commerce manager at Tetra Pak. The advantages and disadvantages with a personal interview agree to a large extent with the ones of telephone interviews. We could however not afford to conduct personal interviews with all our respondents since they were not located in Sweden. The reason for choosing a personal interview here was that we, as well as the respondent, thought it would be easier to understand how the Extranet work if personal contact were used. After this interview we had a much better base to stand on and the following interviews were more straightforward and we did not have to use as much probing as in the first one to be sure we understood the answers. Wijk has also been taking part in building up the Extranet and he therefore had a bit more extensive answers. Prior to the interviews, requests were sent to the head-offices of the organisations to find the most suitable person as respondent and to see if and when an interview could be conducted.

An interview guide was constructed (see appendix). The respondent was made aware what type of questions that was to be asked. The respondent was also asked if anyone else could give more or different information regarding the questions in the interview guide, but this was not the case in any of the organisations contacted. The interview was supported by that the respondent was contacted after the interview was written down to make sure that no misunderstandings had occurred.

The respondents were very helpful and open-minded. There were no needs to ask detailed questions since they understood what was asked for most of the times and they were glad to speak free about this. There were also no problems with refusal to answer any questions, something that could have occurred because of the sensitiveness of the subject. The respondents were also asked to chose the time and date for the interview, which decreased the risk that stress might be involved. The interviews all lasted for about one hour.

3.6. SAMPLE SELECTION

Tetra Pak is an international organisation active in approximately 165 countries in the world. This gives them possibilities to work internationally. The size of this company also helps them to have the possibility to be pro-active and therefore also adaptive to changes in the world in general, and within the company's core business in specific. E-business (or Extranet) has become a popular issue for many companies, but it is in general the larger companies in Europe that can afford to implement it in the first stage, the smaller partners are more of followers.

We chose to conduct our interviews in a Scandinavian environment. Partly because the use of Extranets here has recently become a growing issue, and the organisations involved have still adjustments to make which makes the investigation interesting not only for us, but also for them, and partly because the use of Scandinavian respondents will reduce the risk for misunderstandings. The respondents could give their answers in their mother tongue. The Norwegian market was chosen since the development of Extranets there has been quickest.

The interviews done with customers to Tetra Pak, i.e. Tine Meierier AS and Nen Produkter AS, were chosen since these customers are relatively large and have implemented Extranets.

3.7. ANALYSIS METHOD

Data analysis involves examining, categorising, tabulating or otherwise recombining the collected data according to Yin (1994). The purpose when analysing the data is to find answers to the stated research questions. This thesis presents a multiple-case study. The data collected will therefore be compared with each other, but analysis will also be done within each case. The data analysis will therefore be helpful by making sense of the collected information.

According to Miles and Huberman (1994) analysis consists of three concurrent flows of activity. These are data reduction, data display and conclusion drawing/verification. The first mentioned step consists of simplifying, selecting, focusing and organising the data so that conclusions can be drawn and verified. The data display is when the data is compressed and organised further to make it easier to draw conclusions. This is very helpful in multiple-case studies. In conclusions drawing/verification, patterns are noted, explanations given and casual flow and propositions noted. (Miles and Huberman, 1994)

These three steps are followed in this thesis. The data are reduced via a within case analysis. The data are displayed through a cross-case analysis where the different cases are compared with each other. Conclusions will later be drawn from these analysis.

3.8. VALIDITY AND RELIABILITY

According to Holme and Solvang (1996) the goodness of data can be measured in reliability and validity. This will now be looked into for the subject studied.

3.8.1. Reliability

Reliability is a demand that the instruments for measuring give reliable and stabile deviation. The same instrument used by another investigator, or the same investigator again, in the same way, should give the same results time after time if the reliability is to be high. The goals of reliability are to minimise the errors and biases in a study. (Yin, 1994)

The stability can be measured by re-testing the material and/or change the order/words of the questions. If the results are similar, the reliability is considered high. To gain high reliability in interviews is difficult since they often are not standardised. It is therefore hard to repeat the interview and receive exactly the same results. This especially since factors like if the respondent is under time pressure must be calculated with. In this interview, the respondents were not under time pressure according to themselves and they were given time to complete the answers before we moved on. These factors increase the reliability of this thesis. No answer alternatives were given, also this to minimize potential bias. The respondents were provided with a brief extract of the interview guide before the interview took place and the questions were asked in an objective way to make it possible to avoid bias. The objectivity is of course a subjective opinion but peers in the class as well as supervisors were asked for feedback and these questions were agreed upon to be relative objective. Further, probing was sometimes used to avoid misunderstanding.

If the same study would be done again, targeting the same companies, the answer would therefore most likely be the same. This means that the data gathered can be considered quite reliable. With time though, the answers would have to be changed since the studied area and industry is changing. A possible bias source of the questionnaire is if the respondents were not knowledgeable in the area. However this is unlikely to have been the case since it was targeted towards the best-informed employee of the different organisations and the questions would not have been easy to answer without deep knowledge about both the organisation and the subject of interest.

3.8.2. Validity

Validity is a very central demand on a measuring instrument. Validity is concerned with if the measuring method really measures what is wanted from it and nothing else than that. Validity is therefore the extent to which the measure provides an accurate representation of what one is trying to measure. (Yin, 1994)

The difficulty with validity is that it is impossible to say for sure if a measuring method is valid or not. To state if that is so, you need another measuring method, a method that you know gives true results. However, if this exists you could use this method instead of the one chosen. The validity of the measuring method is instead usually measured by if a question seems reasonable to people with insight in the subject, and with help of looking at if the results gives a correct indication of what is to be investigated among other things. Multiple sources of evidence can also be used. (Yin, 1994)

To increase the validity of this thesis, many different authors support the theories chosen. The interview was also conducted in Swedish/Norwegian, so no problems with translations occurred. Further, the respondents were the persons most competent for answering the questions according to many people in the organisations and they were given the opportunity to correct

misunderstandings from the telephone interview by being sent a copy of the answers written down. The questions used in the interview were also discussed with supervisors and peers at Luleå Technical University. Multiple sources of evidence were also used. All this increases the validity further.

4. DATA PRESENTATION

In this chapter the interviews conducted will be described. We have chosen to start each part with a description of the companies, and thereafter discuss our findings. We have, further on, chosen to discuss both the respondents from an organisation at the same time, although we will refer to who says what.

4.1. TETRA PAK

Ruben Rausing founded Tetra Pak in 1951 as a subsidiary of Åkerlund & Rausing. Tetra Pak develops, manufactures and markets systems for processing, packaging and distribution of liquid food. The company produces packaging material at approximately 66 plants and 78 marketing offices around the world. Every day more than 200 million Tetra Pak packages are distributed in over 165 countries. At the moment the company has 18,900 employees with a sale amounted to 6.8 billion Euro per year. (Tetra Pak, 2001)

The company launched an Extranet system called E-part in January 2000. The system connects Tetra Pak with their customers. Tetra Pak's e-business strategy today has two main parts. The first involves making the current business model accessible so that customers can place orders for packaging material, filling and processing equipment and spare-parts on-line. The second involves larger strategic issues such as e.g. joining a web portal and create a clear strategic picture concerning web opportunities. The company view e-business as an important tool in maintaining the leadership position in existing markets and in winning new markets. (ibid)

The interviews with Tetra Pak were conducted with Olof Wijk, e-commerce manager at Tetra Pak, and Erik Matsen, spare part manager at Tetra Pak Norway A/S.

4.1.1. Extranet use in SCM

Tetra Pak started to use e-commerce about one year ago and the system with Extranet, or E-part as Tetra Pak call its e-commerce system, has today extended to consist of 14 customers together with Tetra Pak says Wijk. Matsen says that E-part has been used since the autumn 2000 in Norway. The system is today only used within the spare-part business. Both the respondents describe the way E-part is used in the same way, i.e. that the customers order spare-parts through the Extranet. An order or quotation is placed over the computer. As help for the customer there is a spare-part catalogue from where the customer can find what part that are to be ordered. Briefly explained the customer goes into the central stock of Tetra Pak (on the Intranet of Tetra Pak) by the World Wide Web. A username, a password, a browser and access to the World Wide Web is all it takes to access the system. Matsen adds that E-part is used since it improves the situation of both the customer and of Tetra Pak. He continues to mention that all the customers that are interested can get access to the E-part system.

The vendor catalogue from which buyers can find, select, and order items directly from suppliers without any human contact is today a paper catalogue but there is one existing which is web-based today as well, even if it not used to any large extent yet says both the respondents.

Regarding the possibility to track shipments, Matsen argues that there is a direct link to the transport company from Tetra Pak's Intranet. The company ordering products from Tetra Pak can very soon use the E-part solution to find out where the goods are at a specific time. Wijk adds that Track and Trace can be used to see exactly where the product is when a courier does the transport today.

The customers can see the order status of a product, i.e. where in the distribution chain the product is, at least to some extent. The customer can also see the stock of the local or regional Tetra Pak company says Wijk. Matsen argues that the customer chooses the shipment dates and if they want a quick delivery they know they will be charged for this cost. The customer also receives a confirmation when the goods leaves Lund, in Sweden, were most of the spare-parts for the Norwegian market are produced. Any direct contact between the customer and Tetra Pak is however not existing through the E-part solution today. This could be used to for example inform the customer of a breakdown of a truck.

Both the persons interviewed argues that there is no possibility to reserve space in public warehouses through the E-part system and that there is no possibility to schedule outbound shipments from distribution centers.

Matsen and Wijk argues that Tetra Pak is able to provide 7 days, 24 hour worldwide customer service in the aspect that the customer can place an order any day, anytime of the day. However, Matsen must later forward the order to the factory in Lund. In the future Matsen will receive a SMS on his cellular phone, and he can after this forward the message to Lund without placing his foot at his office. This system will be available within a few months.

