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Hur en inköpsprocess kan automatiseras och dess effekt på leverantörsrelationen

Magisteruppsats inom Företagsekonomi

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JÖNKÖPING INTERNATIONAL BUSINESS SCHOOL

How a purchasing process can be automated and its effect on the supplier relationship

Master's thesis within Business Administration

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Sammanfattning

Företag verkar i en omvärld med snabb teknisk utveckling. Ett led i denna utveckling är att automatisera inköpsprocessen med olika IT lösningar. Nya koncept och elektroniska lösningar efterfrågas konstant av företagen för att kunna uppnå mer effektivitet i inköpsprocessen, känt som E-procurement management. Detta koncept har blivit allmänt utbrett i fordonsindustrin, vilket har sin orsak i att en bil är en system produkt med 20 000 beståndsdelar och därav många transaktioner vid inköp av dessa delar. För att kunna automatisera inköpsprocessen måste företaget undersöka och analysera vilka nya tekniska lösningar och vilka elektroniska hjälpmedel som finns. Med hänsyn till detta avser denna studie att fokusera på att analysera hur en inköpsprocess i fordonsindustrin kan automatiseras. Författarna har valt att titta närmare på tre olika elektroniska hjälpmedel. Därtill kommer studien innehålla att analysera vilken inverkan en viss produkt och leverantörs typ har på val av elektroniska lösningar. En annan väsentlig fråga som också kommer att diskuteras är hur vid en automatisering av inköpsprocessen påverkar leverantörsrelationen. Dessa frågor kommer att innebära att studera både köparen's och säljaren's perspektiv.

Syftet med denna uppsats är att analysera hur en inköpsprocess i strategiska relationer i bilindustrin kan automatiseras, med hänsyn tagen till vilken typ av produkt och leverantör beträffande val elektroniska hjälpmedel. Vi kommer också studera den eventuella påverkan på kund - leverantör förhållandet som en automatisering kan leda till. För studien har en kvalitativ metod använts, detta för att få en mer precis och djupare kunskap i hur kund-leverantör relationen påverkas vid en automatisering. Författarna har genomfört intervjuer hos ett stort biltillverknings företag i Sverige, och med tre av deras leverantörer.

Studien visade på att där finns ett flertal områden i inköpsprocessen som kan effektivieras. Två drivare har konstaterats som möjliga lösningar : Covisint och web-EDI. Vidare är det möjligt att dra slutsatsen att en automatisering av inköpsprocessen påverkar leverantörsrelationen. Författarna har dragit slutsatsen att företag inte bör rusa in i en automatisering, istället måste uppmärksamheten riktas till frågan om i vilken grad av automatisering som kan tillåtas utan att det får en negativ inverkan på relationen. Vidare bör företaget grundligt studera vilken elektronisk lösning som är mest passande, därtill med hänsyn till vilken typ av produkt och leverantör det handlar om.

Master Thesis in Business Administration

Title: How a purchasing process can be automated and its effect on the supplier relationship

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Date: January 2006

Subject terms: Purchasing process, product and supplier classification, E-procurement solutions, buyer-supplier relationships

Abstract

Companies operate in a changing world with rapid technological development. Automation of the purchasing process in companies by means of electronic solutions is in line with this development. Companies constantly demand new concepts and electronic solutions in order to make the purchasing process more efficient, known as E-procurement management. This concept has become widespread in the automotive industry owing to that a car is a system product that on average consists of 20 000 parts, and consequently many transactions when purchasing these products. However, to be able to automate the purchasing process the company has to explore and analyze what new technology solutions there are. With regard to this, the study will focus to analyze how a purchasing process in the automotive industry can be automated. The authors have chosen to look deeper into three different electronic solutions. Thereto the study will examine what impact a certain type of product and supplier has concerning electronic solution. Additionally, how the buyer-supplier relationship is affected of automation is a fundamental question when considering automation, and will therefore be discussed in the study. These questions will concern to study both the buyer's and the supplier's perspective.

The purpose of this thesis is to analyse how a purchasing process can be automated in strategic relationships in the automotive industry, thereto taking product and supplier type into consideration concerning electronic solutions. We will also study the possible effect on the buyer-supplier relationship of automation. A qualitative method has been employed, in order to get a more precise and deep knowledge of the subject. The authors have conducted interviews with respondents working at a large car manufacturing company in Sweden, and with three suppliers to this company.

The study found that there are several areas in the purchasing process that still can be more efficient. Two technological drivers have been outlined as potential solutions: Covisint and web-EDI. Moreover, it is possible to conclude that an automation of a purchasing process will have an effect on the buyer-supplier relationship. The authors have drawn the conclusion that companies should not rush into things such as an automation. Much attention should be paid to the question what degree of an automation that can be allowed before it will have a negative effect on the relationship. Moreover, they should thoroughly study on what electronic solution is most suitable, thereto with consideration to what type of product and supplier one is dealing with.

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1 Introduction

The first chapter of this thesis outlines the problem, how the problem is derived and the rationale for studying the proposed area, followed by the stated purpose.

1.1 Background

The modern industrial enterprises of today act and are shaped in an environment that is distinguished by a rapid technological development and internationalisation. It is necessary for enterprises to adapt to this new environment with increased international competition and rapid alterations. The improvement of technology and the striving of finding new solutions in order to save time and money, and to facilitate the administration and communication within and between companies, often results in the development of different solutions in information technology (IT) (Axelsson, 2001). Before, IT was mainly a tool for the internal activities within the company; however the IT of today is increasingly used even for the external activities between the company and its suppliers (Fredholm, 2002).

The purchasing process, which partly consists of external activity, has according to Gadde and Håkansson (2001) traditionally been considered an administrative occupation. However, today it is generally agreed that purchasing has evolved from an administrative buying function into an essential strategic part of the companies business and one of the key issues for a company to be competitive in the market (Gadde & Håkansson, 2001; Carter & Narasimhan, 1996). Moreover, it represents one of the main parts of the total cost spent in a company. This even more increases the significance that purchasing, and its strategic aspects, should not be underestimated. An American study reveals that purchasing costs amounted to 50 percent or more of the total costs, depending on the industry. In the automotive industry this figure counts for as much as 70 percent of the total costs and is still increasing (Gadde & Håkansson, 2001). Purchasing does become a key contributor to the profit margin in a company (Day, 2002); consequently it is essential to examine how one can make the purchasing process more efficient, and thus a relevant subject to study.

Nowadays, many companies try to automate their purchasing process by using IT. Around 2000 it became common that companies considered electronic procurement (E-procurement), which is a non-paper based purchasing process (Jonsson, 2004). According to Neef (2001) E-procurement is such an area that facilitates a more efficient purchasing process. The author further explains E-procurement as a process of purchase and/or sales of goods between companies by means of some IT-solution. Essig and Arnold (2001) point out that the purchasing process includes various activities and that an E-procurement system is a substitute, or an addition to classical purchasing methods. Request for quotation, negotiations and invoicing are some activities that are supported by IT in many companies (Fredholm, 2004).

The values of E-procurement are many. It can reduce purchasing costs, increase accuracy and speed of acquisition, reduce paperwork and administrative costs, and provide better information for managers (Giunipero & Sawchuk, 2000). If these advantages are realized, IT could become the primary low-cost network for purchasing transactions. Since there is a high potential for cost savings and productivity improvements, both the buyer and the supplier would benefit from increased use of IT for corporate-related purchasing activities (Deeter-Schmelz, Bizzari, Graham & Howdyshell, 2001).

According to Jonsson (2004) the increased use of E-procurement has led to increased customer value such as personalization, transparency and 24 hour availability. E-procurement also has a positive effect on the number of suppliers, since it makes it easier to handle higher number of close relationships, and to reach additional suppliers. Ericsson (2000) emphasizes that E-procurement will facilitate and strengthen the communication and interaction between a company and its suppliers. McIvor and Humphreys (2005) agree and say that IT represents a powerful technology for procurement and communication at the buyer-supplier interface, and a well functional communication can improve the buyer-supplier relationships (Håkansson & Wootz, 1978).

1.2 Problem discussion

Giunipero and Sawchuk (2000) claim that many companies have computerized the purchasing process and many more are planning to do so. It is a very transaction intensive process and should be handled as efficiently as possible. A car for instance, is a system product that on average consists of 20 000 parts and consequently many transactions when purchasing these products. Thus, the automotive industry has a long and complex supply chain, and with several levels of suppliers, the information exchange takes a long time and causes frequent errors if it is done through fax or paper documents. This causes inefficiencies in various areas, such as procurement, throughout the supply chain (Kim, Im & Kang, 2005). Due to this, E-procurement has become widespread in the automotive industry. At present there are two well known E-procurement solutions in the automotive industry; Covisint¹ and EDI Odette². E-procurement solutions have been around for many years, but due to rapid technological development, companies should always question their present situation whether they utilize the possibilities of IT and other automatic solutions of today in the purchasing process.

In order to appreciate both the need for E-procurement and why it is so revolutionary, Neef (2001) says it is necessary to observe an organization's approach to procurement. The author stresses that it is essential to go through each activity in order to find where in this sequence of activities there are some inefficiencies and how this activity can be automated. The potential to benefit from E-procurement is dependent on several factors (Hörndahl, 2000). So before an electronic solution for the purchasing process can be introduced it requires a deep understanding of what kind of relations the company has to its suppliers and what type of products that are purchased. For instance, how large is the purchase volume, what products are related to high costs and what type of relationship do they have towards their suppliers and how does the communication look like (Cap Gemini, 1999; Fredholm, 2002). Having this defined, it is then possible to investigate which electronic purchasing solutions that is most suitable for the company (Van Weele, 2002).

Jonsson (2004) argues that introducing electronic solutions is less about technique and more about cultures and attitudes. The author points out that the difficulty to be successful

¹ Covisint is a highly publicized example of E-auctions in the automotive industry used in purchasing of goods. It was grounded in 2000 by General Motors (GM), FORD, Dimler-Chrysler and Renault-Nissan (Neef, 2001; Fredholm, 2002), which gave the car manufacturers the possibility to rationalize procurement and to save money.

² EDI is related to the exchange of information between the information systems of two companies by means of standardized communication protocols and data entities (Fredholm, 2002), whereas EDIOdette is one of many standards that exists within EDI.

with E-procurement is how all this technique is implemented. This is where culture and attitudes within the company and between the company and its suppliers are crucial factors. The author claims that in E-procurement management the company has to consider new or modified business relationships, an adjusted supplier market, and influences on buyer-supplier loyalty, as a consequence of the electronic channel. This is important since supplier relationships are very important from an economical perspective. More than half of the total turnover in a company is handled within those relationships. The relationships are also important from a technical perspective, especially in the automotive industry. Moreover, relationships involve high investments and require much time to develop. Consequently a well established relationship is one of the most important resources for a company (Gadde & Håkansson, 1998).

From the discussion above, it is relevant for all actors to consider how one can make its purchasing process more efficient but consequently also take into account its effect on the buyer-supplier relationship. This brings it to an interesting subject to study, because if the variables above are not taken into consideration, automation could instead be a threat to the buyer-supplier relationship, consequently to the company. A certain product- and supplier type requires a certain purchasing method (Kraljic, 1986; Axelsson, 2001; Van Weele, 2002), and depending on purchasing method different electronic solutions are suitable. Therefore, this thesis aims to examine type of product and type of supplier concerning electronic solutions. As Jonsson (2004) said; one must consider modified business relationships in E-procurement management, the authors will therefore include analysing the effects on the buyer-supplier relationship in an automation of a purchasing process.

Due to the fact that a car is a system product dependent on several strategic suppliers and their technology, which imply important relationships; the authors find it interesting to study the purchasing process towards the strategic suppliers and its strategic products in the automotive industry. Secondly, what makes the automotive industry interesting for this study is that the buyer-supplier relationships in the automotive industry is experienced as having unequal balance of power (Waurzyniak, 2001), which could be of a problem if one rely on the theory that an automation will increase the dependence in a relationship, which could lead to increased or decreased balance of power for either of the parties (Gadde & Håkansson, 1998).

If a company wants to succeed with E-procurement, they must give the suppliers the chance to choose what solutions that suits them as well. Consequently, decisions made for the purchasing function implies also to integrate the suppliers and their attitudes in these decisions (Dobler & Burt, 1996; Fredholm, 2002). Therefore, this study will consider both the buyer's and supplier's perspective of the studied area, and will be limited to start out from one purchasing process and strategic suppliers. By examining both perspectives it will give this study different approaches and ideas of how a purchasing process can be automated. Concerning the buyer-supplier relationship, it is also interesting to analyse the buyer's as well as the supplier's view on how automation will affect the relationship. Since the supplier is regarded as having a weaker position in the relationship (Waurzyniak, 2001) it is interesting to examine their total view on how the relationship will be affected. However, concerning the buyer it will be limited to only view their power perspective in an automation.

Since the supplier's perspective will be included, the purchasing process will be limited to only looking at the activities taking place between the buyer and supplier in this process which starts with the selection of supplier and ends with payment of goods.

1.3 Purpose

The purpose of this thesis is to analyse how a purchasing process can be automated in strategic relationships in the automotive industry, thereto taking product and supplier type into consideration concerning electronic solutions. We will also study the possible effect on the buyer-supplier relationship of an automation.

1.4 Disposition of the thesis

The following disposition outlines the structure of the study. The study is built on seven chapters plus appendices.

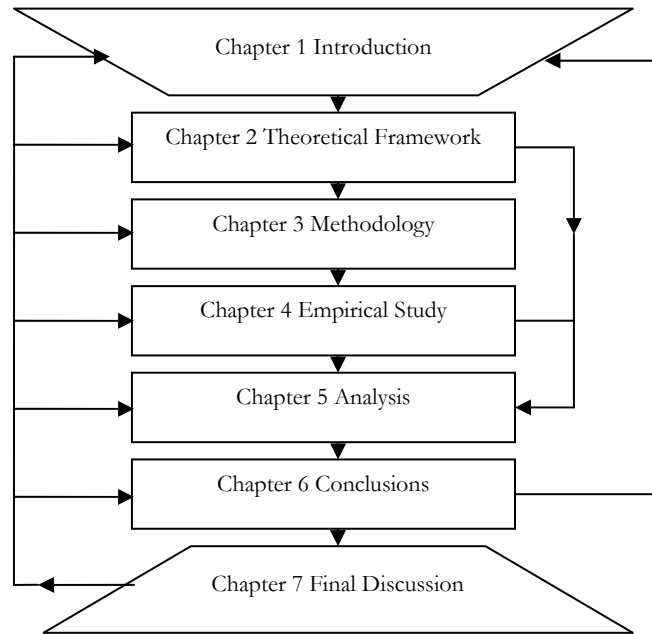


Figure 1-1: Disposition of the thesis

- | | |
|-----------|---|
| Chapter 1 | This chapter outlines the problem, how the problem is derived and the rationale for studying the proposed area, followed by the stated purpose. |
| Chapter 2 | This chapter aims to be conceptual, including theoretical discussions on the purchasing process, product and supplier classification, E-procurement, when and how it can be used, and its impact on buyer-supplier relationships. |
| Chapter 3 | Methodology describes and motivates the applied approach for this study. Moreover, it explains the procedure of gathering information, both secondary data and interviews. |
| Chapter 4 | This chapter will render relevant parts of the empirical material. It consists of two parts: Volvo Cars Corporation and the three suppliers. |
| Chapter 5 | In the analysis the authors gives a discussion based on the theoretical framework and the empirical study. |
| Chapter 6 | This chapter will return to the purpose of this study and present what conclusions that has been made. |
| Chapter 7 | This chapter consist of reflections of the study. It will present criticism and weaknesses of each chapter in this thesis. Finally it will give guidance for further research. |

2 Theoretical Framework

This chapter aims to be conceptual, including theoretical discussions about the main issues under study. The framework starts of by an introduction of Business-to-Business and the “E” concepts that bring the thesis to E-procurement. Thereafter, the traditional purchasing process will be described with theories on how it can be automated. This will be followed by theories on product and supplier classification as concerning electronic solutions. The chapter ends with a discussion about important attributes of a buyer-supplier relationship and its possible effects of an automation.

2.1 Business - to - Business

According to Noyce (2002) business - to - business (B2B) marketing is defined as the buying and selling of goods and services between companies. Van Weele (2002) gives a limited definition, that B2B marketing is the term for business transactions that is carried out between two companies. These business transactions can for instance be invoices, orders and any kind of information related to the business (Kalakota & Robinson, 1999). However, Noyce (2002) stresses that B2B contains more than business transactions and points out the buyer-supplier relationship as another characteristically element in B2B. In a B2B marketing world, both product and services are market and sold in basically the same way as in consumer goods marketing (Block & Block, 1995). Business systems are today common in B2B and it is a tool to achieve effectiveness and simplify the company’s business transactions (Kalakota & Robinson, 1999). This will derive more resources, which can be used to allocate more time for customer friendly activities, for instance developing a relationship (Hörnedahl, 2000).