Tetra Pak in Norway does not receive any orders from international customers today since each market usually has its own market company from whom they order their spare-parts. Therefore the Swedish customers order their products from the Swedish market company located in Stockholm, which in turn place orders from their district center, i.e. northern Europe mostly. Therefore no orders are placed abroad by customers except from countries where no market company is located says the respondents.

Regarding the possibility to notify vendors of changes in configurations in products this is not an issue today according to the respondents. This since the machines used are made by Tetra Pak and therefore the spare-parts produced will fit this machine. One possible problem that can occur is if the customer uses some other machine as a complement at some stage of their production. These spare-parts cannot be ordered from Tetra Pak says Matsen. Wijk argues that when packaging material will be ordered through the E-part solution, configurations will be communicated through this. This will take its first tumbling steps in January 2001.

Today, there is no possibility to pay invoices electronically, according to Matsen and Wijk. It is however possible to find out the outstanding debit balance since the ordered goods can be viewed and the prices of each unit and the total price can be seen. For payments the World Wide Web can be used toward the bank, but not toward the E-part system says Matsen.

One service aspect that has improved with the start up of the World Wide Web is the possibility to communicate on a 24 hours base via e-mail say the respondents. They say however that it is

important to remember that there is no guarantee that the e-mail will be dealt with immediately. Matsen argues that the customer service have always been very high from Tetra Pak. He continues to say that the customers are very satisfied with the service provided by the company. The fact that the customer can decrease the number of spare-parts in their own stock by using the E-part system can be seen as an increase of the service to the customers, he continues. Wijk adds that the introduction of Extranet has led to a decrease in the number of orders that are incorrect because of a decrease in human mistakes, misunderstandings, linguistic problems and problems with blur facsimiles.

The service costs are very much unchanged for both Tetra Pak and the customer, even if the customer can decrease their stock says Wijk. Matsen argues that neither the service costs, nor the response time have decreased significantly with the introduction of Extranet, though slightly. If a complete breakdown takes place, and spare-parts are necessary as soon as possible, the spare-part is usually on the first plane next morning, on its way to the customer.

4.1.2. The advantages of Extranet in supply chain management
The major advantage with the E-part system is that the customer can see the stock level, which in turn decreases the need for the customer to keep a large stock according to Wijk. Matsen adds the advantage for the customer to see prices and follow the delivery very closely (at least in the near future) and that they can easily decide the time for delivery to the advantages. The number of errors will also decrease and the customer can use their own language when using the E-part, which makes it very user friendly he continues.

Seen in a long perspective, the Extranet will reduce costs for placing orders, which in turn might lead to cheaper spare-parts says Matsen. Wijk says that the possibility for the customer to decrease the stock level will decrease the costs for the customer from day one. Both respondents think that the number of persons involved in a transaction can be decreased which decreases the costs further.

Tetra Pak has no shared database with its customers according to Matsen and Wijk, and therefore they could not comment if a shared database could reduce costs. They also say that no middlemen are eliminated, even though less manpower is used. The paperwork will decrease since Tetra Pak Norway only control the orders, they do not receive faxes, printouts etc. according to Matsen. This saves time for him.

Regarding the ability for E-part to reduce the time between trading partners in the supply chain, both respondents say that this is not huge. The reason for this is that there are still persons that must make the packaging at the trucks. But, on the other hand, since the customer types in the orders, Matsen only has to control that everything seems to be alright, and this saves time for Matsen.

The interviewees say that paper handling is more time consuming than electronic transmissions and that this is another advantage with E-part. The co-ordination is also faster after the introduction of E-part.

Both respondents say that Extranet does not have the ability to improve the corporation between trading partners in the supply chain. The corporation has always been good between Tetra Pak's

customer and Tetra Pak itself. Matsen adds that his role has become more of searching for the customer, and this can be an advantage since he can be one step ahead compared to the situation previously. Wijk says that the E-part system rather decreases the corporation in the supply chain since the personal contact decreases and the fact that if many suppliers use this system, it is easy to swap supplier. Since a common database not is used the interviewees had no comment regarding its possibilities to improve the corporation between partners.

Most of the customers buying packaging material from Tetra Pak use machines that Tetra Pak has delivered. Therefore there is no collaboration between two parts when a new machine is produced. Tetra Pak will make sure that there are new spare-parts existing that will fit the new machines. Within the packaging material, collaboration is used, but this is not adapted to E-part yet say both of them.

Wijk argues that integration of key business processes and cross-functional information sharing exists and that this is very central. Matsen on the other hand argues that this does not exist, and that E-part has not caused any changes regarding this issue what so ever. Wijk continues to say that Tetra Pak force the organisations to become more willing to open themselves up. Tetra Pak's database is opened up so that the customer can see prices, claims, discounts etc. Matsen on the other hand argues that the information sharing always has been quite open, even if it has not been so obvious as it became with the introduction of E-part.

The customer service is not affected by E-part, at least not to any major extent. With the use of SMS over the cellular phone, this might change the feedback time some says the two. The waiting time will not be affected very much, they continue, and the same goes for the satisfactory through 24 hours access. The customer can do its part, but the order still has to be forwarded by Erik Matsen.

The good thing with E-part is that the customer can go in and do his part of the transaction. They can also go in and start the process of ordering and later continue with that. The communication between the partners in the supply chain will therefore be quicker they say.

The E-part solution will also decrease the number of printouts that are lost. The orders are saved for 60 days after it was placed and the customer can during this time go back and look at placed orders. This is an advantage with Extranet according to Matsen and Wijk.

4.1.3. The disadvantages of Extranet in supply chain management
The major disadvantages with Extranet are that no telephone contact will be used and that there is quite long response time now and then. The latter comes from capacity problems with the World Wide Web according to Wijk. Matsen says that one disadvantage is that the prices can be seen, but he adds that this can be seen as an advantage in that it is a service for the customers.

The degree of personal contact is not affected very much for Tetra Pak Norway since there is mainly telephone contact going on between the company and its customers. The contact in general decreases though, which can be a disadvantage according to Wijk. The possibility to become more proactive is though very good according to Matsen and this overweighs the disadvantages.

Matsen continues to say that the culture in the company has not been affected by the introduction of an Extranet. The employees have always been open to new ideas, and no one has mentioned anything negative about the project. Wijk says that in a long -term perspective a new way of thinking is necessary. The management must make the whole organisation understand that opening up the databases is the best thing to do. The potential criticism within the whole organisation must be met.

Both the interviewees argue that security is not a problem, and that the customers are not worried either. In a worst case scenario, somebody else could see what is ordered but this is not an issue.

The trust toward the trading partners has not been affected by the introduction of Extranet. This has always been very high they say. The only transmissions that are made over national boarders are made within Tetra Pak. They buy the products from abroad and then they sell it on to the customer in their country.

The costs for implementing the E-part system was approximately ten million Swedish crowns according to Wijk, and he says that it was well worth it. This build up can be used in the whole world. Both hardware and software are included in this cost. Matsen said that it is only the World Wide Web access that is paid for.

Other comments from the respondents were that a stock control program will be linked to E-part so that the customer even easier will see when it is time to order new products. The information advantage for the customer is seen as extremly helpful according to Matsen.

4.2. NEN PRODUKTER AS

Nen Produkter is one of Norways most fast-growing dairy. The dairy is not registered on the stock-exchange, but has plans to become registered in the future. Nen view's their close relationships to customers and suppliers as crucial for their success. Close relationships are necessary to be part of the future, especially since the competition grows harder for every year. Nen has its main business area in central and southern Norway.

Nen Produkter AS started to use E-part in November 2000 and the system is only used towards Tetra Pak. E-part was introduced in order to enhance logistic efficiency.

The interviewees at Nen Produkter AS was working at the department in Fredriksdal, Norway. These were Tore Lundberg, service mechanic, and Jörgen Hulin, production manager.

4.2.1. Extranet use in SCM
The respondent said that they had used E-part since the autumn 2000 within Nen produkter and that they only uses it towards Tetra Pak, and here only towards spare-parts. Before the introduction of E-part, a fax was sent once a week to place an order says Hulin and Lundberg.

The system is used to order products and to see what Tetra Pak has in stock and the prices for these products. There is a catalogue used to find the product to the different machines says the respondents.

By sending an e-mail, Tetra Pak Norway confirms that they have received the order. Nen Produkter also receives a confirmation from Tetra Pak in Lund when they have registered the order. The interviewees does not see any major advantage to see exactly where the goods are since they can choose the date of delivery and that they are informed if any delays occur. Hulin says though that it is possible to track the shipment if it becomes necessary.

Regarding if it is possible for Tetra Pak to contact Nen Produkter by the E-part solution to inform of delays etc., the respondents do not know. Nen Produkter has not had any need for this yet. If there are problems the contact is usually made by telephone since most problems occur if there is a breakdown and then it is very urgent to get the spare-parts as soon as possible.

Nen Produkter has its own stock, so the respondents cannot say if they can reserve space in public warehouses. Regarding the possibility to schedule outbound shipments from distribution centres, this is not used. The status of the products can be checked, i.e. if it is produced, if it is on its way to the customer etc. This status can be checked 24 hour per day. The service can be ordered 24 hours per day, the interviewees continue, but Erik Matsen at Tetra Pak Norway must forward the order today. If a breakdown occurs, Nen Produkter can wake him up in the middle of the night.

All orders from Nen Produkter are ordered from the Norwegian market company of Tetra Pak, so no international orders are placed. No bids can be placed on projects issued by government or industrial buyers the respondents argue.

Configuration issues are not a problem since Nen Produkter uses machines from Tetra Pak, and the interviewees continues to say that no invoices can be paid over the Extranet. The outstanding debit can be checked since the prices are shown, but the customer must keep track of it they have paid an invoice or not.

E-mails can be sent 24 hour per day to communicate with vendors regarding supply issues and deliveries can be schedule. This is seen as advantages from the introduction of E-part by the interviewees.

Regarding the responsiveness to customer service problems, both Hulin and Lundberg argues that no major changes have taken place with the introduction of E-part. They continue to say that response time has not been affected and the same goes for the service costs. The respondents argues that it is possible to schedule pick-ups and deliveries.

4.2.2. Advantages of Extranet in supply chain management
The major advantages with E-part are that the prices can be seen directly and that Nen Produkter can decrease its stock. The respondents continue to say that there are better descriptions on the Intranet of Tetra Pak regarding product descriptions and this leads to that the wrong spare-part rarely are delivered. The cost can probably be reduced in the future, especially with the introduction of the electronic spare-part catalogue say the respondents. The time is not decreased very much according to Lundberg. It takes the same time to receive the spare-parts, but in the process of placing orders etc. a few minuets/hours can be saved. The paper work decreases some, especially in the future with the electronic spare-part catalogue. No middlemen are eliminated and no shared database is used.

The Extranet does not reduce the time between trading partners other than what what was mentioned in the previous paragraph according to the two persons from Nen Produkter. The co-ordination is also not influenced much.

Further, the corporation is also not influenced by E-part. Hulin argues though that the corporation can be a bit more effective in the future, but that no increased dependence will occur.

The company uses Tetra Pak's machines so the product development will not be influenced, and the use of a common database the respondents do not think would influence the corporation.

Key business processes and cross-functional information sharing is not influenced by the introduction of E-part according to Hulin and Lundberg. Regarding the degree of willingness to share information the respondents think that this might be influenced by E-part. They have noticed an increase in the information received from Tetra Pak, especially regarding prices and stocks.

The respondents continue to argue that Extranet has a good possibility to affect the customer service, especially in the future. The examples mentioned in the previous paragraph have already occurred, but they think that there is more to come. This will not go for the feedback or waiting time, but possibly by increased 24 hours service and updated information as well as an increased flow of information. The Extranet can therefore increase the speed of communication with trading partners in the supply chain.

Hulin and Lundberg say that e-trade decreases the number of documents lost and that the potential of this is very high. If for example an invoice will be sent directly, they will find the Extranet even better, and they think that this will occur in the future.

4.2.3. Disadvantages of Extranet in supply chain management

Lundberg argues that it takes a bit longer time when ordering with the E-part system, especially with the long time it take to access the World Wide Web sometimes and that this is a disadvantage with Extranet. However, Hulin says that the competence that Erik Matsen holds decreases the disadvantages to close to none.

The lack of telephone contact is a pity according to Lundberg, but he argues that they call each other anyway between the companies to make sure that everything is in order since the system still is relatively new. This is neither an advantage, nor a disadvantage to Nen Produkter. Hulin says that the contacts in general has decreased and that this is a shame. The Extranet has not affected the culture of the company according to the respondents.

Security is not an issue, especially since Nen Produkter has manual paper backup still. The trust toward Tetra Pak is unchanged and very high and there are no legal constrains for buying via E-part according to the respondents.

There were no costs for Nen Produkter to introducing E-part. It is only a new telephone line that had to be installed. The cost is therefore no disadvantage.

Other comments from the interviewees were that a special page for the customer would be helpful, were for example variants and technical specifications could be seen according to Hulin. Lundberg says that an electronic spare-part catalogue would be helpful and the same goes for if packaging material could be ordered by E-part.

4.3. TINE MEIERIET

Tina Mejeriet is the largest dairy communion in Norway with 5,000 employees and an annual turnover of 10,8 billion Norwegian crowns. The organisation is owned by about 25,000 milk producer, where each and everyone poses a share of the ten dairy associations that delivers around 1,7 billion litres of cow and goat milk per year. The ten associations are referred to as Tine Meieriet. Tine Meieriet operate altogether about 70 facilities spread over Norway. In these facilities the milk is refined to more then 200 products sold under the name TINE. Tine's business idea is to refine pure and natural raw material to a sound food product. The association was established in 1856 in Rausjødalen when 40 farmers founded the organisation. The idea of unifying the efforts came from England, where the first farmer association was established in 1845.

The interviews with Tine Meieriet were conducted with Ove Sörvik and Helge Skarby, both working as service mechanics.

4.3.1. Extranet use in SCM
Tine Meieriet has used E-part since year 2000. They only use it to order spare-parts from Tetra Pak today.

The products are found in a vendor catalogue that is in paper today, but it is suppose to be electronic in the future. The respondent says that they have not had to use the system to track shipments, but they say that it is suppose to be possible. Regarding the contact with vendors for customer service problems, this is not used to any large extent today according to Sörvik. He says that the reception of orders by Tetra Pak can be seen as well as when part of, or the total, shipment has begun. The customer can also see if the product is in stock. However, late arrivals cannot be seen.

No reservation of space in public warehouses is possible from what the interviewees know, Tine Meieriet has its own stock and it is therefore not an issue. No schedule of shipments from distribution centres is used.

A 24 hours customer service exists. Tine Meieriet can place orders any time of the day but it has to pass Erik Matsen at Tetra Pak Norge who passes the things on to the place of production. All orders go through this market company and no international orders are therefore placed over the E-part system.

Sörvik argues that the customer cannot see the status of a product and that no bids can be placed on projects issued by governments or industrial buyers. Changes in configuration is not an issue since the spare-parts ordered are delivered by Tetra Pak, who also deliver the machines according to the interviewees.

Regarding the possibility to pay invoices over the E-part system, this is not possible today according to Skarby and Sörvik. The outstanding debit balances can though be checked by looking at the prices for products ordered and by keeping track of paid invoices.

The respondents argue that there is a possibility to communicate with Tetra Pak 24 hours per day via e-mail. If the parts do not exist in stock, Tine Meieriet is contacted by Tetra Pak by e-mail or facsimile or by telephone. It is a very smooth way to place orders and follow orders up according to Sörvik. He continues to say that if there is a need for a jetpack, the customer are not bound to the E-part system, then they can communicate via telephone.

The deliveries can be scheduled in the way that the estimated time of delivery can be choosen. The interviewees argue that the responsiveness to customer problems is not affected by E-part and that service costs and response time can be reduced slightly.

4.3.2. Advantages of Extranet in SCM

The most obvious advantages is that the price can be seen and that the whole ordering process becomes more easily overviewed. You can also go back easily to check previously placed orders. Regarding the stock, no changes have occurred according to Sörvik and he says that this is because the company is situated long from Oslo, and more important, a long way from Lund.

The costs remain more or less the same after the introduction of Extranets. The time and paper work has not changed either. There is also no shared database according to the respondents, and no middlemen are eliminated.

Regarding the possibility for Extranets to reduce time for delivery the respondent says that the delivery time can be chosen. If the delivery takes five days Tetra Pak pays the fright. If the goods are to be delivered earlier, the customer pays. The introduction of E-part has not reduced the time for receiving a spare-part according to Skarby and Sörvik. The paper handling is a bit longer than working with E-part but the time saved is still marginally and the co-ordination is very much unchanged.

The corporation is unchanged after the introduction of Extranet according to Skarby and there is no common database used, which means that the respondents could not comment whether this could improve the corporation. The product development is not an issue for this company either since also Tine Meieriet uses Tetra Pak machines and spare-parts from the same company.

The integration of key business processes and cross-functional information sharing has not increased with the introduction of E-part since the price for example always has been official and that spare-parts will be needed no matter what and Tine Meieriet uses Tetra Pak machines. The information sharing has therefore always been quite open says Sörvik.

Both the interviewees argue that Extranet have not affected the customer service. The feedback is unchanged and the same goes for the waiting time, as described above. The communication has been discussed previously and it was argued that the 24 hours access exists and that the communication speed will be unchanged.

Extranet can decrease the number of documents being lost to some degree according to Sörvik and misunderstandings are often avoided. Skarby on the other hand says that there have not been any problems before the E-part was introduced.

4.3.3. Disadvantages of Extranet in SCM

The fact that telephone contact decreases with the introduction of Extranet, is seen as a major disadvantage by Sörvik. Another problem is that the data cannot be found for an order after 60 days. Skarby could not come up with any disadvantages. The lack of personal contact is no problem according to Sörvik, but Skarby says that this level has remained the same. Sörvik says that the decreased contact that he perceive can avoid misunderstandings but on the other hand you cannot stress things and use probing to make sure the message was understood. Regarding the personal contact this has always been very limited.

The respondents do not see security as a problem. They are aware of the possible problems that might occur but they do not think they will run into problems with the system they use. Interruptions might occur but this is the case when someone is speaking in the phone as well. The interviewees argue that there is no barrier for them to use E-part and that the trust toward Tetra Pak is unchanged.

The implementation of the E-part system was free for Tine Meieriet. It is only the access to the World Wide Web that is paid for. Sörvik comments that the communication is still very slow, sometimes it can take up to one minute to access the system also with ISDN. The speed varies with the time fo the day. Another comment from him is that it would be very helpful if the customer could get the information to what type of machine the spare-parts fits to, in E-part.

5. ANALYSIS

In the following chapter we will analyse the data collected from the cases. A within case study and a cross case study will be made following the order of the research questions. Regarding the within case study the data collected for each company will be compared with previous research brought up in our frame of reference. In the cross case analysis the findings from each case will be compared between one another.

5.1. EXTRANET USE IN SCM

Lancioni, Smith and Oliva (2000) bring up several ways in how Extranet can be used in SCM. It is on these findings part of the study is based upon.