2.2 E-procurement

The letter E is the symbol of the IT society we live in today and which has increased its importance in the B2B environment. The E, which is here referred to the electronic concepts in B2B, means that business transactions are supported electronically. There are many concepts of this and they are used in many different ways and in many different situations which makes the E area very complex. Therefore, before moving on there will be a brief description of the different “E” concepts in a B2B setting in order to enhance the readers understanding of this complex area and bring the reader to E-procurement.

Electronic Business (E - business) implies business systems that are connected to each other in a network and makes it more efficient to transfer information between the two systems (Fredholm, 2002).

Electronic Commerce (E - commerce) is then a narrower concept. Fredholm (2002) define it as any form of business or administrative transaction, or information exchange that is executed using any information and communication technology. E - commerce covers a broad spectrum of applications that enable a business to form electronic relationships with their distributors, resellers, suppliers, and other partners. By using E - commerce, business can reengineer their supply chain and partnership. The most common systems in E - commerce are: order-, inventory- and invoicing systems, Material – planning systems, accounting systems, purchasing systems and transport – and administration systems (Turban, Lee, King & Chung, 1999).

Electronic procurement (E - procurement) is defined as purchase and sales of goods between companies by means of some IT-solution (Neef, 2001). E-procurement was developed in

the early 1990s, and by that time E-procurement was focused on purchase of indirect material such as office suppliers. However, today E-procurement is also used in purchase of direct material³ from suppliers, that before was purchased in a more “traditional” way (Weil, 2000). There are several E – procurement solutions for different activities in the purchasing process. For example, the buyer could look through the suppliers product catalogues electronically. Moreover, negotiation/bidding procedures can be managed electronically. To place and receive orders are other activities that can be carried out electronically by means of an E-procurement solution (Fredholm, 2002). When introducing an E-procurement solution, Macleod (2000) stresses that it is important that suppliers can meet the buyer’s demand regarding this types of electronic service, otherwise the it might be a threat to the continuing relationship. This thesis will look upon E-procurement as the business and administrative transactions, and other information exchange, which are related to the activities taking place between the buyer and supplier in the purchasing process. The E then stands for how this is performed electronically.

2.3 The purchasing process

Over the years the purchasing function has become more complex and involving many functions in the company into procurement, which has evolved the purchasing process into issue of supply management. This development has consequently resulted in a more integrated supply chain management, where all steps should be taken into account (Trent & Monczka, 2003). Especially the purchasing function has increased its importance in this chain, since purchased materials consist of the majority part of total cost spent in a manufacturing company (Dobler & Burt, 1996). In the automotive industry this figure counts for as much as 70 percent of the total costs and still increasing (Gadde & Håkansson, 2001).

A purchasing process may vary to some extent between companies and within companies; for instance, they may vary depending on if the purchase concerns new- task situation, a modified rebuy or a straight rebuy (Van Weele, 2002). However, clear stages are still recognised and the purchasing process is described by many authors in a similar way. Below is an overview including a few authors description of a purchasing process, and the process is divided into seven steps that have been recognised among the authors. The discussion will be set to manual operations in this process, but it will also include how this can be transferred into E-procurement.

Selection of supplier: There are several ways to look for potential suppliers. One way to do this may be to arrange an agreement with a specific supplier for the delivery of the products (Van Weele, 2002). This can be the case if the buyer favours one supplier and its products. An alternative is to invite suppliers to competitive biddings. The decision is made in this phase but the actual bidding starts first when the request for quotation (RFQ) is presented on the bidding site (Turban et al., 2000). Neef (2001) states that the selection of supplier could as well be done by using web-based catalogues. Web-based catalogues of the company’s approved suppliers will make it easier for the buyer to get access to information, such as product specifications and order status. Products can be identified by features or by model numbers or names, and the results will prioritize the results according to how well items match the buyer’s requirements. The system will provide a side-by-side comparison of the products. Prices can be compared between suppliers, and discounts calculated easily.

³ Direct material is a part of or comes with the final product (Ericsson, 1969)

Request for quotation (RFQ): After deciding on what potential suppliers the company wants to work with, a request for quotation will be sent to the supplier/suppliers by post or email, describing the needs. This activity often requires much communication between the buyer and the concerned supplier/suppliers, since requests often include much information that has to be discussed and questioned (Neef, 2001). Giunipero and Sawchuk (2000) therefore suggest voice communication with the computer in order to generate information about information. Turban et al. (2000) suggest that this activity as well can take place by competitive biddings by placing the RFQ electronically and suppliers get to bid. Often the one with the lowest price will get to sign the contract. This kind of electronic marketplace is discussed later on.

Signing of contract : This activity includes getting an approval from the supplier. Both technical (availability) and financial (price) approvals are determined in this activity (Neef, 2001; Gadde & Håkansson, 1998). This results in negotiations between the buyer and supplier in order to establish an agreement and thereby a contract where both parties are satisfied (Van Weele, 2002). Giunipero and Sawchuk (2000) claim that instead of having paper contracts one can manage the same activity by having on-line virtual contracts. However, the latter point out that to gain security with having electronic signatures it requires that the electronic signature allows the receiver to verify the identity of the sender of the data.

Placing and dispatching the order : Against previously arranged agreement of the terms and conditions and the legal contract the buyer will place a purchase order with the selected supplier (Van Weele, 2002). This is done by collecting the paperwork and the information is transferred, by hand, to a purchase order form and then usually faxed to suppliers. This is generally accompanied further by phone calls to confirm the receipt. For most companies, this process remains much the same as many years ago, except for the fax, with long and unpredictable cycle times (Neef, 2001). Normally there are around seven copies of a purchase order, in different formats, sent out to the supplier and other internal departments. It therefore requires much work to perform these orders manually (Dobler & Burt, 1996), but an automation of this would decrease the workload. Instead of sending the purchase order through fax or post, the orders should be sent electronically by mail and at the same time the computer could prepare all other copies for internal distribution and other forms such as receiving and inspection reports (Dobler & Burt, 1996; Giunipero & Sawchuk, 2000). Another method could be to go to a web site and enter the purchase order onto an electronic page. When having a paper based purchasing order, errors are sometimes discovered too late and resulting in more paperwork that has to be done. But the on-line order form will be rejected if there are any errors, so the customer can correct it immediately (Giunipero & Sawchuk, 2000).

The purchase order might concern only a purchase at that moment or the purchase order might be issued for a definite period, usually a year. In the automotive industry this period is usually as long as the lifecycle of a car. In the latter case the operation department will issue simple releases against the order. These releases are made without questioning the suppliers' condition. On call orders fall into this category, where the buyer dials the suppliers' computer direct, and all important information is transmitted from the buyer's computer terminal to the supplier's (Heinritz, Farrell, & Smith, 1986). This is known as Electronic Data Interchange (EDI) and will be discussed later on. If the purchase order and the placement of regular needs arrive electronically as described above it makes it easier for the supplier to process and dispatch the order automatically (Giunipero & Sawchuk, 2000).

Delivery and receiving of goods : There is usually an inspection department that follows up the delivery and receiving of goods. They check the packing slip which itemizes and describes

the contents of the shipment. The inspection department uses the purchase order to verify that the correct material has been received. To reduce the administrative work in this activity, the receiving can be done using an online computer-based system, coupled with bar code order identification or by having the receiving report filled in electronically (Dobler & Burt, 1996). As in the case of the purchase order, this would as well reduce the number of paper based receiving reports that have to be sent to different departments within the company.

Payment : This activity also includes many paper documents being compared. A typical procedure involves a simultaneous review of the purchase order, receiving report and the invoice. If everything is correct, payment is carried out (Dobler & Burt, 1996). Auditing invoices is a time-consuming task that should be handled as efficiently as possible. If the received material is not in accordance with the purchase order and what is said on the invoice, the purchasing department must make an adjustment with the supplier. This is a long process as well with many documents to be compared and a lot of communication between departments (Giunipero & Sawchuk, 2000).

The activities described above have according to Neef (2001) a good potential to be transferred into E-procurement. Giunipero and Sawchuk (2000) argue for integrated procurement systems when considering automation of a purchasing process. The authors suggest a system that allows posting of RFQ's for supplier review and response on the internet, and which can handle web orders, and on-line supplier catalogues access. However, in order to appreciate both the need of E-procurement and why it is so revolutionary, Neef (2001) says it is necessary to look at a typical organization's approach to purchasing. The author stresses that it is essential to consider each activity in order to find where in this sequence of activities there are some inefficiencies and how this activity can be automated. However, before carrying out an automation of a purchasing process it also requires an understanding of what kind of product and supplier this purchasing process concerns (Cap Gemini, 1999). The next chapter will describe models in order to classify products and suppliers.

2.4 Product and supplier classification

One of the most established and frequently used models to differentiate products and suppliers in order to find suitable purchasing strategies is a matrix developed by Kraljic (1983). The authors have therefore chosen to use this theory, with complementary studies of Axelsson (2001) and Van Weele (2002) in the field of product and supplier classification. The classification indicates that there are different purchasing problems and those are divided in two dimensions. The first dimension explains the purchasing/supplier's impact on the financial result. If a company spends a lot of investments on purchasing of materials it means that the purchasing stage has a large impact on the profit of the company. Also if the expenditures of materials are a great part of the total costs, it means that a small change in the costs of materials leads to great effects on the profit margin. This dimension can be defined in terms of the volume purchases, percentage of total purchase cost or impact on product quality or business growth. The other dimension is the complexity of the supply market. Kraljic (1983) describes it as risks that are associated with the product, which is assessed in terms of availability of the products, number of suppliers, competitive demand, make-or-buy opportunities, storage risks and substitution possibilities (Kraljic, 1983). These two dimensions conclude that there exists a difference in choice of strategy depending on what kind of product the company purchases (Van Weele, 2002; Kraljic, 1983). For instance, are the products produced to the requirements of the customer or are they standardised? Are the products of simple components or are they technically advanced? Does

the supplier have a monopoly or oligopoly position on the market? By analysing the products from these two dimensions, the company can sort out all its purchased products into four categories: strategic, bottle neck, routine and leverage products. By doing this with the products it will also give a classification of the suppliers. The company will then be able to determine which type of purchasing strategy the company should follow for each specific product and supplier.

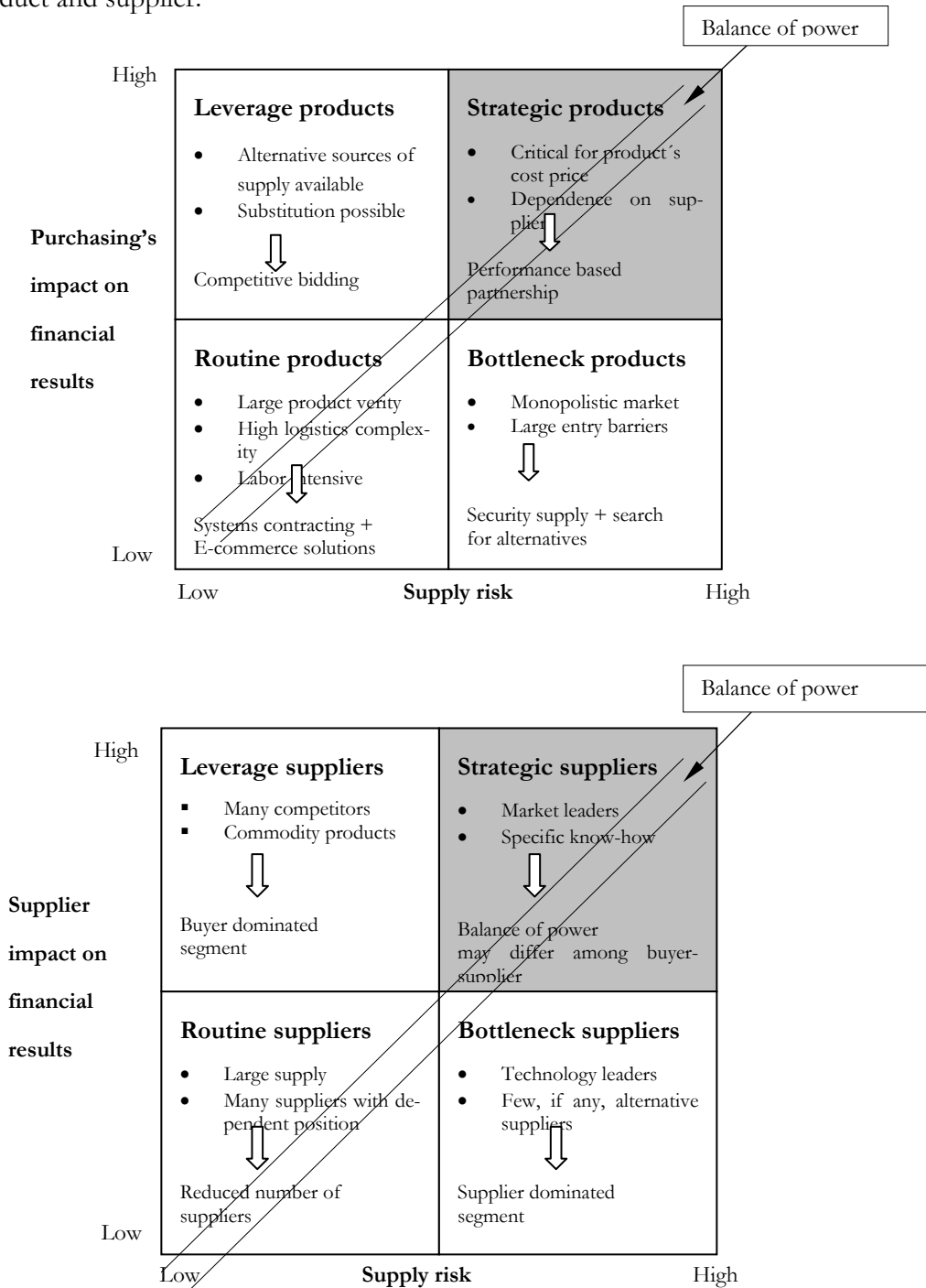


Figure 2-2: Kraljic's purchasing product portfolio and supplier portfolio (Van Weele, 2002, p. 147).

Strategic products have high profit impact and high supply risk. Those products involve highly customised components or integrated subsystems that require strong technology and engineering capabilities. Examples are engines and gearboxes for automotive manufacturers

(Kraljic, 1983). For strategic products the suppliers are market leaders and possess know-how. Only one source of supply is available, which cannot be changed in the short term without incurring considerable costs. The purchasing strategy for strategic products will be aimed at partnership or collaboration. These partnerships often have a high mutual dependence between the parties involved. There should be an intensive communication and interaction.

Bottleneck products are products that have a small profit impact and high supply risk (Kraljic, 1983). Axelsson (2001) defines them as being sensitive for disruptions in delivery. One fine example of this category of product can be the color-pigment used by color manufacturer, which is added in the paint to create different colors. For bottleneck products the suppliers are technology leaders and there are few, if any, alternative suppliers. Hence bottleneck products are characterized as a supplier dominated segment. The purchasing strategy should be to secure continuity of supply, if necessary at additional cost. One should also strive to develop alternative products and suppliers in order to decrease dependence on these suppliers (Kraljic, 1983).

Routine products also classified as non-critical products. These products have a very low profit impact for the company and low supply risk. Example of products would be office equipment, products the company needs for the everyday function (Kraljic, 1983). For routine products there is a large supply, hence many suppliers with dependent position. The purchasing strategy should be to reduce the number of suppliers (Van Weele, 2002).

Leverage products have a great impact on the profit because those products constitute for a relatively high part of the total cost spent relative the final product. A small change in price will thus cause a major effect on costs of the final product. Since these products can be bought from several sources the supply risk is low. Leverage products can be from the steel and aluminium industry, where one can buy standard products in a wide field of application (Axelsson, 2001). For leverage products there are many competitors and commodity products. It is a buyer - dominated segment, which means that the buyer has freedom of choice regarding the selection of suppliers. Abuse of this power however, can lead to co-operation between the suppliers. Since the suppliers and products are interchangeable, Kraljic (1983) recommend competitive biddings and no long-term supply contracts to be the best purchasing strategy. In this way the buyer will be able to cut prices. Buying at a minimum price, while maintaining the required quality level and continuity of supply, will take priority here.

Depending on the product and supplier classification the purchasing strategy will differ as described above. For every segment of the portfolio a different strategy is possible, and different strategies require different approaches to electronic solutions.

2.5 E-procurement solutions

There is a great diversity of electronic tools available already in the field of purchasing. Fredholm (2002) states that when two companies are about to make business with each other electronically there are mainly three different solutions to choose between: electronic market places, EDI and web - solutions. Van Weele (2002) stresses that it is important for the company to investigate which electronic solutions are most suitable for them. The author has derived a systematic model for this, showing which solutions that is available for different purchasing strategies, but the author stresses the fact that in order to achieve successful automation, system standardisations are a prerequisite.