5.1.1. Within-case Analysis of Tetra Pak

Tetra Pak's Extranet can be used in order to find, select and order items directly from suppliers without any human contact and that follows the arguments of Lancioni, Smith and Oliva (2000). By using Tetra Pak's Extranet it is also possible to track shipments and equipment thereby knowing where in the logistics the product is which goes together with the framework presented in chapter 3.

Lancioni, Smith and Oliva (2000) states that Extranet can be used to contact vendors/buyers regarding customer service problems. This is however not possible using E-part and it is therefore contradicting the theory. Up to date it is not possibility to reserve space in public warehouses through the E-part system and there is no possibility to schedule outbound shipments from distribution centres which also goes against the theory.

Lancioni, Smith and Oliva (2000) argues that Extranet can be used to provide 7 days/24 hour worldwide service. Matsen and Wijk agree in the sense that the customers can place orders. However, Matsen must later forward the order to the factory in Lund. In the future Matsen will receive a SMS on his cellular phone, that he forwards without placing his foot at the office. E-part can therefore only partly be said to fulfill the theory, since 24/7 service only can be given in sense of ordering not on other services.

According to Lancioni, Smith and Oliva (2000), Extranet can offer the ability to receive orders from international customer. However Tetra Pak in Norway does not receive any orders from international customers since each market usually has its own market company from whom they order their spare-parts. In other words the Swedish customers order their products from the Swedish market, which in turn place orders from their district internationally. Therefore it can be argued that the Extranet partly follows the literature.

It is not possible to check the status of orders placed with vendors, as suggested by Lancioni, Smith and Oliva (2000). Regarding the possibility to notify vendors of changes in product configurations is not an issue today according to Tetra Pak which therefore contradicting Lancioni, Smith and Oliva's (2000) statement of Extranet being used as a tool for notifying vendors of changes in product configurations. The authors also argued that an Extranet can be

used to pay invoices electronically. It is however not possible for Tetra Pak's E-part system, although it is possible to find out outstanding debit balance and pay through a bank using the World Wide Web.

Another issue brought up by Lancioni, Smith and Oliva (2000) is the ability to directly communicate with vendors and customers via e-mail. This future is something E-part offers according to Wijk and Matsen however arguing that it is no guarantee that the e-mail will be dealt with immediately.

Matsen argues that the E-part system can be seen as an improvement of the services to customers since it decrease the number of spare-parts in stocks. Wijk also argues that the introduction of Extranet has led to a decrease in the number of orders that are incorrect. Lancioni, Smith and Oliva (2000) pinpointed out that the Extranet could be used as a way of being responsive to customer service problems. E-part can in that sense be said to in some sense give better customer service however not being more responsive to customer needs.

Another thing that the authors stated in how the Extranet can be used in SCM is in the ability to reduce service costs and response time. Wijk and Matsen argues that the service costs are unchanged for both Tetra Pak and the customers, even if the customer can decrease their stock.

Tetra Pak's customers can by using the Extranet schedule pickups and deliveries which goes together with what Lancioni, Smith and Oliva (2000) argued.

5.1.2. Within-case Analysis of NEN Produkter AS
The system is used to order products and to see what Tetra Pak has in stock and the prices for these products. A catalogue is offered in order to find the right spare-part to the different machines say Hulin and Lundberg. This goes together with the theory presented by Lancioni, Smith and Oliva (2000)

Hulin argues that it is possible to track shipments and equipment, as the theory suggest, if it becomes necessary. Although he does not see any major advantages to do so since they get informed whether the goods ordered will be delayed or not in other ways. Regarding the ability to contact the vendor (Tetra Pak) concerning customer service as suggested by Lancioni, Smith and Oliva (2000), both the respondents are uncertain. Normally both the respondents are using the telephone when problems are occurring.

Nen Produkter has its own stock, so the respondents cannot say if they can reserve space in public warehouses as mentioned by Lancioni, Smith and Oliva (2000). Lancioni, Smith and Oliva (2000) argues that an Extranet can be used in SCM to schedule outbound shipments from private and public distribution centres on a 24 hours basis. NEN is not using this possibility and they are uncertain if it is possible. In accordance with Lancioni, Smith and Oliva (2000) NEN can get 24 hours 7 days a week access to orders, to see if the product is manufactured and on its way. Other customer services are though not possible yet according to the respondents such as checking the status of orders placed with vendors. Lancioni, Smith and Oliva (2000) stated that an Extranet could be used to receive orders from international customers. NEN is an international customer in the sense of Tetra Pak being Swedish, but since Tetra Pak is present in Norway as well, the order is domestically according to Lundberg and Hulin. In other words contradicting the theory.

According to Lundberg and Hulin neither can invoices be paid over the Extranet, nor can configuration issues be dealt with. Configuration issues are not a problem since NEN Produkter uses machines from Tetra Pak. Lancioni, Smith and Oliva (2000) argues that an Extranet can be used in SCM to pay invoices electronically, check outstanding debit and to notify vendors of changes in configurations. According to the same authors an Extranet can be used to directly communicate with vendors. NEN also use e-mail 24 hours per day to communicate with vendors regarding supply issues. Lundberg and Hulin claims that customer service problems are not dealt with in any new way with the introduction of Extranet which contradicts Lancioni, Smith and Oliva (2000). The respondent did not agree with Lancioni, Smith and Oliva (2000) claiming that the Extranet reduces service costs, response time, responsiveness to customer service problems. The respondents agree with the literature regarding E-part providing the ability to schedule pickups.

5.1.3. Within-case Analysis of Tine meieriet
Lancioni, Smith and Oliva (2000) suggested that Extranet can be used to offer on-line vendor catalogs from which buyers can find, select, and order items without any human contact. Today Tine argues the vendor catalogue is in paper, put it will be changed into an electronic format in the future. Another use of Extranet in SCM according to the same authors is the ability to track shipments and equipment; this is however nothing that Tine is using but argues that it is supposed to be possible. Sörvik agrees with Lancioni, Smith and Oliva (2000) arguing that there are possibilities in E-part to contact vendors' regarding customer service problems. However, its not used to a large extent.

According to the respondents it is not possible for users of E-part to reserve space in warehouses as claimed by Lancioni, Smith and Oliva (2000). It is not possible either to schedule shipments from distribution centres brought up in the literature. However a 24 hours every day a week customer service exist which goes in line with Lancioni, Smith and Oliva (2000). Tine can therefore place orders anytime of the day but Tetra Pak Norway has to accept the order before delivery. All orders goes through the domestic company and therefore no international orders are placed over the E-part system contradicting Lancioni, Smith and Oliva (2000). Lancioni, Smith and Oliva (2000) argued that an Extranet could be used to check the status of an order placed with a vendor. Sörvik argues that the customer cannot see the status of an order placed in E-part.

Neither changes in configuration of a product nor the possibility to pay invoices over the E-part system is offered by E-part according to Skarby and Sörvik. Lancioni, Smith and Oliva (2000) suggested these options as a way that Extranet can be used in SCM. Outstanding debit balances can though be checked, by looking at the prices for products ordered and by keeping track of invoices paid. In line with Lanicioni, Smith and Oliva (2000) the E-part system can be utilised to communicate with Tetra Pak 24 hours per day via e-mails.

As argued by Lancioni, Smith and Oliva (2000) E-part offers the option to schedule deliveries. However, the responsiveness to customer problems is unchanged by the introduction of E-part contradicting the literature findings. Skarby and Sörby do not agree with Lancioni, Smith and Oliva (2000) that service cost and response time is reduced by Extranet.

5.1.4. Cross-case Analysis

In the cross-case analysis, a comparison between cases is made regarding their use of Extranet in SCM (see figure 5.1). The table below lists each of the companies that took part in our sample and their stated use of Extranet in SCM. In the following tables a mark will mean that the organisation agree upon the statements to the left. Sometimes we have had to find out which thought was strongest at the companies. This especially when the respondents had slightly different views on an issue.

TABLE 5.1 USE OF EXTRANET IN SCM

Extranet used in SCM	Tetra Pak	NEN	Tine
Buyers can find, select, and order items without any human contact.	♦	♦	
Able to track shipments and equipment	♦	♦	♦
Able to contact vendors or buyers regarding customer service problems			♦
Able to reserve space in public warehouses			
Able to schedule outbound shipments from private and public distribution centers on a 24 hours basis			
Able to provide 7 days/24 hour worldwide customer service	♦	♦	♦
Able to receive orders from international customers	♦		
Able to check the status orders placed with vendors			
Able to notify vendors of changes in products			
Able to pay invoices electronically an to check outstanding debit balances			
Able to communicate directly with customers and vendors	♦	♦	♦
Able to be more responsive to customer service problems			
Able to reduce service costs and response time			
Able to schedule pickups and deliveries	♦	♦	♦

Source; Authors own construction

Two out of three companies, namely Tetra Pak and NEN, state that an on-line vendor catalogue from which buyers can find, select and order without human contact is utilised in E-part. Tetra Pak explains that a part of their Intranet is opened up so customers can enter the central stock of Tetra Pak. By entering a password and username the buyers get access to the system. However Tine argues that no on-line catalogue is existant although the other options are available such as find, select and order spare-parts without any human contact. Tetra Pak argues that there is an on-line catalogue but it is not used to any large extent. Tines answer may therefore be because of unawareness of all the possibilities with E-part. While two of the companies recognised the on-line catalogue all three agree that it is possible to track shipments and equipment using a variety of modes. Tine and NEN argues that they never have used the system of tracking shipments and equipment but that is suppose to be possible. Tetra Pak that have delivered the E-part system

argues that its possible by using a program called track and trace. Tetra Pak and NEN argues that it is impossible to contact vendors or buyers, regarding service problems from stock-outs and late delivers etc. through E-part. Tine agrees partly though stating that E-part users cannot see late deliveries on the Extranet. Tetra Pak however says that there are no direct contact between the customers and Tetra Pak in E-part. NEN are uncertain after never having to use direct contact with Tetra Pak other then by telephone. The three companies agree upon that E-part does not offer users to reserve space in warehouses.