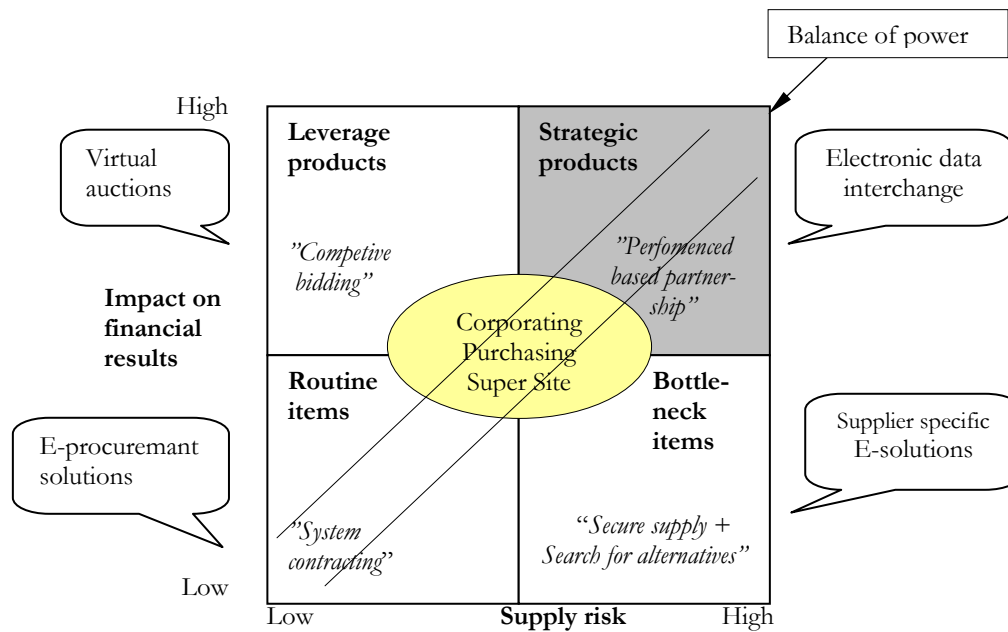


Figure 3-2: Different electronic solutions for different purchasing process (Van Weele, 2002, p. 177).

For strategic products, which are tailored to customer needs, EDI is often favoured as a solution, due to the frequent transactions and interactions. As far as bottleneck products are concerned there is a little to choose from for the buyer. Given the dominant position of the supplier, they will force their system upon their customers. The customer will have to adapt to its suppliers rather than the other way around. For routine products that can be specified easily and are bought against standard qualities, Van Weele (2002) suggests catalogue systems and electronic payment solutions. This segment focuses particularly on the lowering of transactions costs. E-auctions are largest for the leverage products. Since these products can be bought from many suppliers the catalogue systems and E-procurement are most suitable.

Since this thesis focuses on examining electronic solutions towards strategic suppliers and its strategic products it will therefore be limited to discuss the strategic products from the systematic model above and EDI as a suitable tool. However, Fredholm (2000) argues that electronic market places and web-solutions as two additional solutions when two companies want to do business with each other electronically. Since Covisint is an electronic market place used in the automotive industry, this will therefore be discussed with the purpose to study if these are applicable for strategic products as well.

2.5.1 Electronic market places

Electronic market places are defined as a place on the Internet where actual transactions can take place between buyers and suppliers. This is equal to portals, Electronic Auctions (E-auctions)⁴ or virtual auctions as mentioned in figure 2-2. Van Weele (2002) and Turban et al. (2000) describes four variants of electronic market places:

⁴ In the following the terms electronic market places, portals and E-auctions will be used interchangeably.

Website: a place where a single buyer communicates with a single supplier. A website is characterized by a one-to-one relationship between the buyer and supplier (Van Weele, 2002).

Buyer oriented market place: The buyer-bidding site is the most common buyer oriented market place (Turban et al., 2000). Normally large companies, who want to rationalize procurement and purchase to low-prices, organize these sites (Vigoroso, 1999; Baatz, 1999). Suppliers to a particular company offer their products direct at the buyer company-bidding site and in doing so improve the purchasing processes for the involved companies, especially for the buyer. In the buyer oriented marketplace, suppliers will in addition be benchmarked against other suppliers in this bidding process, which can be particular convenient for the buyer since it can sort out the best offer directly (Van Weele, 2002).

Supplier oriented market place: A supplier (sales) focused marketplace consequently gathers suppliers to a common marketplace. This marketplace is most suitable to use if the supplier has many business customers who do not ordering very frequently; thereby making it more convenient to manage. These sites can offer a number of different services to its customers. Neef (2001) and Turban et al. (2000) conclude that besides customer services of different kinds, online ordering and order status are of particular interest. In general, technical support is suitable to distribute in this way to the customers of the supplier (Turban et al., 2000). This type of marketplace is convenient for the supplier's customer, since they do not need to spend time with ordering from many different suppliers' web sites, they can just go into one of these market places to place an order.

Electronic Market Exchange: This is a market place where several suppliers and buyers are presented at the same time. These may be organised by type of industry. One highly publicized example of E-auctions in the automotive industry is Covisint which gave the car manufacturers the possibility to rationalize procurement and to save money. Covisint makes it possible to share information and communicate with the supplier. The main functions for Covisint are naturally online purchase from the electronic product catalogue, offerings and E-auction. SupplyOn a counterpart to Covisint, founded in 2000 from major German automotive suppliers, also has tools for collaborative engineering documents management, which is not yet possible at Covisint (Neef, 2001)

Strategic products are however quite difficult to purchase via E-auctions since they require intense communication and technical coordination. Hence buyer - oriented marketplaces are, for now, more suited for procurement of routine products (Bygdesson, Gunnarsson & Onyango, 2000). Though, Fredholm (2002) claims that one should not underestimate Covisint. It can for instance force the supplier base to move towards online purchasing and adapt certain industry standards for communication protocols, which consequently will move them towards an online approach to procurement. According to Neef (2001) Covisint estimate that once all their suppliers are connected online, they can achieve cost reduction up to 14 percent in production.

Some large companies can even use several of these models described above since they operate in different business areas (Turban et al., 2000).

2.5.2 Electronic data interchange

EDI is related to the exchange of information between the information systems of two companies by means of standardized communication protocols and data entities. Transfer of information, such as purchase orders, shipping notes and invoices, is done by using se-

cure telecommunication links (Turban et al., 2000; Fredholm, 2002). Fredholm (2002) further argues that EDI is suitable when there is a partnership, a business agreement between the buyer and supplier, and that there are regular transactions between those two.

The advantage with EDI is that it is rapid, reliable and effective. For instance an order will be received directly in the right place and in the right format by the business system and the need for personnel that register the order will decrease (Chesher & Kaura, 1998).

EDI has been the major method for electronic transmission of business data between buyers and suppliers (Neef, 2001). Those electronic transmissions are built up according to an agreed structure. This standard means that the information, sent by the buyer, can be interpreted by the receivers system since the data file that is being transferred follows an agreed standard. Consequently EDI is a homogeneous link that connects companies' heterogeneous computer systems. However, Simon (2000) and Fredholm (2002) argue that one major disadvantage is the high cost related to implementing it. The latter explains that EDI requires that the buyer set up a new telecommunication link for each supplier.

2.5.3 Web - EDI

It is possible to combine EDI and Internet, known as web-EDI. Web-EDI is designed to enable business data to be served, received, and processed on the web (Giunipero & Sawchuk, 2000). Unlike traditional EDI, web-EDI allows two data systems to understand each other even though the two systems that exchange information belong to different computer systems (Giunipero & Sawchuk, 2000; Fredholm, 2002). Neef (2001) therefore declares web-EDI as being a better technology than traditional EDI, and continues to say that web-EDI also allow even small suppliers, that can not afford traditional EDI, to easily transfer their catalogues, contract terms, and invoices to any buyer directly and securely via the Internet. When utilizing web-EDI, both the buyer and supplier could aggregate all information into a single web page. Information such as price and available units from a set of suppliers could be located here and would make it easy for the buyer to compare suppliers. When the choice has made, the buyer place the order on this web page which in turn is connected to an order system. The purchase order is filled in electronically and instantly translated into the supplier's automated purchasing order, and then put into the supplier's order system where they can download the order (Giunipero & Sawchuk, 2000; Fredholm, 2002; Turban et al., 2000). This web page also allows storing information such as supplier number and main contact person. There will also be forms connected to the purchase order (e.g. order confirmation, delivery notification, and invoice) that has to be filled in by the supplier and sent back to the buyer (Fredholm, 2002).

Turban et al. (2000) discuss reasons to create EDI over the web. It will offer the potential to reach the widest possible number of trading partners and using the Internet can also cut communication costs by over 50 percent, and from this aspect the web-based EDI is worthwhile even for small, infrequent transactions. It is possible for web-based EDI to complement or replace current EDI applications. For instance if the buyer wants to use web EDI and the supplier want to utilize traditional EDI or vice versa. A buyer can create an extranet where the suppliers can receive the orders via a web page, download those, and send back the order confirmation to the buyer as an EDI-message that goes direct into the buyers business system or it can be transformed to a form on the web and sent through there (Fredholm, 2002; Turban et al., 2000).

Neef (2001) says that there are companies that still feel comfortable with EDI and its security of the direct and proprietary link between buyers and suppliers, and that they doubt

that web EDI is the way forward. The author argues that the greatest hesitation of switching to web EDI is to abandon, what for large companies can be multimillion dollar investments in the traditional EDI links.

2.6 The buyer-supplier relationship

The changes in buyer-supplier relationship over the last decades has been towards a more mutual understanding and moved away from hostility (Whipple & Frankel, 2000). This cooperative view has emerged as a result of more and more complex products, which require much collaboration between buyer and supplier in order to make it possible to develop the products, and complete the requirements specified in the delivery contract (Datar, Jordan, Kekre, Rajivi & Srinivasan, 1996). If both parties are to gain profit and benefit from a close relationship, then a mutual understanding and a win – win situation must exist between them (Larsson & Kulchitsky 1998; De Toni & Nassimbeni, 1999). Those kind of close relationships brings increased understanding between the parties, faster and better decisions, and a better end product (Axelsson & Wynestra, 2002).

2.6.1 E-procurement: Strengthened or weakened relationship

In order to participate in the new world of E-procurement, the suppliers are being expected to have the ability to integrate their technical infrastructures closely with the buyer's technical infrastructure and to be able to change their business processes to adhere to the buyer's wish for increased automation (Neef, 2001).

Gadde and Håkansson (1998) argue that increased automation of the communication through IT will naturally have an effect on the buyer-supplier relationship. The introduction and implementation will in addition lead to an increased adjustment of the buyer-supplier relationship, since the adaptation requires it. Fredholm (2002) summarizes that E-procurement can be used either to strengthen the relationship as well as to weaken it. For instance, some companies seek the best offer in every situation via E-auctions, which is not the best condition for creating close relationships. Gadde and Håkansson (1998) stress the fact that computerized communication can decrease the complexity in a relationship since it will help to organize details connected to order and delivery. But the complexity can also increase since it requires higher quality and more accuracy in the delivery status.

Gadde and Håkansson (2001) conclude that no business can do without suppliers. From the discussion above there is obviously a risk that if E procurement is not handled correctly it will weaken the relationship. Therefore it is important to be aware of relevant aspects of a relation, the importance of these and how they might be affected in an automation.

2.6.2 Relationship attributes and its effects of an automation

The implementation of E-procurement, purchasing managers has to consider new or modified buyer-supplier relationships, e.g. influences on buyer-supplier loyalty, as a consequence of the automation (Jonsson, 2004). The following chapter will present important attributes of a relationship and how they might be affected in an automation of the purchasing process.

Integration: Gadde and Håkansson (1998) stress that in order to increase the integration, and consequently minimize conflicts, between a buyer and supplier it requires an increased openness. Especially in strategic questions, such as an automation of the purchasing proc-

ess, where both parties must take part in the advantages of the increased integration it results in. The openness is important since both the buyer and supplier has do adapt to a new change, which requires integration and corporation for it to work. So the authors stress for early involvement of the suppliers.

Communication: A study made by Fredendall, Hopkins and Bhonsle (2005) demonstrate that one qualification of external corporation is communication. Also Skoog and Widlund (2001) points out that when a company wants to manage successful relationships with its suppliers, communication is of great importance. If a company assumes that they know what their suppliers want, there is a risk that the company will base decisions on wrong information. The authors claim that the company should strive to search for the correct information, that is to say, to find out in what situation the supplier is in, and this can only be done by communicating. If a company does not communicate with its suppliers, the suppliers might feel that the company take no interest in the suppliers' situation and this will create a distance, which is not a good condition to build good relationships.

Gadde and Håkansson (1998) discuss that it is hard to create an information system that can satisfy all the information exchange that is important for the purchasing process. Some information will be possible to standardise, but some other information will, by its character and complexity, be difficult or impossible to design in this way. The authors stress that it is the administrative information that is most suitable to carry through electronically.

Security and Trust: Another qualification to manage external corporation according to Fredendall et al. (2005) is trust, or as Gadde & Håkansson (2001) put it; to reduce uncertainty. Building trust is a time-consuming process in which relationships between individuals are crucial. This is where the personal contacts are important for interpretation of what is going on. Gadde and Håkansson (2001) claim that it is necessary to create social situations to encourage contacts among individuals. The benefits of, and the need for, personal contacts in building up this confidence cannot be overemphasized. Social interaction is necessary because it is the primary driving force for development of trust.

E-procurement brings issues such as trust and security to be very crucial in managing buyer-supplier relationships. Shifting to an Internet-based form of procurement the security is of significant concern. There are two areas of concern in this case. First, the internet itself is insecure. Secondly, to be effective, an E-procurement initiative requires the exchange of often mission-critical, or revealing, data between buyer and supplier. This is rather sensitive information such as financial data, pricing models, strategic plans, expected new products announcement. Some do not want to share this kind of information because of the risk of the information being spread to competitors (Neef, 2001). So if there are plans to automate the purchasing process it is important to have in mind what information that has to be shared and if both parties are willing to share this information. However Gadde and Håkansson (2001) claim that there is a limit of how much a relationship can be automated before trust in a relationship will decrease.

Transparency: Transparency of data on inventories, price and performance means that the members can reach benefits in terms of reductions in inventory levels and cost savings, however the degree of transparency have an impact on the degree of benefits (Yu, Yan & Cheng, 2001). Neef (2001) says that this type of honesty and transparency may well undermine a buyer or supplier's ability to manoeuvre, as for example the buyer quickly learn to calculate a supplier's costs, profit margins, and stock levels, and can therefore force the prices down. However Yu et al. (2001) still stress that increased information sharing in a buyer-supplier relationship will lead to a win-win situation for both parties, but not to for-

get that those authors are presenting transparency in terms of costs. Lamming, Caldwell, Harrison and Phillips (2001) have a different approach to transparency. They are moving away from that kind of approaching transparency and are involving value in the focus of transparency and further present it as an element of supply relationships. If automation implies more and more information being shared between buyers and suppliers, a new level of trust becomes necessary.

Personal Contact: The personal contact is one of many factors to take into account in a supplier relationship (Bannister, 2004), and is in this thesis defined as communicating either through phone or face to face. To reach a high level of trust there is consequently a need for personal contacts (Gadde & Håkansson, 2001). Personal contacts play an important role, even if the integration in the buyer- supplier relationship has gone far (Spens, 2001), and could not be replaced by automation of the purchasing process.

According to a study made by Jonsson (2004) the E-procurement might reduce the personal contact on one hand, since activities that before were made through phone might be automated and performed through mail instead. On the other hand, E-procurement can increase the quality of the personal relationship. Since automation of certain activities can free time to engage more in having personal meetings and discussion.

Power and Dependence: According to Gadde and Håkansson (1993) the most present element in relations is power and dependence. Cox, Watson, Lonsdale and Sanderson (2004) declare that it is a correlation between improvement of supplier's performance and the power circumstances that exist between the buyers and suppliers. Buyers have a possibility to realize improved performance from suppliers in situations of buyer dominance or interdependence. The authors show that in close collaboration relationships, buyers and suppliers operate in a suitable relationship given the power conditions between them, and then they will achieve expected performance outcomes from it. However misaligned and suboptimal relationships have buyers and/or suppliers operating with inappropriate relationship management styles, given the power circumstances they are in. Despite this, the research shows that these types of relationships can be realigned to improve performance outcomes if one or both parties change their behaviour.

Uneven and dysfunctional relationships tend not to be capable of realignment. These are relationships in which one or both parties exercising an inappropriate behaviour given the power position, and have no intention to help the other side. In these situations, it is normal to recommend that the partners seek alternative business partners (Cox et al., 2004).

When a buyer is in a dominance or interdependence power position, there is scope for proactive (supplier development) rather than reactive (supplier selection) sourcing approaches. Likewise, when the power system structure as a whole has extended dyads of buyer dominance and interdependence then it is possible for proactive (supply chain management) rather than reactive (supply chain sourcing) strategies to be adopted (Cox et al., 2003).

Cox et al. (2003) also demonstrates that, whatever the objective power structures within supply chains, there is considerable scope for buyers to subjectively misperceive what are appropriate sourcing choices, and how to implement them effectively. This indicates that business relationships must have situations of alignment and misalignment that may, or may not, be "remediable" in terms of performance outcomes.

Gadde and Håkansson (1998) stress that an automation and the adaptation that it requires will increase the dependence in a relationship. When computerized communication first arise in terms of electronic markets, one thought that the buyer would be less dependent

on the supplier and instead get the possibility to change between different suppliers. Nowadays the experiences show that it instead leads to a higher degree of closeness in the relationships.

To sum up, automation will consequently affect buyer-supplier relationships in many ways. However, Fredholm (2002) declare that partnership is something that never will disappear since there is an endpoint to how far it is possible to automate a relation. It is according to the author more or less impossible to fully automate the human relations.

2.7 Summary of theoretical framework

The purpose of this thesis is to analyse how a purchasing process towards strategic suppliers in the automotive industry can be automated, with consideration to the type of product and supplier as concerning electronic solutions. The authors will also study its possible effect on the buyer-supplier relationship. The following section will give a summarise of how the theoretical framework will be used in the analysis. Because of the purpose, the analysis will be divided into three parts, see below. Before continuing, the authors have chosen to use two theories on how a purchasing process can be automated. They serve as a complement to each other, since section 1 described below will give a detailed analysis on how a purchasing activity can be automated, examining each step. Section 2, the product and supplier classification will give a broad view on what electronic solution a certain purchasing process should have in consideration to product and supplier type. The latter only include the actual purchase, while section 1 includes all activities around it.

1. The purchasing process and how it can be automated

The starting point for outlining the need for E-procurement solutions is according to Neef (2001) to go through each activity in the purchasing process in order to analyse where in this sequence of activities there are some inefficiencies and examine how this activity can be automated. This will be done using theories from a few authors, which describe the purchasing process in a similar way and give suggestions on how it can be transformed into E-procurement. The activities that have been studied are: selection of supplier, request for quotation, signing of contract, sending the purchase order and dispatch the order, delivery and receiving of goods and payment.

2. Product and supplier classification as concerning electronic solutions

Before an electronic solution for the purchasing process can be introduced it requires a deep understanding for what kind of products that are purchased, and which result in a certain type of supplier (Cap Gemini, 1999). This study is limited to examine the purchasing process towards strategic suppliers, consequently strategic products. So the classification is in one way already done, but the authors still aim to use the purchasing product portfolio and supplier portfolio matrix by Kraljic (1983), supported with Van Weele's (2002) and Axelsson's (2001) theories in this area. This is done in order to confirm that the strategic suppliers are defined in the same way in the automotive industry as in the theory. The other purpose with conducting a product and supplier classification is, as mentioned above, that it will give direction to what electronic solution that is preferred. It will then only include studying EDI since this is the most preferred solution for strategic suppliers. However, Fredholm (2000) argues for electronic market places and web-solutions as two additional solutions when two companies want to make business with each other electronically. Those will therefore be discussed as well.

3. Buyer supplier relationship and its effects of an automation

In E-procurement management, purchasing managers has to consider new or modified buyer-supplier relationships, e.g. influences on buyer-supplier loyalty, as a consequence of the automation (Jonsson, 2004). It is therefore important to consider the elements in a relationship and how they might be affected in an automation. The authors have reflected upon six attributes that are, according to the theory, important in a buyer-supplier relationship, and will base the analysis on these. The attributes are: integration, communication, security and trust, transparency, personal contact, and power and dependence.

3 Methodology

Methodology in this thesis is to describe how and why. The chapter starts of by a knowledge characterization and continues to describe and justify the research approach chosen for the empirical study. Moreover, it explains the procedure of gathering information, both literature studies and interviews, followed by the analysis procedure. The method forms the basis for the readers' interpretation of credibility, which is critically reflected upon in the end of this chapter.

3.1 Knowledge characterization

The selection of the mode of procedure and method in thesis writing depends on what kind of knowledge that is going to be developed (Goldkuhl, 1998). Knowledge characterization is therefore necessary in order to establish a strategy for the thesis writing.

The knowledge that the authors want to gain with this study is how a purchasing process towards strategic suppliers in the automotive industry can be automated, with consideration to the type of product and the type of supplier as concerning electronic solutions. The authors also want to explain how an automation of a purchasing process affects a buyer-supplier relationship. According to Goldkuhl (1998) this is an explanatory knowledge and in order to gain this knowledge, the authors first have to understand the purchasing process and what effects the type of product and type of supplier have on the selection of electronic solutions. Additionally, the authors will state attributes that are important in managing buyer-supplier relationships and explain how they might vary when there are changes in the business activities between the buyer and supplier. By doing this the authors will be able to outline what the crucial elements are for the buyer-supplier relationship when considering an automation of a purchasing process.

3.2 Qualitative approach

Given the explanatory purpose the authors have chosen to do a case study at Volvo Cars Corporation (VCC). The authors first decided to contact all three car manufactures in the Swedish automotive industry; VCC, Scania and SAAB for this study. VCC in Gothenburg was first contacted and since there was an interest in participating in this study, and due to that the authors realized the extensive purpose of the thesis, it was decided to focus on VCC. Case study is where the researchers explores an activity or process in depth and is bounded by a certain time. Since the authors will examine how a purchasing process can be automated it requires that the present purchasing process and its characteristics are being studied and understood first (Neef, 2001). It requires deep work and it takes time, therefore was a case study suitable (Yin, 2003). The advantage with a case study is that the thesis is being established in a real and complex situation. One major argument against a case study is that it is hard for scientific generalization (Yin, 2003) However, Eriksson and Wiederheim-Paul (1999) argue that research often aim to gain an understanding of a special situation and consequently not to generalization.

When selecting suppliers to interview it was decided to contact three suppliers that supply VCC with strategic products. Kongsberg Automotive, Sapa and Autoliv Inc. were chosen mainly because the authors were familiar with those suppliers as supplying VCC with strategic products.

This study consists of complex observable facts such as integration, coordination, communication and relationship. So in order to gain a deeper understanding of the problem, and

because of a case study, the authors have adopted a qualitative approach. The principal purpose with qualitative research is to describe and analyze the culture and behaviour among people and groups (Bryman, 1997). Lundahl and Skärvad (1992) state that qualitative studies base its conclusions on non quantified data such as attitudes, valuations and conceptions. A study of actor's attitude towards an automated purchasing process and its effect on relationships require deep insight and understanding of this area. Furthermore, it involves that many variables are studied that can not be expressed in numbers, which bring this thesis to a qualitative approach to be most suitable.

Within the qualitative study the authors have adopted a deductive study, which imply that one make the study from existing theory. The theory is tested by comparison to the empirical findings of the study in question (Collis & Hussey, 2003).

The authors of this thesis have experienced both advantages and disadvantages by conducting a qualitative approach. It has provided the authors with an overall picture of the studied area, which was the purpose. Moreover, the qualitative method has allowed the authors to be active and immediately correct misunderstandings and in that way reach mutual comprehension. In this way one is able to test and correct ones understanding by either directly or indirectly ask about a specific action and its meaning (Eneroth, 1984).

The negative part is that the reality can in some situations be complex, time demanding and unstructured. As Taylor and Bogdan (1984) stress, a qualitative approach also puts demand on that the interviewers to not affect or try to steer the respondents during the interviews. Instead the interviewer should listen to attitudes, values and ideas among the respondents in order to gain the understanding and knowledge that is demand in order to answer the purpose. There is also a risk that interviewers are being steered by the respondents.

3.3 Literature studies

The data collection in this context means to read literature and study the reality through interviews. This study comprises concepts such as B2B, purchasing process, E-procurement, product classification, supplier classification and buyer-supplier relationships. So first a fundamental literature study was conducted in order to get general familiarity with these subjects. This was done at the library at Jönköping University through available library resources where the authors could find suitable literature. The intention was to end up with knowledge and being able to draw conclusions and parallels between different theories. Thereafter, relevant articles was searched in the library's databases, for example Libris, full text data bases (e.g. ProQuest ABI/ INFORM). The searching included concepts as mentioned above. Journals such as Inköp & Logistik, Ny Teknik and Computer of Sweden were also used in order to get a connection with reality.

It was noticed that E-procurement is a wide area with much literature available, and it was necessary to get familiar with complementing keywords⁵, in order to understand E-procurement. There were some confusion among all the "E" concepts and electronic solutions in the beginning and it was difficult to find a comprehensive treatment interpreting such a complex phenomenon as E-procurement and buyer-supplier relationships and still keep it short. The authors had to limit the theoretical framework and only look at few variables when examining how a purchasing process can be automated.

⁵ E-business, E-commerce, E-purchasing

Moreover, it is very important to be critical regarding source, relevancy and topicality when studying secondary data. The importance of buyer-supplier relationships has been around for many years therefore a mix of overall earlier studies and information of new sources was used. In order to avoid that the theoretical framework simply treat one parts perspective, several references were used, for example theories that are supported by many authors' different research studies. The second source of information was conducted through in-depth interviews.

3.4 Interviews

The literature study is the major work of preparation before the interviews, but also studies on how the interviews should be carried out is important knowledge before starting. The process described below is the same for the two parties that are being studied: the buyer and the suppliers.

3.4.1 Choice of respondents

The authors have used judgement selection, which is a common method in qualitative research (Lekvall & Wahlbin, 1993). According to Lekvall and Wahlbin (1993), judgement selection take place when the interviewer, from certain criteria, chose respondents that in advance can be estimated interesting for the study. Holme and Solvang (1997) state that the sample of respondents is of vital importance in a study. It is important that a respondent possesses much knowledge of the subject that is being studied, which will increase the information content. Different persons within the same company would probably not give the same answer to a question that is being asked. Their answer will be based on their personal attitude.

When planning the interviews it can be difficult to decide how many persons to interview (Lekvall & Wahlbin, 1993). At VCC the authors intended to interview four people, with different positions, but with a long background and experience in the company, and in the field that is studied in this thesis. Due to the wish of being anonymous the name of the respondents at VCC will not be presented. The different positions of the respondents will still be presented so that one will be able to make the judgement if the selected are of relevance for the study. The first respondent that was interviewed has been employed at VCC since 1980 and has since five years back been working with business projects within Manager Operational Development Projects at the purchase department. Secondly, a group manager of IT and systems was interviewed. This respondent has a central position in the company and is responsible for the systems that keep track of all the suppliers. This respondent was regarded as trustworthy due to the current position, the employment since 1969 in the company and the previous position at the purchasing department as a purchaser towards strategic suppliers for 17 years. The third interview was carried out with a purchasing director, who is responsible for business development and IT questions. Finally, an EDI team leader was interviewed, who is responsible for the group that works with the EDI concept at VCC. The position also involves establishing EDI relationships with the suppliers. The four respondents are not mentioned by their positions in the empirical findings and analysis since the authors did not put any relevance in who said what. Instead, to make it shorter and simpler, they will be mentioned as employee 1, employee 2, employee 3 and employee 4 with no relation to the order above.

The selection of the respondents was done with the background of their positions in the company, and hence their different perspectives on how an automation could look like. This would give this study a wider perspective. With more respondents representing the purchase department the study could result in more attitudes from purchase people and how they experience the daily activities in the purchasing process, but in respect of fulfilling the purpose of this thesis the authors find that the gathered empirical material with the four respondents is enough to reach trustworthy results from our study.

When selecting respondents at Kongsberg Automotive, Sapa and Autoliv Inc, the authors wanted to interview people that are involved in the relationship and sales to VCC and has been for a while so that they could describe the relationship with VCC. Also these respondents wanted to be anonymous in the sense of who said what in the empirical findings, and will hence be mentioned as supplier A, supplier B and supplier C. However, the order of these is not related to the order they are presented in below.

With the same reason as above, the authors gives a presentation of the respondents' positions within the company. At Kongsberg Automotive the marketing manager was interviewed. Due to that this person participated in the start up of the business relationship with VCC 1984 and has been delivering products to VCC since then, this respondent is regarded as trustworthy. At Sapa the authors did not get the chance to interview the person that is responsible for the direct contact to VCC, since this person did not have time to participate. Instead, the authors got to interview the person that is responsible for the marketing and sales since 1987 and possess an overall view of the relationship to VCC. Due to the long employment and that this person did get some complementary information from the person that could not participate, the authors still claim this respondent to be valid. As regards Autoliv Inc., the account manager was contacted and interviewed. This respondent has been employed at Autoliv Inc. since 1991 and is together with another person responsible for the contact and sales to VCC since eight years back. In total there have been seven interviews and each interview lasted around one hour.

3.4.2 Interview technique

There are two factors to take into consideration while deciding on the interview technique, namely the standardization and the structuring. The purpose of a standardized interview is often to be able to compare different results, while non standardized interviews means that the interviewer gets to formulate the questions during the interview and to decide in what order the questions should be asked. Further, an interview can be either structured, semi structured or unstructured. A totally structured interview gives the respondent a limited space to answer, while unstructured interviews gives the respondent the allowances to talk freely. A questionnaire can be characterized as high degree of structuring and standardization, while journalistic interviews are characterized as low degree of structuring and standardization (Patel & Davidsson, 2003). Semistructured lies in between, were the interviewer use an interview guide with questions and areas that should be covered, even if the questions might vary (Saunders, Lewis & Thornhill, 2003).

The interviews were made with a semi structured interview guide with open-ended questions. Primarily because this kind of questions gives the respondent recall freely and can take up a direction in the response. The response may then be followed up with more specific questions from the interviewer (Keats, 2000; Trost, 1997). Trost (1997) states that an interviewer should, during the interview, be open minded for new questions and approaches on the problem in order not to lock the interviewer and the respondent to a spe-

cific line of argument. However, the interviewer should be attentive so no digression appears in the interview.

3.4.3 Design of interview guide

Developing questions is a critical part since it is here the gathered literature should be treated. This work should be well thought-out in order to give the respondent a good impression of the authors' knowledge and skills, which would probably result in that the meetings should end up with a trustworthy interview with honest answers.

When constructing an interview guide it is important that the questions are not directed (Ejvegård, 1996). The purpose with the interview guide was to create a good structure for the coming interviews, and they were used in each interview. There were two different interview guides. One for VCC containing questions so that the authors could investigate how the purchasing process looks today and possible activities to automate. It also contained questions on how the relationship towards the strategic suppliers looks today and if an automation would have any effects on these relationships. The interview guide sent to the suppliers consisted of questions so that the authors could classify the supplier and its product as being strategic. Questions regarding the suppliers view on the relationship with VCC, and if an automation would have any effect on the present relationship, were also included. This interview guide also had one section on what the respondents think about an automation and in such cases, what activities that should be automated.

The interview guide was heavy because of the broad purpose. It was sent to the respondents a few days before the interview took place in order to give the respondent the possibility to prepare for the interview. Before it was sent out, the authors did get feedback on the interview guide from the supervisors and it was tested on a respondent at one of the chosen suppliers. This respondent was aimed to participate in the study but the authors later on found this interview too weak because of the respondent's short employment in the company. However, this gave the authors a possibility to test the interview guide, and a few adjustments were done. This respondent was then replaced by another respondent within the company.

3.4.4 Carrying through the interviews

According to Ejvegård (1996) it is common that one person asks the questions and one person that get to answer the questions. In exceptional cases there are several persons that ask the questions. The author further states that it is important to get the persons that are being interviewed to open up and tell what they know. Sometimes, in order to achieve this, it can be useful to tell the respondent that anonymity can be guaranteed. The respondents were individually interviewed by both authors, since the questions were partly non standardized and semi structured, which in turn can lead to long answers and discussions.

The suppliers were interviewed by telephone since it was, according to them, more suitable. An orator was used so that both authors could participate in the interview with the respondent. Three of the respondents at VCC were interviewed at VCC in Gothenburg, and due to illness that day; the fourth respondent was interviewed by telephone. In both telephone and physical interviews, a recorder was used, in consent with the respondent. This was done since some of the questions that was asked intended to receive the respondent's own opinion, which might lead to long answers.

Both authors participated in all interviews. The division of labour between the two interviewers was that both had the responsibility of taking notes from what was said during the interview. However, during the physical interviews one interviewer had a more subjective role and was responsible of carrying through the interview by asking the questions. This in order not to lose focus from the interview guide and on the information that was considered to be necessary to collect at the different interviews. The other interviewer represented the objective role and had the responsibility to study the visually aspects among the respondents such as facial expression and intonation since these can sometimes strengthen and clarify an answer. The same person also had the responsibility to observe that the interview was going in the right direction and to make sure that the interviewer did not affect the respondent in a specific direction or vice versa.

3.5 Interpretation of data

There is always an interpretation of data, both in the literature study and in the conversation with the respondents. The interpretation is about making sense out of text and imaged data. In qualitative research the purpose is to gather information in order to attain a deeper understanding of the phenomenon that is being studied and further be able to describe the overall impression of the context where the studied phenomenon lies within (Eriksson & Wiedersheim-Paul, 1999). A verbal analyse was used since qualitative approaches have an understanding purpose.

In order to prepare the interview material for the analysis the first thing that was done was to write down what was said on the recorder, with concentration on what was missed out from the notes. Then it was translated from spoken language into written language. After having structured the interview material, the process that followed was to eliminate superfluous material such as deviations and repetitions, and to distinguish between essential and unessential depending on the purpose of the study and theoretical assumptions, this in order to concentrate the text and find the core. The theories are used as a lens when the authors tried to make sense of the collected data. By using the theory one can separate what is important for this investigation (Yin, 2003). It is preferred to use the theory when analyzing the collected data (Yin, 2003).