As exhibited in table 5.1 above, none of the companies agrees with that E-part offers the ability to schedule outbound shipments on a 24-hours basis from distribution centres. NEN produkter though says that by E-part, users can check the products, if it is produced or on its way. All four companies claims that Extranet provides everyday world-wide customer service. Tetra Pak argues that they are able to provide the stated customer service in the aspect that the customer can place an order on a 24/7 basis however no other customer service is offered by E-part. Furthermore, only Tetra Pak claims that E-part can receive orders from international customers. This may be because Tetra Pak is an international company dealing with customers on a world-wide basis. International sales and purchase is also made only where no domestic market company of Tetra Pak is located. Normally the commerce is made within the country and it is most likely the reason for the two Norwegian companies not realising the international dimension of E-part.

As shown in table 5.1 none of the companies states that E-part can be used to check the status of orders placed with vendors neither notifying changes in configurations in products that are produced. The reason for this is that there are no needs of configurations today, since the machines used are made by Tetra Pak and therefore the spare-parts produced will fit the machine. However these options will be added to the system when Tetra Pak is offering packaging material on E-part as well. Regarding the ability to pay invoices electronically and check outstanding debit balances, all respondents agree that its not possible to pay invoices electronically but though check outstanding balances. Payments can though be made outside E-part on the WWW towards the bank according to Tetra Pak.

Tetra Pak, NEN and Tine all agree that E-part can be used to directly communicate with vendors and customers on a 24/7 basis by e-mails. None of the companies acknowledge that E-part makes the responsiveness to customer service problems better. However none of the companies have noticed that the response time and service costs have reduced more then slightly with E-part. All the companies agree that E-part offers the ability to schedule pickups and deliveries.

Overall, the respondents disagree to some extent about the functionality of E-part or in other words the use of Extranet in SCM. One reason for the respondents to disagree is that the Extranet is rather new and the users have not fully changed their routines and explored on the possibilities of E-part. One argument for supporting this is that Tine has not found out that there is an on-line web catalogue offered on E-part, although both Tetra Pak, which is the provider of the system and NEN supports it. Tine also argues that E-part users can contact Tetra Pak regarding customer problems. Since we interviewed the E-commerce manager of Tetra Pak that was involved in building E-part we find it less likely that Tine Meierier is accurate. Regarding the ability to receive orders form international customer, Tetra Pak is the only company to be able to know that

companies outside of Norway can use the Extranet. The other parties are only dealing with Tetra Pak in Norway and are not viewing the Extranet on a global level.

5.2. ADVANTAGES OF EXTRANET USE IN SCM

The advantages of Extranet use in SCM has been investigated by several researcher as presented in chapter 2. The theory is compared with the data gathered in the within-case analysis. After the within-case analysis, a cross case analyses is conducted exploring on the differences between the cases made.

5.2.1. Within-case Analysis of Tetra Pak

Ananarajan, Ananarajan and Wen (1998) states that one of the advantages of Extranet use in SCM is that it lessen the time and paper work associated with coordinating and dealing with suppliers, which will benefit in cost savings. Tetra Pak argues that some time and paperwork associated with co-ordination will end up in cost savings. The paperwork will decrease since Tetra Pak only control the orders, they do not receive faxes and printouts as well as they do not have to make the work twice typing in the orders. However, Extranet does not refer to any cost savings in paper work and timesavings when looking at transport. Ananarajan, Ananarajan and Wen (1998) argue that a shared database between partners is a cost reducer since it reduces relevant costs of e.g. marketing research. Tetra Pak has no opinion of this since they have no shared database with their customers.

Holme (1998) argues that Extranet reduces costs when unnecessary middlemen are eliminated. Tetra Pak has no experience of eliminating middlemen due to the implementation although the manpower has been lessen regarding paper handling and time consumption. However, Tetra Pak supports Holme (1998) regarding middlemen since both respondents think that the number of persons involved in a transaction can be decreased, thereby reducing the cost.

Altogether Tetra Pak argues that Extranet in SCM reduces the cost in different time spans. Matsen argued that cost savings are seen in the long run when the cost for placing order would end up in cheaper spare-parts. In addition Wijk argues that the possibility for the customer to decrease the stock level lessen the costs for the customers from day one.

Regarding the ability for E-part to reduce the time between trading partners in the supply chain, both respondents say that this is not much. The reason for this is that there are still persons that must make the packaging at the trucks. Timesaving can though be made according to Tetra Pak since paper handling is more time consuming than electronic transmissions and that is another advantage with E-part which correspond to the argument by Pfaffenberg (1998). The respondents do agree to some extent with the argument saying that the Extranet is speeding up coordination among trading partners in the supply chain. In essence timesaving is present according to the respondents following the theory presented in chapter 2.

Tetra Pak argues that the Extranet decreases the corporation in the supply chain since the personal contact decreases and it is easier to swap supplier, which goes against the theory by Graham and Hardaker (2000). Since a common database not is used the interviewees had no comment regarding its possibilities to improve the corporation between partners. McIvor et al. (1997) states that companies are collaborating in new product development, integrating key

business processes and cross-functional information sharing on a range of issues. Wijk argues that integration of key business processes and cross-functional information sharing exists and that this is very central. Matsen on the other hand argues that this does not exist, and that E-part has not caused any changes regarding this issue what so ever. One reason for this is that the respondents hold different positions in the company. No collaboration in product development is made at the present, which is suggested by Pfaffenberg (1998) to improve corporation. Since the respondent does not collaborate in product development they did not comment on the matter. According to Saunders (1994) and Spekman, Kamaufff and Myhr (1998) companies are more willing to share information with trading partners, which is agreed by Wijk and Matsen. This has been made by Tetra Pak that has opened up their database so customers can see prices, disclaims, discounts etc.

Tetra Pak follows the arguments of Anandarajan, Anandarajan and Wen (1998) stating that Extranet can be used to improve the feedback to customers however not to a high degree. The lead-time is not affected significantly as suggested to be by Anandarajan, Anandarajan and Wen (1998). The reason for this is that orders where made by faxes previously and at the present it is made electronically. However there is always someone that has to accept the purchase. Wijk and Matsen agree that the customers get 24 hours-a-day access as stated by Evans and King (1999), however the order still has to be forwarded by someone. To sum up the customer service is not affected to any major extent by Extranet according to Matsen and Wijk.

One good thing with Extranet is that the customer according to the respondents can go in and do his/her part of the transaction and therefore the communication between the supply chain partners will be quicker as suggested by Pawar and Driva (2000) and Maloney (1999)

The respondents agree with the argument of reliability and accuracy being improved by Extranet implementation. As argued by Pawar and Driva (2000) the number of printouts, documents being lost and errors will get lower. This is an advantage with Extranet according to Matsen and Wijk.

5.2.2. Within-case Analysis of NEN Produkter AS
The major advantages with E-part according to Lundberg and Hulin is that "the prices can be seen directly and that Nen Produkter can decrease its stock."

Ananarajan, Ananarajan and Wen (1998) claims that Extranet will lessen the time and paper work associated with coordinating and dealing with suppliers. Lundberg though argues that time is not decreased much in the process of placing orders and only a few minutes to hours can be saved. In accordance with the literature though, the respondents agree that cost will reduce by Extranet seen in the long run. This because paper work will decrease some as argued by Ananarajan, Ananarajan and Wen (1998) especially in the future with the electronic spare-part catalogue. Holme (1998) suggest that middlemen will be eliminated and therefore the cost will be reduced with the Extranet. This statement is however not agreed upon by NEN.

The respondents does not believe that Extranet reduce time between trading partners as suggested by Pfaffenberger (1998) and Ananarajan, Ananarajan and Wen (1998), other than what was explained in the previous paragraph. It is claimed that Extranet is speeding up coordination among trading partners involved in transactions, this is however not in line with what the respondents believes.

Hulin and Lundberg believes that the corporation is not influenced by Extranet other than in the future which goes against what the literature suggest. McIvor et al. (1997) suggests that companies are collaborating in new product development, integrating key business process and cross-functional information sharing. The respondent do not agree on that this will be applicable to E-part since all machines are owned by Tetra Pak and they can therefore not see any advantages in it. The participants of the Extranet do not use a common database and they do not think it would influence the corporation in the supply chain as argued by Anandarajan, Anandarajan and Wen (1998). Saunders (1994) and Spekman, Kamauff and Myhr (1998) suggest that organisations are more willing to share information with trading partners, which is in line with what the respondents argues. They have noticed an increase in the information received from Tetra Pak, especially regarding prices and stocks.

Anandarajan, Anandarajan and Wen (1998) claim that Extranet in SCM can be used to improve feedback to customers. Hulin and Lundberg disagree with this arguing that Extranet has a possibility to affect the customer feedback especially in the future, though arguing that the customer service in total is improved by E-part. The respondents do not agree with Anandarajan, Anandarajan and Wen's (1998) statement of Extranet reducing lead times. However, following the argumentation of Evans and King (1999) that Extranet gives the customers around the clock and everyday access with updated information. Using that as a basis of argumenation the respondents further argued that Extranet increase the speed of communication with trading partners in the supply chain as stated by Pawar and Driva (2000) and Maloney (1999).

In line with Pawar and Driva (2000), Hulin and Lundberg say that E-part decreases the number of documents lost and errors to occur such as wrong spare-part being delivered.