Thereafter the interviews were interpreted and analysed, and the authors tried to look at similarities and differences among the seven interviews. By doing this a new, holistic, perspective on the phenomenon could be gained gradually.

When the analysis of the interviews was done, it was presented to the different respondents. This gave them the possibility to give comments on the authors' interpretation from the interviews. By doing this it gave this study more trustworthiness. This is necessary for the study, but there is a risk that the respondents want to change spontaneous statements that might be important for this study. So the authors want to point out that they did not take all the changes into consideration, only where wrong data had been documented. The authors received good feedback from the respondents and there where only a few data that had to be changed.

The interpretation of the data is a long but important process. While the empirical collection took around two weeks, the interpretation of the material and to write it down required three to four weeks, because of the broad purpose and the extensive interview guide. Even though this part was regarded as done, the authors have returned to the em-

pirical findings as work progressed. Changes such as the structuring of the empirical material and elimination of superfluous were done several times.

3.6 Validity and reliability

According to Patel and Davidsson (2003) validity in a qualitative study refers to how the entire research process has been conducted. Accordingly, validity in a qualitative study is not just related to the data collection, but more that all parts of the study are coherent. Validity measures if a study is valid or not, in other words does it measures what was intended to measure (Holme & Solvang, 1997). Merriam (1994) states that a qualitative study can be regarded as having a high validity if it is possible to redo the research by following the stated method. Accordingly, validity in a qualitative study is connected to the ability the authors have to argue for their interpretations of their study and how it is communicated to the reader. In order to facilitate this the authors have strived to be as clear as possible about how the study has been carried through and to follow a clear structure throughout the process. The authors want to conduct a coherent line of reasoning in order to end up with trustworthy conclusions. The approach to achieve this has been to have a clear logic link between theory, empirical findings and the analysis.

According to Patel and Davidson (2003) reliability in a qualitative study should be seen in the light of the unique situation at the time for the study. Moreover they argue that the important aspect with a qualitative study is to capture and interpret the uniqueness of the studied situation. Hence, asking a person the same question repeated times and then get different answers is seen as low reliability in a quantitative study, but does not have to be in a qualitative study if the question captures the unique in the studied situation. It is more important to identify and get an understanding of the distinctiveness of the studied object. As put forward by Patel and Davidson (2003) this makes the concept of reliability in a qualitative study to become close to the meaning of validity. Thus, since the two concepts are interconnected in the context of a qualitative study, reliability is generally not accounted for.

In this study the authors aimed to get a holistic view of possibilities to automation and how it might affect the buyer-supplier relationship. Therefore this study contains equal interviews with a few representative respondents in order to avoid that a respondent's opinion gets to dominant and thereby distort the study. It is hard to know if the respondents are suitable for this study, since their answers can be angled, depending on what their personal attitude is to E-procurement rather than the use of E-procurement from the company's perspective.

In a qualitative study based on interviews it is crucial how the questions are formulated and how the interviews are conducted (Ejvegård, 1993). According to Lekwall and Wahlbin (1993) the validity of interview questions can be increased by having them evaluated by other people and then revise them. Feedback was gained from the supervisors of this thesis, and from an interview carried out with a respondent, who is not included in the study anymore. To receive more reliable answers during the interviews, the interview guide was sent to the respondents two days in advance so they were prepared for the subject concerned.

Using interviews as a data collection method might result in processing problems. When the respondents' answers are to be used in the study, it is easy that the researcher affects

the content of the data received from the respondent. Moreover it may be tempting for the one who does the transcription to formulate sentences and in other ways “organise” the spoken language (Patel & Davidsson, 2003). To avoid this, both authors participated in the interviews. Patel and Davidsson (2003) say that another problem is that the interpretation might be based on misunderstandings from the interviews. Hence, the collection of data was performed through recording all interviews. If there were any unclearness about the answers the respondents were contacted again.

To generalise from qualitative studies is often seen as problematic (Patel & Davidsson, 2003). The analysis in this thesis is connected to a specific industry and a specific car manufacturer, which might result in that the answers not being fully generalised. On the other hand, as both Neef (2001) and Van Weele (2002) state, a purchasing process can differ but clear stages are still recognised, which allow the authors of this thesis to make some general conclusions. But as put forward by Patel and Davidsson (2003), it is the receiver of the information that has the responsibility to judge if the results can be applicable on a new situation, and the receiver must make sure that there exists enough information in order for a generalisation to be possible (Kvale, 1997). To make this possible there was put effort on being as exact as possible in the descriptions and analysis.

4 Empirical Findings

This chapter will render relevant parts of the empirical findings. This will be presented in two parts: the first part presents the answers from the four respondents at VCC and the second part will show the empirical data of the three suppliers. Company descriptions are presented in appendices 3 to 6.

4.1 Volvo Cars Corporation

Below there will be a presentation of the purchasing process towards the strategic suppliers, by VCC named production supplier, and possible electronic improvements in this process. This will be followed by how VCC view the buyer-supplier relationship and its power situation, and how it might be affected in case of automation. All four respondents have different positions within VCC, and have been separately interviewed; however all of them were asked the same questions. Therefore, the authors have chosen to integrate the respondents answer in one chapter in order to avoid similar answers and repetition. Due to this it will not always be confirmed who said what. Lastly, the respondents' wish of being anonymous has resulted in employee A, employee B, employee C and employee D.

4.1.1 The purchasing process

The described activities in the purchasing process concern both strategically and transactional business activities towards the 400 production suppliers of VCC. In these relationships there are approximately 350 purchasers, technicians, and others involved at VCC.

Selection of Supplier: The selection of supplier is explained to be a strategic activity, where VCC first of all acquires knowledge about which supplier market they got and which suppliers they want to work with in the future. This is done before a new car model and VCC then put up a few criterions what they demand from the suppliers. The supplier selection process is not carried through automatically, instead it is an evaluation process handled manually, where the decision is taken in consensus in a supplier choice meeting where decisions are made to select suppliers for new models based on their capability to meet the project requirements for quality, cost and timing. The supply choice meeting is a forum where representatives from different units participate e.g. purchase, technicians, department of material supply, research & development, and discuss which suppliers they want to work with. Everyone takes their view in this decision process and everyone wants to reach a consensus in the forum. The supplier selection process is not carried through automatically since it is commented to be a rather complex process.

Request for quotation: As the selection of supplier, the request for quotation (RFQ) is also regarded as a strategic activity. The RFQ follows a certain standard but have specific information on what to buy, volume, frequency, which demands they have on the supplier and product, and how payment should be carried out. Employee 4 comment this activity in the followin way: "*The RFQ requires much time since it must include all pre-requisites so that the supplier can submit a valid quotation*" (Employee 4, personal communication, 2005-12-01). There are two ways of presenting the RFQ to suppliers. The non-system way, where the RFQ is sent to the suppliers through email, followed up first by telephone and then with a meeting between VCC and the supplier, in order to go through the RFQ.

Online quotation or E-auctions, is an alternative when presenting the RFQ to the suppliers. This was introduced in 2001 and according to employee 3 this was a try to automate the

negotiation process : *"What takes two weeks can by E-auctions be done in two hours, by inviting for example four suppliers to exactly the same conditions, and open up for bidding in two hours, then it is done. However, E-auctions require three months of preparation and the purchaser has to write down everything that otherwise can be answered in a sales question"* (Employee 3, personal communication, 2005-12-01). It is explained that E-auctions were popular a few years back but is not frequently used any more. The purchasers can use online quotation if and when they want but they do not. On the question why it is not in use that much anymore, employee 3 responded : *"It requires to much preparation and the purpose of E-auctions is to get the lowest price, however VCC put priority in quality instead "* (Employee 3, personal communication, 2005-12-01). On the same question employee 4 answered : *"From the begining one thought that E-auctions would revolutionize the purchasing process, but now one can not see the effects with E-auctions and it sometimes results in misunderstandings, such that the supplier interpret the product specifications wrong. Moreover, there is a limited use of E-auction. We have learned a lot and know much better now where e-auctions are effective"* (Employee 4, personal communication, 2005-12-01).

Signing of contract : When terms and conditions are agreed upon there will be a legal contract, mentioned as a target agreement. This agreement describes the concept that VCC wants their suppliers to respond to and also what demands they have on them. On the question how this activity is carried out, employee 3 replied : *"This activity do not consist of much electronics, it is done by an ordinary Word document that is sent through email"* (Employee 3, personal communication, 2005-12-01). It is added that VCC do not create a new Word document of a legal contract each time there is a new contract signing, they follow a standard contract.

Placing and dispatching the order : When signed the contract there is a legal binding and the continuing activities in the purchasing process are by VCC stated as transactional activities rather than strategic activities. The purchaser will place the order in VCC's purchase system, which is printed out and return them by post. The supplier has to sign these papers and send back by post to VCC. The supplier also has to transform this information manually into its own system. All these steps are done, because all parties do not use the same system. The purchase order for the non-production material is however carried through by Covisint, where the supplier gets an email saying that there is an order that can be collected at this portal. However, this concept was not introduced to the production suppliers. VCC do not give any answer on why they did not launch it for the production suppliers.

The purchase order is only placed once during the lifecycle of a car and contains information about volume, price, how and where the product should be delivered. From here VCC will place their product needs via EDI, which the supplier will respond to. For instance, that VCC require a certain amount of a certain product to the next day. This applies to all production suppliers. EDI is an old concept and is performed via a direct line which the supplier is connected to. However, there are a few suppliers, which systems can not respond to this. In those cases it is possible to conduct the same activities through the web, known as web - EDI. This is not often the case since in 98 percent of the cases the supplier fulfill the direct line. When changing suppliers it requires, and is the responsibility of VCC, to set up a new EDI line to this specific supplier. On the question when EDI is used, employee 2 responded : *"EDI is used first when the suppliers start to deliver from our needs. EDI is further used in the delivery of goods, receiving of goods and payment"* (Employee 2, personal communication, 2005-12-01)

Delivery and receiving of goods: Simultaneously as the supplier delivers the products, VCC receives an EDI message that the products are on its way. The receiving of goods is not regarded as any purchasing activity since it is not conducted by the purchase department. The receiving of goods is instead done by the department of material supply. On the question how this process is carried out, the respondents answer that it is automated in the way that the delivery arrive, they control it in a system, which makes it possible to match the delivery to the invoice and see if they correspond to each other. As long as the the delivery agrees with the invoice, the purchaser will not be involved, but if there are deviations, the purchaser will be contacted and asked for the right conditions. Even if there are no deviations there will be a signal sent to the purchaser that everything is correct.

Payment: There are around one million payment transactions each year, and they are all carried out via EDI. The supplier sends an invoice, which is controlled against the order and payed by VCC. Otherwise VCC will make a self billing which means that VCC will make the invoice for the supplier. VCC register how many articles they have got and pays the agreed price. However, this method is not that common when it comes to the production suppliers, with no explanation, and the problem with the self billing is that there can be price deviations due to currency differences that has to be solved manually.

4.1.2 How the purchasing process can be automated

This section will present the respondents opinion to an automation and what transactions in this purchasing process that the respondents consider to have good potential to automate and how. At present VCC utilise EDI and the Covisint portal, which both are standards within the automotive industry.

When the authors asked about their opinion to automate the transactions in the business relationship to the production suppliers employee 4 formulated the following: *"Everything concerning transactions and communication can always be automated to a greater extent. However, when something needs to be jointly developed, you need more human interaction"* (Employee 4, personal communication, 2005-12-01). Employee 3 commented the same question the following way: *"The purchasers at VCC says that they want to deal with strategic discussions and negotiations with the suppliers and not be busy with orders. Transaction to transaction should therefore be computerized/.../ However, an automation requires a standard, as EDI, which is an old concept but it works out good"* (Employee 3, personal communication, 2005-12-01).

To the question what transactions in the business relationship to the strategic suppliers they consider to have good potential to automate and how, there were different opinions among the respondents. Concerning the selection of supplier employee 4 replied: *"This process will never be automatic/.../It is a strategic activity that the purchaser must do together with production, technicians and other people involved"* (Employee 4, personal communication, 2005-12-01).

When it was asked about the request for quoting, employee 4 answered: *"An alternative of the present method is to continue to send the RFQ electronically, but also have an updated version on the web. It would also be good to create an evaluation system so that it could be possible to make online analysis of the information the supplier gives us. Having a system that compares our information (offer) with the information the supplier gives us, the offering could be executed automatically/.../This should be possible by using the Covisint portal, but this function does not exist in Covisint, owing to that Covisint can only handle information to be sent through it"* (Employee 4, personal communication, 2005-12-01). It is argued that analytical tools and models will become important in order to gain a better view of the costs and so that the purchaser gains a basic data for decision-making. This

would sift out information so that the purchaser has the right information when negotiating and prevent a situation where the purchaser ends up in a weak position.

Whether the signing of contract should be more automated, employee 4 says : *"The signing of contract will not be automated since it has to be signed manually"* (Employee 4, personal communication, 2005-12-01). Employee 3 has a different approach when answering the same question : *"Of course we could have a system that send this document automatically, but this is such a little work for us "* (Employee 4, personal communication, 2005-12-01).

Regarding an automation when placing and dispatching the order, employee 4 argue for an automation : *"Instead of signing the purchase order manually there can be an electronic signing or confirmation"* (Employee 4, personal communication, 2005-12-01). Employee 3 gives a somewhat divided answer : *"At present the purchase orders are paper-based and sent by post, either we will continue with paper documents or carry it through by email. These documents could be automated and done by EDI, but it do not concern many documents per year, since an article is just placed once during the lifecycle of a car, if it do not changes of course. If it changes we will have to place additional orders/.../We have not put priority in the purchase order, concerning an automation, since there is a very low volume of these transactions, around 30 000- 40 000 orders per year. It would involve to high costs of introducing EDI for these order "* (Employee 3, personal communication, 2005-12-01). Employee 3 instead stress mail to be the solution. An alternative solution is to have a purchase system that makes it possible to send the order from this purchase system directly in to the supplier's system with information such as agreed price and estimated volume of the coming year. When sending out an order, this purchase system should then use VCC's internal supplier register consisting of a database where all the supplier are registered and their contact details, bankaccount et cetera. Employee 1 comment the same question in the following way : *"At present, this activity is relatively manual, however this is in progress to carry through by email instead. Internally at VCC it is done automatically, the system does a lot beforehand, but externally it is made by post"* (Employee 1, personal communication, 2005-12-08). Concerning the regular needs that appears after a purchase order, employee 3 respond : *"These transactions should be optimized and automated. Computer to computer is the key, it will reduce the manual work. However, this is where standards are important"* (Employee 3, personal communication, 2005-12-01)

Regarding the delivery and receiving of goods there was not much respond. However, Employee 4 commented : *"These activities will continue to be done with EDI"* (Employee 4, personal communication, 2005-12-01)

To the question if payment should be more automatized employee 3 respond : *"The transactions that should be automated are already automated at VCC today, payment is such a transaction that consists of approximately one million transactions each year and this is already working out good by EDI. However, payment might develop more towards self billing ; automatic invoices"* (Employee 3, personal communication, 2005-12-01).

4.1.3 The buyer-supplier relationship and its effects of an automation

All of the respondents interviewed express the relationship with the production suppliers as being long-term relationships. They strive to have the same supplier during the lifecycle of a car and they also prefer continuing with the same supplier in coming car models. The relationships are also characterised with a high level of trust, but still the suppliers must sign a secrecy agreement.

To the question how the balance of power in these relationships looks like it is expressed that VCC has a strong position in most cases. As an example, if a supplier wants to work with VCC, they have to accept the terms and conditions created by VCC. If the suppliers do not agree on those conditions, there will not be any business. Before there was more of a win-win situation and the suppliers were more involved and both parties were in agreement. Nowadays, VCC have more power to cut prices. VCC explain that this is not done to exhibit their power; instead it is required by the market, and VCC points out that they are dependent on their suppliers. The more collaboration between VCC and its suppliers, the more dependent the parties will get.

4.2 Suppliers

The interviews with the suppliers will be structured together but since these suppliers want to be anonymous, in the sense of who said what, they will be mentioned as: supplier A, supplier B and supplier C. Regarding the question which transactions that have a good potential to be automated, the authors did not follow the same structure as in the case with VCC, where each activity was mentioned. This was done due to that the authors wanted to gain spontaneous answers of which activities the suppliers believe are inefficient

4.2.1 Product and supplier classification

Once again due to the anonymity; the order of the suppliers' products presented below have no correlation with the order of the suppliers in the rest of the empirical data.

Sapa is the world's third largest manufacturer of aluminium profiles, with special focus on creative aluminium solutions for its customers. They have been suppliers to VCC since 1990s and the products they deliver are innovative vehicle components based on extruded aluminium profiles. Products such as: fuel distribution pipes, engine brackets, load retainer slides are delivered to VCC (Sapa, 2004). On the question if there are other substitutes on the market, Sapa responded: *"We are not alone in the market; there are many more companies that could produce similar products"* (Sapa, personal communication, 2006-01-10). If there is a high or low frequency in sales towards VCC, Sapa answered that they deliver to VCC on a daily basis, but when it comes to sales activities, it only happens when there is a new car model. Sapa explained that the sales activities are related to if they get the contract or not. Sapa conclude that there is a high frequency in the daily needs from VCC, but low frequency when it comes to sign a contract, which is the sales activity.