5.2.3. Within-case Analysis of Tine Meierier

"The most obvious advantages are that the price can be seen and that the whole ordering process becomes more easily overviewed. You can also go back easily to check previously placed orders. Regarding the stock, no changes have occurred" according to Sörvik and he says that "this is because the company are situated long from Oslo, and more important a long way from Lund. "

One of the advantages of Extranet use according to the literature is cost savings. According to Tine Meierier the cost remains more or less the same after the introduction of Extranet. A factor said to reduce cost according to Ananarajan, Ananarajan and Wen (1998) is less time and paper work. This does not go in line with what the respondents argued. Neither is any middlemen eliminated nor any common database present as suggested by Holme (1998) and Ananarajan, Ananarajan and Wen (1998).

Pfaffenberg (1998) states that time savings can be made since paper handling is more time consuming than electronic transmissions. Skarby and Sörvik admit that the paper handling is more time consuming then working with Extranet but it is small differences. The Co-ordination among trading partners in the supply chain is unchanged according to the respondents.

Another advantage suggested in the literature is improved corporation, however Skarby and Sörvik have not found any signs of improved corporation with the introduction of E-part. The

product development is not an issue for the company either since Tine Meieriet uses Tetra Pak machines and spare-parts from the same company. In other words companies are not collaborating in new product development as was argued by McIvor et al. (1997). No shared database is existing as was suggested by Anandarajan, Anandarajan and Wen (1998) to improve communication and the respondents are therefore not commenting on this issue. The integration of key business processes and cross-functional information sharing has not increased with the introduction of E-part since the price for example always has been official and that spare-parts will be needed no matter what. Therefore the arguments of McIvor et al. (1997) is not agreed upon.

There has not been any change in information sharing according to the respondents, as claimed to occur with the introduction of Extranet stated by Saunders (1995), Spekman, Kamauff and Myhr (1998). The information sharing has always been quite open says Sörvik.

Both the interviewees argue that Extranet has not affected the customer service as suggested in the literature. Neither the feedback nor the waiting time is affected and it therefore contradicts Anandarajan, Anandarajan and Wen (1998). However, the respondents agree with Evans and King (2000) who state that customers are given 24 hours a day access with updated information.

Pawar and Driva (2000) and Maloney (1999) argue that Extranet improves the communication within the supply chain. This is something that Sörvik and Skarby disagree with. Although Sörvik claims that the number of documents being lost has decreased, and misunderstandings are avoided as mentioned by Pawar and Driva (2000). Skarby on the other hand says that there have not been any problems before the E-part was introduced.

5.2.4. Cross-case Analysis

In the cross-case analysis, a comparison between cases is made regarding their perceived view of Extranets advantages in SCM. Table 5.2 lists each of the companies that took part in our sample and their perceived view of the advantages of Extranet use in SCM.

TABLE 5.2 THE ADVANTAGES OF EXTRANET USE IN SCM

Advantages of Extranet use in SCM	Tetra Pak	NEN	Tine
Cost saving	♦	♦	
Less time and paper work associated with co-ordinating and dealing with suppliers	♦	♦	
A shared database between partners is a cost reducer since it reduces relevant costs of market research.			
Extranet reduces costs when unnecessary middlemen are eliminated.	♦		
Time reduction	♦	♦	♦
Timesaving can be made since paper handling is more time consuming than electronic transmissions.	♦	♦	♦
The Extranet is speeding up coordination among trading partners directly involved in specific transactions	♦		
Improved corporation			
Extranet will improve communication through a common database for tracking customers in the supply chain			
Companies are, collaborating in new product development, integrating key business processes and cross-functional information sharing on a range of issues	♦		
Co-operation and trust is in focus and the organisations are more willing to share information with trading partners	♦	♦	
Extranets enable remote and internal users to interact in order to design, plan and market products or services.			
Improved customer service	♦	♦	
Extranet in SCM can be used to improve feedback to customers.	♦		
Extranet provides access to information and decreased lead times.			
Extranet gives the customers 24 hours-a-day access, updated information and more focused target marketing efforts.	♦	♦	♦
Faster communication	♦	♦	
Extranet improves the communication within the supply chain.	♦	♦	
Reliability and Accuracy	♦	♦	♦
The chance of documents being lost, printing errors to occur is getting lower with Extranet.	♦	♦	♦

Source; Authors own construction

As exhibited in Table 5.2, Tetra Pak and NEN perceive cost savings as an advantage for Extranet use in SCM. Tetra Pak argues that some time and paper work associated with co-ordination will end up in cost savings. The paperwork will decrease since Tetra Pak only control the orders, they

are not obligated to handle faxes and printouts as well as they do not have to retype orders. Tetra Pak however argues that no cost savings will be made regarding transport. NEN claims that although cost savings are made, these are marginal. Tine is the only company that does not see any major cost savings. One reason for this is that Tine does not use the Extranet to its full potential, which is seen by the fact that Tine still uses paper backups. This explains why Tine is not seeing any cost savings due to less time and paperwork associated with E-part. Therefore it can be argued that Extranet can save money and time for an organisation if the system is trusted and used thoroughly.

Regarding time, some minutes up to hours can be saved because of less paper work. None of the companies had any opinion regarding shared databases lowering the costs, this due to the fact that none of the respondents had any experience about it. As shown in table 5.2, Tetra Pak claims that Extranet reduces costs when unnecessary middlemen are eliminated. Although Tetra Pak has no experience of eliminating middlemen they have noticed a decrease in workload. The reason for this is that Tetra Pak believes that the number of persons involved in transactions can be decreased thereby reducing the costs.

Tetra Pak, NEN and Tine agree that timesavings can be made with Extranet use in SCM. The reason for this is that they have noticed a reduction in workload and that paper handling is more time consuming then electronic transmissions. All companies though argue that the reduction in workload is marginal. Another reason for arguing that Extranet saves time can be that it speeds up the co-ordination among trading partners. As shown in table 5.2, Tetra Pak is the only company agreeing with this statement. This might be because Tetra Pak is communicating with all their customers with E-part whereas NEN and Tine are only communicating with Tetra Pak. However, Tetra Pak finds the time savings marginal.

As shown in table 5.2 all companies believes that Extranet reduces or on maximum maintains the communication level in the supply chain and that it does not improve supply chain corporation. The reason for Extranet reducing the communication according to Tetra Pak it that the personal contact between trading partners decreases and it is easier to swap supplier. Thereby implicating that trust is getting lower in the supply chain with Extranet. Tine claims that the reason for Extranet maintaining on the same level is because of no signs has been seen in their organisation. NEN Produkter speculates that the communication within the supply chain will increase in the future. The respondents of Tetra Pak disagree whether it is an advantage with integrating key business and cross-functional information sharing. They see advantages and disadvantages with it. Wijk argues that it is very central and existent in E-part, whereas Matsen argues the opposite. Tine and NEN are not seeing Extranet giving the advantage of integrating key businesses and cross functional information sharing, since e.g. prices always has been official and spare-parts will be needed no matter what.

The three companies do not see any advantage of E-part to provide collaborating product developments, since Tetra Pak owns all the machines and NEN and Tine are buying spare-parts over E-part. According to all three companies the trust in the supply chain has always been high. This might have its origin in the dependence on each other. Tetra Pak and NEN states that more companies are willing to share information on a range of issues. NEN has for example noticed an increase in the information received from Tetra Pak. Tetra Pak on the other hand has opened up their databases so customers can see prices, claims and discounts, thereby arguing that the

information sharing has increased. No collaboration is made when designing, planning and marketing products or services. This is because E-part covers orderings of spare-parts and not other types of materials. The companies can therefor not respond to weather Extranets ability to offer these services to E-part are advantageous or not.

In general none of the organisations think that Extranet will lead to improved corporation. One reason for this is the tight link between suppliers and customers in this industry in general, and that the corporation was high before the E-part was introduced. Both before and after the introduction of E-part the dependence and trust among parts in the supply chain was high. The co-operation will not change regarding new product development since it is Tetra Pak machines that are used by the customers and it is only spare-parts that are handled by the E-part system today. It can be argued that this might change in the future, with improvement of the E-part introducing more futures such as handling of packaging material such as suggested by Tetra Pak. In that case the benefit of corporation might be more obvious.

Two out of three companies, namely Tetra Pak and NEN believes that Extranet brings the advantage of improved customer service. The reason for this is that the company argues that feedback to customers is improved. This is however not agreed upon by Tine that states that no such improvement has been seen. However somewhat in contradiction, arguing along with Tetra Pak and NEN that the customer gets 24-hours-a-day access and updated information. Different respondents might therefore view for example the word "service" differently. None of the companies however argues that E-part provide decreased lead times.

Tetra Pak and NEN agree with that one of the advantages with Extranet is faster communication. This might be because the customers can enter E-part and do his/her part of the transaction thereby speeding up the transaction according to Tetra Pak. NEN on the other hand pinpointed the fact that E-part provides up to date information that can be accessed by the user whenever suitable.

As exhibited in table 5.2, the three companies all agree on that Extranet gives the advantage of higher reliability and accuracy. This might be because of the chance of documents being lost and printing errors to occur is getting lower with E-part. Adding that the number of wrong spare-parts being delivered has decreased also support this argument. Skarby at Tine is though contradicting the argument, saying that no problems was seen before E-parts introduction.

In general it is important to remember that Tetra Pak is the developer of E-part and therefore most likely has a more of a visionary's view, looking for continues improvement of the system. This can be one reason for why Tetra Pak seems to be more positive about the Extranet in general then the other respondents, as exhibited in table 5.2.

5.3. THE DISADVANTAGES OF EXTRANET IN SCM

The theory will be compared with the data gathered in the within-case analysis. After the within-case analysis a cross case analyses is conducted exploring the differences between the cases made.

5.3.1. Within-case Analysis of Tetra Pak

According to Spekman, Kamauff and Myhr (1998) the face to face contact is getting less with the introduction of Extranet. This is something that is agreed upon by Wijk and Matsen. The respondents argue as well that the physical contact such as face to face is not affected substantially, however the telephone contact will decrease.