Kongsberg Automotive develops systems for gearshifts, clutch actuation, seat comfort, stabilising rods and couplings, which they have been delivering to VCC since 1980s. From being a relatively small supplier of automatic gearshifts, Kongsberg Automotive has in recent years carved out a position as one of the few leaders in this market segment in Europe (Kongsberg Automotive, 2005). When Kongsberg Automotive was asked about the competition in the market it was replied: *"There are three or four comparable suppliers in Europe and VCC work with two of them, so there is a lot of competition"* (Kongsberg Automotive, personal communication, 2006-01-10).). If there is a high or low frequency in sales towards VCC, Kongsberg Automotive responded that they deliver frequently against suborders from VCC, more or less on a daily basis. The other type of sales activities takes place before a new car model is released, due to supplier's selection at VCC. If they are selected and an agreement is signed, they will deliver this product approximately for 5 years or as long as this car model is produced.

Autoliv Inc. has since 1960-1970 supplied VCC with airbags and seat belts. They pioneered seat belt technology in 1956, and after a merger with the leading airbag manufacturer in North America and Asia; Morton ASP (Automotive Safety Products), they are today the leader in airbag development. Moreover, Morton ASP was involved in the launch in 1980 of the first airbag system that became a commercial success. Autoliv Inc. began manufacturing textile cushions for driver airbags using its new one-piece-weaving (OPW) technology. This patent technology has turned out to be instrumental for the inflatable curtain, which was introduced in 1998. Autoliv is the world's largest supplier in its business segment and 50-70 percent of the total turnover in the Swedish business is delivered to VCC (Autoliv Inc., 2005). On the question whether they have competitors, Autoliv Inc. responded: *"There are a handful of global competitors, however we are the biggest in the world within the*

seat belt industry” (Autoliv Inc., personal communication, 2006-01-10). Regarding if there is a high or low frequency in sales towards VCC, Autoliv Inc. replied similarly as Sapa and Kongsberg Automotive, that the sale frequency is a daily business even though the commercials regarding a new carline are rather low in frequency since there is a gap of 2-4 years between new introductions. However, Autoliv Inc. want to point out that the daily delivery is not regarded as sales.

4.2.2 How the purchasing process can be automated

On the question what their opinion is to more automated transactions in the business relationship to VCC, supplier A said that it should not be any problems. Supplier B formulated the following: *“All automation that contributes to decreased costs is positive, both for VCC and for us. However, VCC is larger in comparison to its suppliers and can afford higher investments and can offset the costs and sum up the profit more than a small supplier can do. Indeed supplier B would not have had any problems with this issue if VCC had wanted to use Covisint and send requirements through it. As long as there is a compromise solution, a win - win situation and benefits of it. Automation will probably happen and if we do not adapt to it, we will probably not survive”* (Supplier B, personal communication, 2005-11-16). Supplier C commented the same question in the following way: *“There is always possibilities to automate further, but it should only be done in the administrative activities that do not create any value”* (Supplier C, personal communication 2005-11-09).

All three suppliers shared similar opinions regarding the question of what transactions they consider to have good potential to automate in the business relationship to VCC, and how. Supplier A comments this question by saying: *“In a new business opportunity with VCC there are many documents circling around. For instance, the RFQ consists of a pile of documents that is sent through mail, which I have to fill in correctly with certain information, and then send back to VCC. Those files could instead be located on a web page so that both parties could see the same information. For example, there could be a message through email saying that there is a new specification of requirements from Monday located on the web now, please update your quotations”* (Supplier A, personal communication, 2005-11-15). Supplier A continues to say that there are always a few questions that one might wonder in a new business opportunity and therefore suggests that after having filled in the documents, it would be good to have a small meeting and look at the documents together. This could be arranged by connection through phone and a web address so that one can talk and at the same time look at the same document. Supplier B gives a bit unclear answer to which activities in this process that could be automated: *“All processes where a profit can be calculated should be automated. There is for example still much paper work that I think can be more efficient. The construction phase for instance, consists of many paper documents to fill in, and this could be more standardized. However, I do not think it is possible to drop the human contact completely, since this is where businesses arise.* (Supplier B, personal communication, 2005-11-16). Supplier C answer the question on what activities that should be automated in the following way: *“The contracts are at present emailed to us or placed at a VCC server and we are directed to this site in order to download the contract. Then we have to print them out, check that they are correctly filled in and in line with our figures and finally sign and send them back. This should be more automated, by letting a computer compare both the buyer’s and the supplier’s contracts and find a match between them”* (Supplier C, personal communication, 2005-11-17). However, supplier C says that there will be problems if the two contracts do not match, since the computer would not be able to deal with it. In this case it has to be administrated manually as it is done today. Supplier C continues to say: *“From VCC perspective this process is at the moment more automated since they only have to place an order, type in the price and the supplier number in their computer, then an order is executed and loaded up at their system. The suppliers then have to collect the order manually”* (Supplier C, personal communication 2005-11-09).

4.2.3 The buyer-supplier relationship and its effects of an automation

When the suppliers were asked to describe the present business relationship with VCC and what relationships they prefer to have with VCC in the future, the following answers were given: *"It is a healthy business relationship for all parties and it is a rather tight and unique relationship with a very good technical collaboration"* (Supplier A, personal communication, 2005-11-15). Supplier A exemplifies by saying that in the development of new products, VCC is very respectful to involve the suppliers in an early stage, and let the supplier to develop the products to them. Regarding the question what relationship they prefer to have with VCC in the future supplier A responded: *"It is important for us to have a strong relationship with VCC even in the future"* (Supplier A, personal communication, 2005-11-15). Supplier B answers the same question but with some scepticism: *"I would say that it is a good relationship, but it has changed since Ford became the owner. In some sense, as we see it, it has been a slightly deterioration in our relations, but we still have good relations with VCC"* (Supplier B, personal communication 2005-11-16). The latter concludes, regarding the question on which relation they would prefer to have with VCC: *"As we said we prefer to be a first-class supplier to VCC and that we obtain a more openness from VCC by giving us permission to participate more in advance in the design process and what is going on at VCC, the better supplier we can be"* (Supplier B, personal communication 2005-11-16). Supplier C also brings up Ford when describing the relationship with VCC: *"It is as it always has been; a good relationship, but it is not always that we agree on, and have the same opinion, how much things should cost/.../The relation is becoming more strict due to that Ford nowadays is involved"* (Supplier C, personal communication, 2005-11-17). On the question why the relation is seen as more strict because of Ford, supplier C says it is due to that Ford and VCC have different cultures. Concerning the future relationship, supplier C responded: *"We prefer to have a good relation with the costumer where we have been able to meet the requirements that they expect from us. This will generate long term business agreements"* (Supplier C, personal communication 2005-11-17).

If automated transactions in this business relationship would have any effects on the relationship with VCC, supplier A answers both yes and no: *"One must reconsider to work in a different way; if this is not done the automation might be a threat to us and the relationship, such as we drift apart. However, an automation might make us a better supplier; it would be more clear and strict which would result in less errors"* (Supplier A, personal communication, 2005-11-15). On the question whether automation would strengthen or weaken the relationship supplier A says: *"It depends how VCC and the suppliers choose to handle it. If VCC close the door and says; from now on we will only communicate via automated links, I think that it would result in a weaker relationship"* (Supplier A, personal communication, 2005-11-15). Supplier B replied that automation would create more time to engage more in the relationship. The latter also formulated the following: *"If we could build and tailor a specific system that would be unique for supplier B and VCC it would lock out the competitors and create a stronger relationship between us and VCC. However, if the rationalization is driven too far so that you can not ask any questions and be creative, then I believe it would restrain VCC's and supplier B's development"* (Supplier B, personal communication 2005-11-16). Supplier B says that this could lead to that they do not develop the products that VCC demand, which would have a negative effect on the relationship, yet Supplier B says that automation would deepen the relationship. Supplier C stresses that automation would deepen the relationship but the negative part would be that the automation is done in a way that would lead to less control.

If an automation of transactions would have any effects on the integration the opinions among the suppliers differ. Supplier A gives a bit unclear answer to this question when saying that it would not change the integration in any certain way. However, Supplier B believes that the integration would be better as long as there is a win - win situation, and the better integration the better the relationship will be. Supplier C concludes by saying: *"The*

interaction in a business relation is to a great extent based on the personal contact between two parties, consequently being able to meet face to face in a meeting. It is not wise to think that it is possible to replace a relation with increased automation, then one have gone to far" (Supplier C, personal communication, 2005-11-17).

On the question whether the communication would change, supplier a said that the communication would be more strict and clear and that it would only be better if there is automation in the transactions. Supplier B shares this positive change and comments that it would hopefully mean that the information transferred would be more correct. However, supplier B expresses the risk that the personal communication decreases. Supplier C support supplier B when responded: "*The communication face to face must always be present. We will never go as far as having businesses performed by computers*" (Supplier C, personal communication, 2005-11-17). Supplier C argues that there is a risk that the communication worsens in automation. The respondent says that automation could create a scenario where the purchaser attaches a pile of documents and says read this and come back to me next week. It will require a lot of time for the supplier to go through all documents just to find out what they really want. This overflow of information will only create disorder in the communication of what they mean.

All suppliers show their concern when it comes to the security and trust in an automation. Supplier A stresses to sustain trust in a relationship, there has to be some sort of personal contact left, even if some activities are being automated. Supplier B commented the importance of trust in automation in the following way: "*The trust must increase if you should allow a higher efficiency in the business process*" (Supplier B, personal communication 2005-11-16). Supplier B also expressed the dissatisfaction with E-auctions. They have proven to be insufficient when it comes to sustain and increase trust, supplier B commented. Supplier C says that automation might be a threat to trust if it leads to greater transparency. This is explained further by supplier C: "*The more VCC know about us, for example having access to our invoices from our suppliers, the more they can put pressure on our prices. This is a sign that they have little trust in us since they want to know everything from us*" (Supplier C, personal communication, 2005-11-17).

Regarding the transparency, supplier A says that VCC have during the last 10-15 years been very open and involved with the supplier at an early stage of a new car model. If the transparency would change in an automation, supplier A do not raise any concern when saying that there is already much information exchange between VCC and supplier A, and supplier A therefore thinks that an automation would not increase the transparency so much more. Supplier B has the *philosophy* that the higher degree of transparency and information exchange the better it is. Whether automation would change the transparency, supplier B said: "*Automation will increase the transparency and also the information exchange, and that is just fine*" (Supplier B, personal communication 2005-11-16). Supplier C says that there is a limit of how much information they are willing to share. On the other hand they demand information about VCC's future plans on new technology so that they know what VCC want on their future cars. Supplier C says that VCC is fairly good at this but sometimes it can be hard to get this information, so if automation can lead to increased transparency here, it is a good thing.

On the question if the personal contact would have any effects of automation, the answers were: "*Business processes require that people meet and discuss. The risk might be that we never meet the purchaser, even if we know who he is. I think that an automation will lead to less focus on personal contact. It is therefore important to find a good balance*" (Supplier A, personal communication, 2005-11-15). Supplier A says that there are no problems for him to create time for personal contact with

VCC. However, a purchaser at VCC has many suppliers and internal customers at VCC that are important to work with. Therefore supplier A hope for an increased automation internally at VCC since he thinks that this would release time for VCC to focus more on the personal contact with its suppliers. If this kind of automation would free time, I think that the personal contact would only be better, supplier A commented. Supplier B share the same opinion as supplier A that the personal contact in business relationships are very important, and comments it in the following way: *“Without the personal creative meeting there would be no business deals”* (Supplier B, personal communication, 2005-11-16). Moreover, supplier B discusses the problem with less personal contact as a consequence of increased automation: *“The problem would be that VCC’s logistics people do not need to speak to supplier B’s logistics people, due to that everything is performed electronically, there has to be a dialogue”* (Supplier B, personal communication, 2005-11-16). However, supplier B stressed the positive outcome of automation and said that it might as well create more time to meet and discuss if the personnel, whose work is getting automated, is kept within the company and instead let them work in a proactive way. This could enhance the personal contact, by releasing time for these persons and instead work with the relationships. Supplier C responded a bit different on the same question: *“The personal relation is of great importance and is based on human contacts, which can never be replaced or taken away. However, VCC rotate the purchasers on a regular basis and use this as a strategic method to prevent unwanted bonds and loyalties to a certain supplier. Since the buyer fears that it will arise unhealthy personal bonds, and the personal contact it thereby set aside”* (Supplier C, personal communication, 2005-11-17).

As to the balance of power, the suppliers expressed the present situation and its effects of automation in the following way: *“There is a respectful power balance and VCC do not use their power in any negative way. However, no one knows what the future will look like”* (Supplier A, personal communication, 2005-11-15). If there would be any changes in the power balance in automation, supplier A says: *“VCC could use this to gain more power, however if it would be good for them in the end is another question. In some cases of an automation they could strengthen their power and positions as well”* (Supplier A, personal communication, 2005-11-15). Supplier B describes the present power balance saying: *“It is of course not so good if you look from the supplier’s perspective. The supplier has a subdominant position, except if you have a unique product that no one else have. However, it is almost never like this since we operate in a market where supply is greater than demand. We have competitors and that is something that the buyer can use against the supplier”* (Supplier B, personal communication, 2005-11-16). One the question whether there would be a change in the power supplier B says: *“I do not think it would change that much. However, it depends on what type of automation you look at, if you consider e-auctions VCC would gain more power considering the price issue, but I do not think they would gain from it”* (Supplier B, personal communication 2005-11-16). Regarding the present balance of power, supplier C responded: *“The power balance is very unequal and the automotive industry knows how to make use of it. On one side is Ford, a world wide group, and on the other side is supplier C”* (Supplier C, personal communication, 2005-11-17). Supplier C expresses no concern in the balance of power in automation; instead the automation is viewed as a rationalization: *“How can we do this in a better way so that we erase the number of hours that we spend on the manual activities. This, I do not think would affect the power balance between us”* (Supplier C, personal communication, 2005-11-17).

5 Analysis

In the analysis the authors give a discussion based on the theoretical framework and the empirical study. In the chapter presenting the empirical findings, VCC and the suppliers were separated but will in this chapter be integrated, to make it easier to look at similarities and differences in the view of an automation and its effects on the buyer-supplier relationship. This analysis will later form the conclusions.

5.1 The purchasing process and how it can be automated

The first chapter is extensive and will include looking at how the purchasing process at VCC looks like in comparison to the traditional purchasing process described in the theory. From this, both VCC and the three suppliers view on how it can be automated will be presented, and discussed from the theory. Moreover, it will be discussed what electronic solution that would be suitable in case of an automation in some activities. Hence it follows that section 4.1.1 (The purchasing process), 4.1.2 (How the purchasing process can be automated from the buyer's view) and 4.2.2 (How the purchasing process can be automated from the suppliers view) from the empirical findings will be included hereunder, and discussed from section 2.3 (The purchasing process) and 2.5 (E - procurement solutions) in the theoretical framework. The most frequent used solutions are according to Fredholm (2002); electronic market places, EDI and web solutions. The authors will in this analyse assume that these different solutions or tools are the major ones when performing an automation, however in this field there can be several other solutions or different combinations of them. They are not in the authors' scope to investigate them all, given that it does not fulfil the purpose of this thesis. On the contrary it is important for a company to investigate what kind of electronic solutions that is available and most suitable for them in an automation of the purchasing process.

Axelsson (2001) stresses that it is important that companies adapt to the rapid technological development, in the present environment of increased international competition, in order to stay competitive. VCC have understood the importance to continuously adapt and improve existing technology, in this case in the purchasing process. VCC says that everything concerning transactions and communication can be automated in a greater extent from what it is today, and they do believe that transactions to transactions should be computerized. Essig and Arnold (2001) argue that E-procurement is a substitute to classical purchasing methods, however VCC do not agree since they claim that some activities including information that have to be interpreted require meetings, and could not be replaced by any electronic solution. The suppliers share the same positive view as VCC and say that an automation of the transaction in this relationship would only be good, as long as there is a win-win situation. They have also understood that it is necessary to adapt to new technology otherwise one will not survive. The suppliers also agree on that E-procurement can not be a substitute in all activities, only the administrative activities that do not create any value. According to the authors of this thesis, it is a good, and necessary, starting point of having realised the importance of the technology, but still be aware that it can not replace all activities in a purchasing process, when considering an automation of a purchasing process. The empirical study also confirmed a third important aspect when considering an automation of the purchasing process, supported with Jonsson's (2004) statement; that it is important to give the suppliers the chance to choose which solutions that suit them as well. One supplier says that VCC is large in comparison to their suppliers, which and can result in that the investments of an automation might be too high for the supplier, who might not be able to sum up the profit as much as VCC can do. Therefore, the supplier stresses that there has to be a compromised solution in order to create a win-win situation. An automa-

tion costs money and it is essential that this is taken into account when proposing new electronic solutions to the suppliers. If not, the whole project can be jeopardized.

The purchasing process is described in a similar way by many authors but can vary depending on type of product and type of supplier (Kraljic, 1986; Van Weele, 2002) but it can as well vary depending on if the purchase concerns new-task situation, a modified rebuy or a straight rebuy (Van Weele, 2002). The purchasing process studied at VCC describes the activities taking place towards strategic suppliers and its strategic products, and also concern a new-task situation. In other words the purchasing process illustrated concerns the introduction of a new car model and the search for suppliers to supply VCC with strategic products to the new car model.

5.1.1 Selection of supplier

At present this process includes to first acquire knowledge of potential suppliers and thereafter to make the decision on which supplier / suppliers to choose. The supplier selection process is not carried through automatically, instead it is an evaluation process handled manually and by group meetings. These supply choice meetings are a forum where represents from different units participate (e.g. purchase, technicians, department of material supply, research & development) and discuss what suppliers they want to work with.

Van Weele (2002) argues for two alternatives when selecting suppliers. One is to arrange an umbrella agreement with a specific favoured supplier, which could be compared to the supply choice meetings at VCC. The other method is to arrange competitive biddings, where the buyer invites a few suppliers to bid. However, the authors of this thesis are of the opinion that supplier selection is a rather complex process, in the sense that a car is a system product with much technology connected to it. Since there are 5 to 6 years between the introductions of two cars, the technology does change much in these years. Furthermore, when considering strategic suppliers and consequently strategic products, these should be evaluated before a new car model so that they match with the development of the technology.

Neef (2001) stresses that the selection of supplier could as well be done by using web-based catalogues including information such as order status and price. They could be of good help in the search of information of potential suppliers, as a basis for the discussions in the supply choice meetings, and they are probably necessary and the most accessible source to collect information. However, the authors of the thesis do not think that web-based catalogues should replace the meetings. The supplier selection process would probably require much more time if all should look through these catalogues and for instance email or telephone their suggestions to the decision maker. The risk will also be that web-based catalogues are not updated, and decisions will be made on wrong data. Of course, web-based catalogues are more preferred than paper documents, but it requires a good communication with the supplier and that the latter provide the buyer with updated web-catalogues. However, the authors of the thesis still think that it will require phone calls to confirm the validity of the catalogues.

To sum, it appears that VCC has understood the importance of not underestimating the supplier selection process. They argue that this is an activity that the purchaser must do together with production, technicians and other people involved. The suppliers are not involved that much in this activity and did not take this activity into consideration when they were asked the question of what activities they consider to have good potential to automate. From this the authors draw the conclusion that this activity seem to work out well

and do not seem to be the main concern when wanting to automate the purchasing process, most likely since it is regarded as a strategic activity.

5.1.2 Request for quotation

As the selection of supplier, the RFQ delivery is seen as a strategic activity at VCC, and is performed in a non-system way. How the RFQ arise is in this thesis regarded as an internal activity and will not be taken into consideration. However, after having selected potential suppliers and developing a RFQ, VCC sends the RFQ to the suppliers through email. This is followed up first by phone call and later by a meeting in order to go through the RFQ. Turban et al. (2000) argue that this process could take place on a bidding site instead, where the RFQ could be located and the supplier gets to bid in order to get to sign the contract. This has already been tested at VCC, and it was an attempt to automate the negotiation process. VCC does agree that it saves some time in the negotiation process. They stress that a negotiation carried through by meetings, email and telephone, with several suppliers can take two weeks. This could instead be done by E-auctions in two hours. However, VCC has experienced the downside of it. It requires three months of preparation since the purchaser has to write down everything that instead could be answered in a sales question, but there were still misunderstandings. Concerning strategic products it is even more important, comparing to routine products, that all information about the requirements of the product is clearly specified. Especially in the automotive industry where the strategic products often include much technology. One can conduct this activity by competitive biddings as Turban et al. (2000) stress, but the empirical data indicate that it probably do not suit strategic relationships. However, there could be other reasons why it did not work out at VCC, for instance, lack of knowledge and experience at both VCC and their suppliers concerning E-auctions. Still the authors of this thesis stress the fact that it is not suitable for the strategic products, due to the discussion above that they require discussion and evaluation from a technological perspective and should not be chosen from the lowest price. On the other hand, E-auctions result in that the RFQ's are done in an accurate way, since this is a requirement for managing E-auctions. Conducting the RFQ manually could possibly result in that the RFQ is not as accurate as in E-auctions since the buyer knows that it will be followed up by meetings, mail or telephone. If a company experience many errors in the RFQ's, then one should focus on to make this activity efficient by making more accurate RFQ's.

From our findings it occurs to be a lot of resistance that E-auctions will be the appropriate solution to manage the RFQ in strategic relationships. If returning back to the present non-system way when managing RFQ's, that was first described in this chapter, both VCC and all three suppliers argue for improvements in how the it is carried out today. VCC claims that the RFQ should continue to be sent electronically but to also have an updated version on the web. This is supported by the supplier data, which indicates that there is an extensive work with sorting out the relevant information, which has been sent through email, to understand what the RFQ is about. The RFQ should instead be located on a web page so that both parties could see the same information, where a message through email tells that there is a new specification of the RFQ on the web and that one should collect it. Neef (2001) and Fredholm (2002) propose a similar solution, that it should be convenient to organise the RFQ using an electronic market place such as Covisint. Except online auctions, this portal also makes it possibilities to share information and communicate with the supplier and vice versa. However, one supplier points out that there are always a few questions that one might wonder concerning an RFQ and suggests that it is important to have the possibility to go through the documents with VCC and be able to discuss and ask ques-

tions, which according to Neef (2001) is necessary. VCC argues that there are follow up meetings and phone calls but the supplier explain that there can be a small meeting arranged by connection through phone and a web address so that one can talk and at the same time look at the same document. Giunipero and Sawchuk (2000) suggest voice communication with the computer to be an alternative in order to discuss a RFQ.

VCC continues to argue for an evaluation system so that it can be possible to make online analysis of the response the suppliers gives concerning the RFQ. It can save some time to have a system that automatically compare VCC's offer with the supplier's response. VCC points out that analytical tool like this will become important in order to quickly gain correct basic data for the decision-making. According to VCC, this function does not exist in the present Covisint portal. However, Neef (2001) claims that one should not underestimate the possibilities with Covisint. The author argues that Covisint can make the purchasing process to move towards an online approach to procurement, and it can perhaps be possible, from a technological perspective, to develop this portal to also function as an analytical tool in the RFQ process. However, this thesis does not include evaluating possible developments of Covisint from a technical perspective. Neef (2001) states that there is a counterpart to Covisint; SupplyOn, founded by German automotive suppliers which in contrast to Covisint, have tools to share technical documents among collaborators. So there are evidently improvements to make with Covisint. If adding new technology into Covisint, or find a similar portal as the SupplyOn, it could probably be possible automate as discussed above. However, the authors of this thesis still believe that information concerning technical information and strategic products should not be fully automated. As supplier B puts it: "*I do not think it is possible to drop the human contact completely, since this is where businesses arise.*" (Supplier B, personal communication, 2005-11-16). Automation should have the purpose of creating more time to be innovative and discuss good solutions, not to eliminate the human contact.

According to Van Weele (2002) and Turban et al. (2000), a one-to-one website is another form of electronic market places to conduct the discussed activities above. Supplier B argues for this solution as well and stress: "*If we could build and tailor a specific system that would be unique for supplier B and VCC it would lock out the competitors and create a stronger relationship between us and VCC*" (Supplier B, personal communication 2005-11-16). However, the authors of this thesis want to point out that having 400 production suppliers, as in VCC's case, it is time-demanding and too costly to communicate with each supplier in this way. As employee 3 at VCC expressed it: "*automation requires standards*" (Employee 3, personal communication, 2005-12-01).

To sum up, some might think that e-mail is a way to rationalise the communication and thereby the purchase process, but this is clearly not the case in every situations. The fact that one supplier suggests video conferences indicate inefficiency and uncertainty in email. It is important to use e-mail with common sense, otherwise the effect will evidently be the opposite to what it was intended to be. It is a good thing having realised that competitive biddings do not work out for some activities as finding a new supplier and present ones RFQ, if the company focus on quality rather than price. However, there might be other possibilities with the Covisint and other forms of electronic market places, that could be a strong tool for activities described above, when considering an automation of the RFQ process. Having access to, and be able to send, information such as product catalogues and terms and conditions is convenient, however empirical data indicates that the use of electronic market places and other automatic links should stop there in case of strategic products and strategic suppliers.

5.1.3 Signing of contract

At present VCC sends the contract, which is an ordinary Word document, to the supplier through email or upload it on a server. In both cases, the supplier has to print it to sign and send back to VCC. This activity does not consist of much electronics. VCC claims that there could as well be a system that sends the contract automatically but sending it by email do not require much time. VCC continues that the signing of the contract will not be automated since it has to be signed. So therefore the supplier has to send back the contract by post and not by email. So if only viewing VCC's perspective this activity seem to work out efficiently, but from the suppliers' perspective it is still a manual activity. One of the suppliers stress that it takes some time to first download it, check that the contract is correctly filled in and in line with the agreed terms and conditions, sign it and then send it back. Instead the supplier argues for this process to be more automatic. For instance, it would be more efficient to let the computer do the comparison of the contract sent and the agreed terms and conditions. This would of course save some time for the supplier. However, if the two contracts do not match, the computer will not be able to continue the work. In such cases it will still have to be administrated manually by the supplier.

Relying to the findings, the contract is still paper-based from the suppliers' perspective, but Giunipero and Sawchuk (2000) argue that this process could be managed with on-line contracts. They state that the whole process could be automatic, even the signing of contract. The security in it would be to have some sort of identification number that allows both parties to verify the identity of the sender of the data. This in combination with having a system that allows to electronically comparing the contract of the buyer with the information in terms and conditions would result in less work for the supplier, except when there are errors in the contracts being compared.

5.1.4 Placing and dispatching the order

This activity is divided in two stages. The first stage is when the purchase order is sent to the supplier. VCC only place an order to strategic suppliers once during the lifecycle of a car, given that the car do not changes. In such cases, where the car might require new or different products, then a new purchase order has to be placed. However, this study assumes that the purchaser order do not changes. Due to that VCC and its strategic suppliers do not use the same computer system the purchase order is, as the signing of contract, managed both manually and electronically. VCC place the purchaser order in their purchase system, which is then printed and sent to the suppliers by post. The supplier has to sign the order and send back to VCC by post. The supplier later on has to transform the information in the purchase order manually into its own system, for internal use. The process that follows, or the second stage, is that that the purchase order is now in the suppliers system, and VCC will hereafter place their regular needs via EDI. EDI is performed via a direct line between the buyer and supplier.

Starting with the purchase order, one of the suppliers argue that this process is rather automatic from VCC's perspective while they have to carry through all the manual work, consequently the supplier argues for a more automatic procedure even for the supplier. According to our findings at VCC, there are different opinions whether this activity should be more automated or not. However, the common opinion is that the purchase order could be carried through more automatically for instance, sending the order through email instead of by post. One respondent continues to argue for an electronic signing so the entire process of the purchase order can be handling automatically. However, another one stresses that

the purchase orders do not concern many documents per year since an article is only placed once during the lifecycle of a car, therefore they have not put priority in this process. Neef (2001) states that this process remains much the same for many companies as it did many years ago, and this seem to be the case at VCC as well. This study only contains to examine the activity towards the suppliers and not any internal activities. However, the fact that there are around seven copies of a purchase order (Dobler & Burt, 1996; Giunipero & Sawchuk, 2000) that has to be sent to suppliers and different functions internally, an automation would decrease the work load both internally and towards the suppliers, and at the suppliers. Dobler and Burt (1996) and Giunipero and Sawchuk (2000) also argue for orders to be sent by email and at the same time, the computer could prepare all other copies for internal distribution.

The authors of this thesis do not see many disadvantages to conduct the purchase order through email, as long as it allows electronic signing there will not have to be any manual actions. However, there could be a scenario where the buyer is insecure if the email actually reached the supplier, since emails sometime fail to appear. The authors of the thesis want to bring up the same discussion as earlier, that a development of Covisint could as well allow VCC to place the purchase order at this portal instead of email. Both the buyer and supplier would have access to Covisint and could place the order respectively collecting it, allowing electronic signing here as well. Locating the purchase order at Covisint or similar, Giunipero and Sawchuk (2000) say it would make it possible to find errors in an early stage, since the computer would reject the online order form if there were any errors. This function is not possible with email. Employee 3 put forward: *"Computer to computer is the key; it will reduce the manual work. However, this is where standards are important"* (Employee 3, personal communication, 2005-12-01). Covisint is a standard within the automotive industry and could live up to this statement. Covisint is actually in use to send purchase orders to non-production suppliers, where the supplier gets an email saying that there is an order to be collected at the portal. The difference in non- production products and strategic products is that strategic products require more information to be shared and discussed. However, since all technical information, terms and conditions are by this stage clear, and the purchase order is regarded as a transactional activity, it could be suitable to automate as discussed above.

Moving to the second stage in this process when the buyer continuously places their needs through EDI. EDI is further used in the delivery of goods, receiving of goods and payment. EDI via a direct line to the supplier is an old concept at VCC and works out good. Chesher and Kaura (1998) stress that EDI is rapid, reliable and effective. However, Simon (2000) and Fredholm (2002) argue that there are high costs related to implementation of a direct line. EDI requires a new line for each new supplier, consequently when a new supplier is selected the IT section at VCC has to connect the supplier and prepare them for the EDI communication via a direct line to VCC. Moreover, they have to adjust the connection and optimise it before they can get started. This is both time consuming and requires a lot of recourses from VCC to manage, but when this is done it works almost without friction, is highly automated and secure. Towards the strategic supplier this system works really well, and Fredholm (2002) stresses that EDI is preferred when there is a partnership and regular transactions.

It is important that the security in the transactions made by EDI is high. Consider that one minute of a standstill in the assemble line at VCC cost hundreds of thousands Swedish Crowns, and can not be tolerated. This is probably one of the reasons that VCC emphasises the security and is quite conservative when it comes to the use of new technology

connected with EDI. From this perspective, EDI should maybe not be questioned, but since it is not flexible, consequently expensive, EDI could be questioned from a cost perspective.

According to Lankeford and Johnsson (2000) Internet is a tool that provides cost-effective and simple web-solutions, consequently not that costly and inflexible. Turban et al. (2000) and Monczka and Carter (1988) argue for Internet based solutions of EDI, so called web-EDI. This solution does not require the same recourses to prepare for the transmissions between the buyer and supplier, and it is possible to create solutions where both the buyer and supplier can work with the technique that suits them most. Since it will be possible for two data systems to communicate with each other even though the two systems belong to different computer systems it will not require high costs when starting up businesses with a new supplier. Since traditional EDI is expensive there might be small suppliers that are not prepared to take this investment and change their whole system. Supplier B commented *"VCC is larger in comparison to its suppliers and can afford higher investments and can offset the costs and sum up the profit more than a small supplier can do"* (Supplier B, personal communication, 2005-11-16). A large company like VCC might then miss out of important business opportunities. A small supplier can sometimes be as important as large suppliers since they can possess unique technology. Another reason that new suppliers could hesitate to accept the large investments of traditional EDI is that they get dependent on the buyer. Even if they accept the investments of EDI, it does not guarantee that they will get to deliver to that buyer forever. At present there are some suppliers to VCC, which system can not respond to traditional EDI, where web-EDI is in use instead. These are not many but still if this method is already tested and implemented on a few suppliers, it should be evaluated and see if it is applicable for the process of sending the contract and also for the placement of regular needs.

Going back to the purchase order, one respondent at VCC said that traditional EDI could be an option, but changed opinion and said it would involve too high costs, relating to that there is a very low volume of these orders per year. Web-EDI could instead be an option, since Internet can cut communication costs by over 50 percent and do not involve as much investments costs as traditional EDI. Web-EDI then gets worthwhile even for small, infrequent transactions, as the purchase order described at VCC (Turban et al., 2000). Giunipero and Sawchuk (2000); Fredholm (2002) and Turban et al. (2000) argue for the possibilities with web-EDI. Their discussion of web-EDI and its purpose and possibilities is similar to the discussion the authors of the thesis had about Covisint as an option regarding the purchase order.

Summarily, the implications drawn from the supplier data is that the purchase order consists of much manual work, and should be handled more automatically. Even if the buyer gets to do it electronically they should consider the suppliers' situation. Giunipero and Sawchuk (2000) argue that if the purchase order arrives electronically as described in web-EDI or Covisint it will facilitate for the supplier to process the order automatically. Web-EDI could replace traditional EDI regarding the regular placements of needs. Neef (2001) says that the main reason why companies stick to traditional EDI is because of its large investment and that it is secure. In other words, security costs money, but in the rapid technological development, web-EDI is probably improving and could in the future promise the same security as traditional EDI.