Regarding whether cultural disadvantages is seen, the two respondent disagree. Matsen says that the culture in the company has not been affected by the introduction of an Extranet, Wijk however says that in the long run a new way of thinking is necessary and an understanding within the organisation that the databases should be opened up is important. The arguments of Wijk correspond to the theory brought by Franklin (1999) which deals with that cultural problems occur with the introduction of Extranet. Wijk might see the question in a more global way than Matsen.

Security is a barrier to widespread use of Extranet, hence not recognized by Tetra Pak arguing that security is not a problem. The trust between the parties in the supply chain is considerable high according to the respondents. Trust has never therefore been an issue when implementing the Extranet. The respondents are though agreeing with Wilson (1997) stating that trust is an important factor in Extranet use. The cost of implementing was another thing brought up as a disadvantage for Extranet. The cost for the Extramet system was not viewed as a disadvantage by Wijk. The respondents did not agree upon the cost of the implementation, probably since Matsen were not aware of this and saw it from his market company point of view.

5.3.2. Within-case Analysis of NEN produkter AS

Lundberg argues that "it takes a bit longer time when ordering with the E -part system, especially with the long time it take to access the World Wide Web sometimes and that this is a disadvantage with Extranet".

According to Spekman, Kamauff and Myhr (1998) the face to face contact is getting less with the introduction of Extranet. Lundberg and Hulin says that the face to face contact is almost the same however the number of contacts is decreasing and especially those by telephone due to the Extranet. This is according to Hulin a disadvantage. The respondents therefore agree with the literature in the sense that the contact has diminished in favor of electronic means of communication.

Franklin (1999) states that cultural problems have been found to occur with the introduction of Extranet. Lundberg and Hulin do not agree with this saying that the Extranet has not affected the culture of the company at all.

Wilson (1997) argued that security is a barrier and that trust is an important factor in improving security. According to the respondents, security is not an issue since NEN produkter still is conducting manual paper backup. Trust toward Tetra Pak is unchanged and very high. The cost of implementing the Extranet is another disadvantage according to the litterature. NEN produkter had only the cost of a new telephone line, and the respondents therefore argues that it is no disadvantage.

5.3.3. Within-case Analysis of Tine Meierier

Spekman, Kamauff and Myhr (1998) stated that the face to face contact is getting less with the introduction of Extranet. According to Sörvik this fact is not a problem adding that the personal contact level has remained the same with the introduction of Extranet. Sörvik has though observed that the telephone contacts have decreased with E-part.

Security remains a barrier to widespread use of Extranet. The respondents claims that there are no barrier for them to use E-part and the trust towards Tetra Pak is unchanged. Wilson (1997) argues that trust towards technology and trading partners is an important factor in improving security. In essence the interviewees do not look at security as a disadvantage for Extranet use. Another disadvantage earlier mentioned is the cost of implementation, something that according to the respondents is not a disadvantage since it was for free.

Other disadvantages however suggested by the interviewees were that the speed of the system varies depending on the time of the day and information regarding what type of spare-part that fits to which machine.

5.3.4. Cross-case Analysis

In the cross-case analysis, we will compare the disadvantage of Extranet use in SCM between the cases. The table below, lists each of the companies that took part in our investigation and their perceived view of the disadvantages of Extranet use in SCM (see table 5.3).

TABLE 5.3 DISADVANTAGES OF EXTRANET USE IN SCM

Disadvantages of Extranet use in SCM	Tetra Pak	NEN	Tine
Lack of personal contact	♦	♦	
Face to face contact is getting less with the introduction of Extranet	♦	♦	
Cultural problems	♦		
Cultural problems have been found to occur with the introduction of Extranet	♦		
Security issues			
Security remains a barrier to widespread use of Extranet			
Trust towards technology and trading partners is an important factor in improving the security	♦		
Cost of implementation			

Source; authors own construction

Two companies out of three, Tetra Pak and Tine, view lack of personal contact as one disadvantage of Extranet. Tetra Pak argue that the physical contact such as face to face is not effected substantially, however that the telephone contacts decrease. NEN and Tine adds that the telephone contact and contacts in general in the supply chain has decreased with Extranet. The reason for this might be that Extranet could be viewed as a substitute or/and a complement to traditional communication tools. It might be interesting to note that Tine does not mention one negative aspect at all with the E-part system, which might be based on that they are not very experienced with the Extranet.

Tetra Pak believes partly that another disadvantage with Extranet is cultural problems. Matsen claims that the culture in the company has not been affected whereas Wijk argues that the company has to change its thinking in the long run. The reason for the interviewees to disagree might be because they have different views of Tetra Pak. Matsen more on a domestic level with focus on Norway and Wijk with global view and different E-part systems. In the other companies investigated the Extranet might not influenced as many people as in Tetra Pak.

None of the companies view security as a disadvantage for Extranet. NEN argues that they are not looking at security as a barrier for Extranet use, and the reason for that is that they take manual paper backups. The company also mentions that they do not look at trust towards technology as a problem, thereby contradicting itself when taking paper backups. Tetra Pak agrees with that trust towards technology and trading partners is an important factor, though pinpointing that there always has been high level of trust among the supply chain actors. Thereby arguing for the lack of barriers in security to implement Extranet.

As exhibited in table 5.3 none of the companies agree that cost of implementation is disadvantages of Extranet. NEN and Tine had to pay for a telephone line to get connected, whereas Tetra Pak paid for the Extranet system. According to all the three companies there are no legal restrains towards Extranet use in SCM.

6. FINDINGS AND CONCLUSIONS

In this, the last chapter of the thesis, the findings and conclusions drawn from the study is presented following the structure of the research questions.

6.1. EXTRANET USE IN SCM

Extranet is used to improve the process of trade and deliveries of spare parts. Overall, the companies investigated agree upon how it is used and what can be done. We think some disagreements steams from subjective views of e.g. what an improvement is.

One research question was how Extranet is used in supply chain management. In order to explore on this question, theory was compared to reality. Our finding shows that in overall the suggested use of Extranet in SCM given by the theory is not fully corresponding to the reality of the Extranet investigated. The study shows proof of possibilities to add services to E-part suggested by the literature.

Somewhat surprisingly, the respondents answer differently on three occasions regarding the functionalities of the Extranet. Since the functions are fixed in E-part and all users should be able to use neither more nor less functions than the others, the answers should be equivalent. This is however not the case. Therefore the research indicates that there is an unawareness of all the possibilities of Extranet use in SCM. The thesis also indicates that the view of the Extranet use in SCM might depend on the viewpoint. This indication is drawn from the fact that one of the companies has a global view of the use of Extranet in contradiction with the domestic parties, thereby observing possibilities with E-part not seen by the others.

The research also shows some indications that trust in Extranets might affect the adoption of its use. One reason for this indication is that the company that differed concerning Extranet functions, claims that they are still using manual backups and telephones, thereby indicating a lack of trust towards Extranet. E-part, has only be used for less then one year by the users, and some respondents claims that they have not changed their routines by its implementation. The study therefore indicates to some degree that the experience of the use of Extranet might affect the understanding of the functionality of Extranet.

In order to summarise the Extranet use in SCM the thesis indicates that the studied Extranet is not fully developed, and more functions can be added. The thesis also indicates that the users are not aware of all the possibilities of Extranet use in SCM. The reason for this might be according to the study findings because of lack of overview, lack of experience using the Extranet and lack of trust in Extranet.

6.2. ADVANTAGES OF EXTRANET USE IN SCM

Another question from previous chapters was the advantages of Extranet use in SCM. A firm base of literature was developed and compared to the reality. The study shows that the companies interviewed agreed some of the advantages suggested by the literature upon.

The research shows proof that Extranet use in SCM is advantageous in sense of time saving and reliability and accuracy.

The findings regarding the advantages of Extranet use in SCM were as followed:
- Extranet use in SCM might decrease cost
- Trust might to some degree be considered important in Extranet use in SCM
- Extranet might not improve the corporation in the supply chain
- Extranet might improve the customer service in Extranet
- Extranet might improve communication
- Extranet might save money and time for an organisation if it is trusted and used thoroughly

The research indicates that the provider of the Extranet seems to see more advantages with its use then other parties. The research also indicate that there can be a correlation between Extranet use and how perceiving its advantages.

Also within advantages, disagreements occur among the respondents. Especially the degree of corporation differs from what the literature discuss.

6.3. DISADVANTAGES OF EXTRANET USE IN SCM

Another question asked previously was concerning the disadvantages of Extranet use in SCM. In general the findings did not support the literature. The research however indicates that lack of personal contact might be a disadvantage with Extranet use in SCM. Some other findings regarding disadvantages with Extranet use in SCM were as follows:

- Security might not be a disadvantage with Extranet use in SCM
- The cost of implementing an Extranet might not be a disadvantage of its use in SCM
- Extranet might not create cultural problems in SCM

The research indicates that the provider of the Extranet might see more disadvantages with its use then the other parties. The research also indicate that there might be a correlation between Extranet use and how perceiving its disadvantages.

6.4. CONCLUSIONS

The conclusion drawn from the thesis is that the provider of the Extranet seems to view the Extranet in different ways then the user both in terms of its usage and also its disadvantages and advantages. The study further indicates that the knowledge of Extranet use might depend on experience of using it, trust towards Extranet and what overview the user have of the Extranet. There is a correlation between the usage of the Extranet and how the advantages and disadvantages are perceived.

The Extranet investigated differs from what the literature suggest on many points. One reason for this might be the low maturity of the Extranet studied. Another reason can be the tight relationship that seems to exist among the companies investigated. The well-established co-

operation that already existed before the Extranet was introduced may be another reason for the differences compared to the literature.

An overall conclusion is therefore that the more mature the Extranet become the more experienced the user will be and the more trust he/she will have in the system. This will in its turn make the user be more aware of the disadvantages and advantages of the Extranet.

6.5 IMPLICATION FOR THEORY

This study has explored on the Extranet use in Supply chain management and more specifically how the use, advantages and disadvantages of Extranet in SCM can be described. The purpose has been to gain a better understanding of Extranets usage in the supply chain and we have therefore explored this phenomenon.

The thesis indicates that there is a difference in perception/usage between the provider and the user of the Extranet. Another conclusion is that the provider of the Extranet is more aware of the advantages and disadvantages than the user. Study finding shows indications that the reason for these differences might be because of differences in; lack of overview, lack of experience using the Extranet and lack of trust in Extranet. Our study therefore suggest, which is new to the theory, that the accuracy of previous studies in the area of advantages and disadvantages of Extranet use in SCM, depends on how the Extranet has been adapted by its participants. We have also described in more detail, via the data collected to answer our research questions, the phenomenon, i.e. how to describe the use of Extranet in the supply chain, how advantages/benefits and disadvantages/risks of using an Extranet in the supply chain can be described. Further, we have started to explain the phenomenon when answering these research questions.

6.6 IMPLICATION FOR MANAGEMENT

The companies involved must work to get rid of negative views of the E-part system since it seems crucial that everyone involved pulls in the same direction, especially regarding such a fundamental change in the purchase and selling relationship. The effect on employees is probably crucial to explain in depth. Information is therefore the most important word, making sure that everyone knows why changes are done and what is supposed to be reached. We think that this might be missed to some extent in this system.

We also think that lack of information is a reason for the diverged answers received and this is something that has to be dealt with. In the long run we find it harmful for the E-part system if its users does not understand the Extranet's full potential and how to make use of the same. With improved communication both within and between companies involved, we think that the E-part system discussed has great possibilities to be very successful in the future.

6.7 IMPLICATION FOR FURTHER RESEARCH

The concept of Extranet use in supply chain management is a rather new concept as mentioned previously. Through this thesis that look at Extranet in a general way, some contributions to the theory could be made.

The theory in general did not correspond to the literature gathered. It is shown through out the study that Extranet gives advantages but also drawbacks. The concept is though rather new, and all benefits and drawbacks have not come clear to participants using the Extranet yet as noticed in this study. We therefore believe that further study is needed following the continuous development of Extranet.

In our conclusion we stated that there is a correlation between Extranet use in SCM and the perception of advantages and disadvantages. This is an area not developed in literature and possibilities to deepen the research would be of interest. A second area of study would be to further develop on the indications found in the study exploring on why there is a different in perception and usage between the provider and the users of the Extranet. A third possible area to look into is to study two different Extranets, for example one more developed and one more recently established, to look for similarities and differences. A study into future possibilities could also be done we think, since progress and development occurs all the time.

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7. **APPENDIX A ENGLISH INTERVIEW GUIDE**

General Information

Name of the company
Name of the respondent
Position of the respondent
Field of business

Background to use of Extranet in SCM
When did you start to use Extranet in SCM?
How have you used Extranet in SCM?

How is Extranet used in SCM
1. How do you use Extranet in SCM? Why, why not and how on all questions Below?
2. Vendor catalogs from which buyers can find, select, and order items directly from suppliers without any human contact.
3. Able to track shipments and equipment using a variety of modes including truck, rail, and air transport
4. Able to contact vendors or buyers regarding customer service problems from late deliveries, stock-outs, alterations in scheduled shipment dates, late arrivals, and a wide variety of other service issues.
5. Able to schedule outbound shipments from private and public distribution centers on a 24 hours basis
6. Able to provide 7 days/24 hour worldwide customer service
7. Able to receive orders from international customers
8. Able to check the status for orders placed with vendors
9. Able to notify vendors of changes in configurations in products that are produced to order
10. Able to pay invoices electronically an to check outstanding debit balances
11. Able to directly communicate with vendors, customer etc.. Regarding supply issues on a 7/24 basis via e-mail
12. Able to be more responsive to customer service problems
13. Able to schedule pickups and deliveries
14. Able to reduce service costs and response time.

The advantages of Extranet in SCM
1. What are the advantages of using Extranet in SCM?
2. How do you perceive the Extranets ability to reduce costs? In what way?
   - ❑ Less time and paper work
   - ❑ Shared data base?
   - ❑ Middlemen are eliminated?
3. How do you perceive Extranets ability to reduce time between trading partners in the supply chain?
   - ❑ Paper handling is more time consuming than electronic transmissions
   - ❑ Faster coordination

4. How do you perceive Extranets ability to improve the corporation between trading partners in the supply chain?
   - ❑ Common database
   - ❑ Collaboration between companies in new product development
   - ❑ Integrating key business processes and cross functional information sharing
   - ❑ Organisations are more willing to share information with trading partners. If so give example how?
5. How do you perceive Extranets ability to affect the customer service?
- ❑ In terms of feedback?
- ❑ Decreased waiting time?
- ❑ Satisfaction through 24 hours access, updated information and focused marketing efforts?
6. How do you perceive Extranets ability to create faster communication with trading partners and customers in the supply chain?
   - ❑ Improves communication
7. How do you perceive Extranets ability to decrease the number of documents being lost and printings getting lower?

The disadvantages of Extranet in SCM
1. What are the disadvantages of using Extranet in SCM?
2. How do you perceive the lack of personal contact of Extranet?
   - ❑ Is it a disadvantage or advantage to your firm?
   - ❑ Face to face contact is getting less
3. How do you perceive the Extranet to have affected the culture in the company?
4. Do you consider security as a problem?
   - ❑ Barrier
   - ❑ Have the trust towards your trading partners changed in any way with the introduction of Extranet?
5. How do you perceive the cost of implementing the Extranet?

8. APPENDIX B SVENSK INTERVJU GUIDE

Generell information

Företagsnamn
Namn på den intervjuade
Den intervjuades position
Affärsområde

Bakgrund till användandet av Extranätet i SCM
När började ni använda er av Extranätet i SCM?
Hur har ni använt er av Extranätet i SCM?

Hur används Extranätet i SCM?
1. Hur använder ni Extranätet i SCM? Varför, varför inte och hur? på alla nedanstående frågor
2. Försäljnings kataloger från vilka köparna kan finna, välja och beställa objekt direkt från leverantören utan personal kontakt
3. Möjligt att spåra transporter och verktyg som levereras via tåg, flyg transport och lastbil.
4. Möjlighet att kontakta försäljaren eller köparen vid kund service problem, vilka har uppstått genom sen leverans, lager brist, förändring i schemalagda transport dagar, försenad ankomst och en rad möjliga service frågor.
5. Möjlighet att schemalägga utgående transporter från privata och offentliga distributions center på en 24 timmars basis.
6. Möjlighet att erbjuda 7 dagar/24 timmars global kund service
7. Möjlighet att ta emot beställningar från internationella konsumenter
8. Möjlighet att kolla statusen för beställningar hos försäljare.
9. Möjlighet att meddela försäljaren om förändringar i produkt konfigurationer
10. Möjlighet att betala fakturor elektroniskt och att kolla utestående debet balanser
11. Möjlighet att kommunicera direkt med försäljaren, köparen gällande utbuds frågor på 24/7 basis via e-post.
12. Möjlighet att vara mer följsam till kund service problem
13. Möjlighet att schemalägga leverans och hämtning
14. Möjlighet att reducera service kostnader och svars tiden.

Fördelarna med Extranätet i SCM
1. Vilka är fördelarna med att använda Extranätet i SCM?
2. Hur uppfattar ni Extranätets möjlighet att reducera kostnader? På vilket sätt?
    ❑ Mindre tid och pappers arbete
    ❑ Gemensam data bas
    ❑ Mellanhänder är eliminerade.
3. Hur uppfattar ni Extranätets möjlighet att reducera tiden mellan handels partners i Utbuds kedjan (supply chain)
    ❑ Pappers hanteringen är mer tids konsumerande än den elektroniska överföringen
    ❑ Snabbare Koordinering
4. Hur uppfattar ni Extranätets möjlighet att förbättra samarbetet mellan handels partners i Utbuds kedjan?

- ❑ Gemensam databas
- ❑ Samarbete mellan företag i produkt utveckling.
- ❑ Integrering av nyckel affärs processer och krossfunktionell informations utbyte
- ❑ Organisationen är mer villig att delge information med handels partners. Om så är fallet ge exempel.

5. Hur uppfattar ni Extranätets möjlighet att påverka kund servicen?
- ❑ Gällande återkoppling
- ❑ Minskad väntetid
- ❑ Tillfredställelse genom 24 timmars tillgänglighet, uppdaterad information och fokuserade marknadsförings aktiviteter

6. Hur uppfattar ni Extranätets möjlighet att skapa snabbare kommunikationer med handels partners och konsumenter i utbudskedjan?
   - ❑ Förbättrad kommunikation

7. Hur uppfattar ni Extranätets möjlighet till minskat antal dokument som försvinner eller utskrifter?

Nackdelarna med Extranätet i SCM

1. Vilka är nackdelarna med att använda Extranätet i SCM?
2. Hur uppfattar ni bristen på personlig kontakt genom användandet av Extranätet?
   - ❑ Är det en fördel eller nackdel för erat företag?
   - ❑ Den personliga kontakten blir mindre
3. Hur uppfattar ni att Extranätet har påverkat kulturen i företaget?
4. Anser ni att säkerhetsaspekterna är ett problem?
   - ❑ Hinder för användandet?
   - ❑ Har tilltron till era handelspartners förändrats på något sätt genom införandet av Extranätet?
5. Hur uppfattar ni kostnaden för implementeringen av Extranätet?