5.1.5 Delivery and receiving of goods

In accordance with Dobler and Burt (1996) the administrative work in the receiving of goods could be minimized by using an online computer system that can handle the bar code identification of the received products instead of checking the bar code against paper documents. As in the case of the purchase order, the receiving report will have to be sent to several functions internally, and with the respect to this, those should be filled in electronically in a computer system. This activity is carried out by a receiving department, but when the delivery is not in accordance with the purchase order there is much communication that has to be exchanged internally and externally. The receiving department will have to contact the purchase department which in turn will have to contact the supplier. Dobler and Burt's (1996) suggestion on how this activity can be managed electronically is already present at VCC. When the delivery arrives, they make a control in a system, where it is possible to match the delivery to the invoice to see if they correspond to each other. This study will not go into how the internal activities in the receivment can be automated since it is not included in the purpose. Therefore it will not be presented exactly how the process looks like more than the brief description above. The external activity in this process is when the supplier sends the delivery report through EDI. VCC stresses that this will continue to be done in the way it is done today. The authors of this thesis want to point out the same discussion as above that traditional EDI could be replaced by web-EDI for the same reasons as presented earlier.

5.1.6 Payment

There are around one million payment transactions at VCC each year, which are carried out by EDI. VCC is satisfied with how it is done at present time and do not imply on any inefficiencies in this activity. However, there are cases where VCC does a self billing, instead of having the supplier sending the invoice. The invoice requires that VCC control it so it is correct and payment can be carried out. Self billing is the other way around; the buyer makes the invoice for the supplier. They register how many articles they received and pay for the agreed price, and the supplier gets to control if it is correct. This can of course be an option when carrying through payment since it decreases all stages that the invoice involves. The invoice might for instance be based on a delivery report that was not consistent with what was actually delivered and received. The supplier will then charge the buyer wrong. This will be noticed by the buyer that will have to contact the supplier, and the procedure has to start over, this time with correct information. The self billing will eliminate this unnecessary work, but on the other hand if the self billing is not correctly done by the buyer, the same workload the buyer get of an invoice will be put on the supplier, that would have to contact the buyer which has to start all over again with correct information. Web-EDI can as well be an option, especially if it will be implemented to the other activities described above. However, the authors of the thesis point out the concern that will probably arise among the companies, that web-EDI is too insecure for carrying out payment of large sums.

5.2 Product and supplier classification concerning E- procurement solutions

If not considering each activity as in previous chapter, but instead present an overall view on how the purchasing process could be automated, the authors have chosen to use a two dimensional matrix by Kraljic's (1983). The authors consider this matrix to be too broad, and do not include detailed information on how different parts in the purchasing process could be automated. Therefore this theory serve more as a complementing and supportive theory, but still valid. Before carrying through the empirical study it was already decided to interview strategic suppliers. The authors categorized the production suppliers as being strategic suppliers. The aim of carrying through a product and supplier classification is foremost, from theoretical data, to confirm that they are strategic suppliers, and consequently examine what are the preferred electronic solutions for this kind of product and suppliers. The discussion below is based on section 4.2.1 (Product and Supplier classification) from the empirical findings and related to section 2.4 (Product and supplier classification) from the theoretical framework. The theoretical framework does include all four categories of products; Strategic products, bottleneck products, routine products and leverage products. The authors want to underline that they will only consider analysing the strategic products, but presenting them all makes it possible to place the strategic products in relation to other ones. This should not be underestimated since it increases the understanding to this matter even though the authors do not have the intention to analyse them all. Section 2.5 (E - procurement solutions) will be mentioned in this chapter as well concerning product type and supplier type.

When combining Kraljics matrix with theory developed by Van Weele (2002) and Axelsson (2001) it is possible to analyse which product classification the suppliers sort under, by examining the purchasing impact on the financial results and the supply risk. Suppliers that deliver products to a car are according the empirical data mentioned as production suppliers. If there is one component missing, there will not be a final car. Consequently a car consists of critical products and do not concern any routine products, since they are classified as being non-critical products (Kraljic, 1983; Van Weele, 2002). The empirical data appears to confirm that the products of the suppliers in this study can be excluded as being leverage products. According to Axelsson (2001) and Kraljic (1983), the market for leverage products is characterized as having competition and those products can be bought from several sources, hence the supply risk is low. Moreover, it is a buyer-dominated segment. Even though, VCC expresses them as having some power over the suppliers, they also acknowledge that they are dependent on them; consequently the relationship towards the strategic suppliers is not fully buyer-dominated. Furthermore, the empirical data indicates that it do not concern leverage products, since having two suppliers that are market leaders within their segment could not always be compared to smaller actors, however this can vary if there is a unique technology. According to those findings, the authors believe that the supply risk is not that low, and consequently no leverage product. Having pioneered seat belt technology and being the leader in airbag development, as the third supplier is, it is for sure not leverage product. Moreover, having the philosophy: "Center of Excellence of Safety" (Volvo Cars Corporation, 2005), there is a rather high than low supply risk, since there are probably not many that can offer as good safety as the leaders.

From the matrix of Kraljic (1983) one could think that a car consists of bottleneck products, since a car is sensitive for disruptions in the deliverance and since the suppliers in the study are leaders within their market segment, so is bottleneck products. However, the authors of the thesis do not agree on the reasoning that the three suppliers should be bottle-

neck suppliers. Both theory and empirical data confirm that the automotive industry is not characterized as being supplier dominated; consequently they are not bottleneck suppliers. From this the authors can draw the conclusion that the three suppliers can be classified as strategic, and this is supported by that both VCC and the suppliers expressed that there is interdependence in the relationship, hence there is a partnership. If there is a partnership is also proven by that all three are in relationships with VCC since at least the two last decades. Secondly, they are strategic suppliers since, as supported by Kraljic (1983), strategic products are products with strong technology and engineering capabilities and they are often market leaders. The only argument against the suppliers being strategic would be that all three suppliers express that there is a competition on the market, which is not in line with the matrix of Kraljic (1983), since strategic product only have one source of supply. This can be explained by that the supplier might feel that there is competition in some way but nothing that could replace their products.

Since all three suppliers deliver strategic products to VCC they represent a high supply risk and they also score high in the dimension on financial impact (Kraljics, 1983). Moreover, this stresses which strategy each company should pursue for each specific product and supplier. In this case all three suppliers sort strategic, even though they deliver different products to VCC, and therefore a similar strategy should be used when VCC purchase products from them. As already discussed and agreed by Emiliani (2000); purchase of strategic products from strategic suppliers is not suited to carry through by E-auctions. This is supported by Van Weele (2002), who instead favour EDI as a solution due to the frequent transactions and interactions, such as on calls (Van Weele, 2002). However, the authors of this thesis will not, once again, go through EDI as an electronic solution, since this has already been done in chapter 5.1 (The purchasing process and how it can be automated). But this has proven that EDI is a suitable solution when trying to automate specific activities in the purchasing process towards strategic suppliers, and it supports our analysis of EDI as an important tool and one should not underestimate it, but instead reconsider how it can be further developed, for instance towards web-EDI.

5.3 The buyer-supplier relationship and its effects of an automation

Hereunder, the effects on the relationship will be discussed from both the buyer's and suppliers' perspective. Consequently section 4.1.3 (The buyer-supplier relationship and its effects of automation, from the buyer's perspective) and 4.2.3 (The buyer-supplier relationship and its effect of automation, from suppliers' perspective) from the empirical findings will be presented. This will be discussed from chapter 2.6 (The buyer-supplier relationship) in the theoretical framework

5.3.1 The buyer-supplier relationship

All three suppliers describe the relationship to VCC as a good relationship. However, since Ford became the owner of VCC, supplier B and supplier C claim for deterioration in the relationship. This might indicate that Ford prefer to have loose and independent relationships, but as put forward by Datar et al. (1996) this can not be done in relationships of complex and strategic products, since it requires much collaboration between the buyer and supplier in order to make it possible to develop these products. Supplier A says that VCC is very respectful to involve the supplier in an early stage, and let the supplier to develop the products to them, the latter emphasises the good technical collaboration. However, sup-

plier B and supplier C do not agree and comment that they want to obtain a more openness from VCC so that they can meet the requirements that VCC expect from the supplier. They stress that this could be done by allowing the supplier to participate more in advance in the design process. If this will not happen and if Ford is going to continue with the managing of short term relationships this will probably give the opposite result from what Axelsson and Wynestra (2002) say about long term relationships, as bringing increased understanding, faster and better decisions, and a better end product. Despite the fact of Ford and the lack of early involvement in product development, the prediction of the relationship is positive among the suppliers. They aspire to have a strong relationship in the future and be the first-class supplier to VCC.

5.3.2 E-procurement: Strengthened or weakened relationship

Fredholm (2002) claims that E-procurement can be used either to strengthen the relationship as well as to weaken it. These both conditions are experienced among the three suppliers. Supplier A says that it might weaken the relationship if VCC want to communicate only via automatic links, in this case supplier A fear that they will drift apart. Supplier B states that automation would strengthen the relationship if there was a tailored system that would be unique for the relationship, which would lock out the competitors. But on the other hand supplier B says that E-procurement could as well weaken the relationship if it is driven so far that one could not ask any questions, since this would restrain the supplier ability to develop products that correspond to VCC's demands. Supplier C comments that it would deepen the relationship but also stress that it could have a negative effect if it is done in a way that leads to less control.

From these statements, one can see, and as Gadde and Håkansson (1998) say, that increased use of E-procurement will naturally have an effect on the buyer-supplier relationship, either in a positive or negative way. From the statements made by the suppliers, one might further conclude that the effects will depend on how the buyer chooses to handle it. The outcome could be, as put forward by Neef (2001), that the suppliers will be expected to adapt their technical infrastructure to the buyer's, which result in that they have to change their business processes.

5.3.3 Relationship attributes and its effects of an automation

Integration: The lifecycles of cars becomes shorter due to rapid development in the technology and demand, and requires faster developments of new ones. Due to this situation, Datar et al. (1996) put forward the importance of integration between the buyer and the supplier in order to gain faster development and reduced time to market. The implication of this is that integration in a strategic relationship in this kind of industry is very important. Supplier A thinks that an increased automation will not change the integration dramatically, but supplier B concludes that the integration would change to the better, but only if there is a win-win situation.

According to Gadde and Håkansson (1998) an automation do lead to increased integration, but to make this possible it requires an increased openness between a buyer and a supplier. This openness would in this case mean that the supplier gets involved early in a project of automation, so that, as supplier C express, a "win-win situation" can occur. Supplier C does not agree on that automation necessarily will lead to increased integration. This is how supplier C puts it: "*The integration in a business relation is to a great extent based on the personal contact between two parties, consequently being able to meet face to face*" (Supplier C, personal communi-

cation, 2005-11-17). From this one can conclude that much personal contact give high integration, and should consequently not be fully replaced by computers.

Communication: Skoog and Widlund (2001) point out that to manage successful relationships with its suppliers, communication is of great importance. The common opinion of supplier A and supplier B is that the change in communication, from automation, will be towards more strict, clear and correct communication. Supplier C on the other hand, stresses that the risk with automation is that there will be an overflow of information sent between two computer systems, which will make the communication worse. From experience, supplier C put forward the scenario where the purchaser misbehave and attach a pile of unrelated documents under the assumption that it could in some way be useful.

Gadde and Håkansson (1998) announce how complex the communication can be in a relationship, and supplier C underlines: *“The communication face to face must always be present”* (Supplier C, personal communication, 2005-11-17). Gadde and Håkansson (1998) support this and say that it is important to maintain a good communication between the buyer and the supplier, since it is difficult to design an information system that can be suitable for all exchanged information in the purchasing process. However, they argue that administrative information do not require face to face communication. Skoog and Widlund (2001) say that the complication with electronic communication is that there is a high risk of misunderstandings. One is not able to ask questions when reading an email as in a telephone call and one might base decisions on wrong information. If this is a recurring incident there might be a risk that the receiver of the information is estimated as not performing well in the business relationship.

In reality it is impossible to perform businesses only via computers, meaning that the communication is totally rationalized, but in theory one might think it is possible to divide the communication in tangible steps which separately can be automated and executed by computer - based communication. These parts together contain the whole complexity of the human communication, and inherent some parts that is not possible to automate. The personal communication contributes to so much more which will be lost if one try to push this issue too far. Supplier C is not concerned that the situation where business is performed by a computer will occur.

Security and trust: Gadde and Håkansson (2001) stress that social interaction is necessary since it is the primary driving force for development of trust. So most important and in line with the empirical findings, is that there have to be some personal contact to sustain trust. Or else, as supplier B puts it; if there is no trust it is not possible for the business process to be more efficient. So to allow a higher efficiency in the business process, like automation, the trust must increase, not decrease. Supplier A and supplier B discuss a decrease of the personal contact to be a threat for the trust. Supplier C instead puts forward the increased transparency that automation would result in, to be crucial for the trust. At supplier C, the authors did get some indications that they are sceptical to automation if it leads to greater transparency and consequently have a negative affect of the trust. As supplier C stated: *“The more VCC know about us, for example having access to our invoices from our supplier, the more they can put pressure on our prices. This is a sign that they have little trust in us since they want to know everything from us”* (Supplier C, personal communication, 2005-11-17). Relying on the theory and the empirical findings, the personal contact can not be taken away in automation without affecting the trust.

Trust is strongly related to security. Trust can according to Gadde and Håkansson (2001) help to reduce the uncertainty, consequently to add security into E-procurement do be-

come important to sustain trust and reduce uncertainty. Similarly supplier B agreed: “*E-auctions, as an example, have proven to be insufficient when it comes to sustain and increase trust*” (Supplier B, personal communication, 2005-11-16). If a buyer makes an approach towards E-auctions with their existing suppliers, the lack of security is shown in that the supplier will feel insecure regarding the future business relationship, since there are now higher expectations on the suppliers, which they might not be able to live up to. Confirmed by theory and empirical findings is, that if one want to keep suppliers it is important to be aware of the effects of the decrease in trust and security, which an automation will lead to.

When a company considers shifting to an Internet-based form of procurement the security is of significant concern. As Neef (2001) put forward; Internet itself is insecure, and E-procurement initiative requires exchange of sensitive information, such as pricing models and strategic plans, between the buyer and the supplier, which has proven from the empirical findings that there is a limit of how much information one is willing to share. To conclude, security and trust seems to be two important factors that are holding back the development of E-procurement.

Transparency: Supplier A believes that automation and consequently the increased transparency would not be any problems. Similarly supplier B agreed: “*...the higher degree of transparency and information exchange the better it is*” (Supplier B, personal communication, 2005-11-16). Yu et al. (2001) support this and argue that increased information sharing will lead to benefits and a win-win situation in terms of costs. However, Supplier C is more sceptical when expressing that there is a limit of how much information they are willing to share. This is probably, as Neef (2001) claim, because the transparency may undermine a buyer’s or a supplier’s ability to manoeuvre. However, supplier C thinks that the automation, and the increased transparency that it results in, can be a good thing if it includes information that gains them, such as future plans on new technology. The fact that supplier C says that this is not the case today, might explain their worries in an increased automation from their perspective. Lamming et al. (2001) stress that this is where trust becomes very important. If both parties feel that they can trust each other, there might be an increased willingness to greater transparency, and both parties will experience that they actually gained a profit in having more transparency in the relationship. Yu et al. (2001) put forward that it will result in a win-win situation, but not to forget that they are presenting transparency in terms of costs.

Personal Contact: As mentioned in previous section, trust becomes very important when it comes to the degree of transparency that will be allowed from both parties, and according to Gadde and Håkansson (2001), a high level of trust requires personal contact. From our findings it occurs to be a lot of hesitation to automation, and still maintaining the personal contact. Supplier A fear that an increased automation might lead to less focus in personal contact. Similarly supplier B agreed when saying that an automation would result in that the people at VCC would not need to talk to the people at the suppliers due to that everything is performed electronically. Jonsson (2004) agrees and say that E-procurement will reduce the personal contact in the way that activities that before was carried out through phone will instead be carried out through email or by other electronic facilities. Above is one way to view how the personal contact would be affected in an automation. However, both Jonsson (2004) and supplier B want to make room for another probable outcome. The common opinion for the two is that an automation could as well result in that there will be more time for personal contact. Supplier B says that automation can enhance the personal contact, by releasing time for some persons, who instead could work with the relationship. Jonsson (2001) fill in that this could increase the quality of the personal relationship. Sup-

plier A has some concern that an automation would lead to less personal contact, but on the other hand agree with Jonsson (2004) and supplier B when stated: *"If an automation would free time, I think that the personal contact would only be better"* (Supplier A, personal communication, 2005-11-15). However, what is important is that supplier A argues for automation internally at VCC. Since a purchaser at VCC has many suppliers and internal customers that are important to work with. So if automation would be carried through on the internal activities at VCC, it would free time for VCC to focus more on the personal contact with its suppliers.

According to our findings at supplier C, a third outcome is that the personal contact would not be affected of automation. Unlike the two other suppliers, supplier C seems to express the personal contact in terms of the personal bounds that is created when two people have frequent contact. Since VCC rotate the purchasers on a regular basis, to prevent unwanted bounds and loyalties to a certain supplier, there are no personal bounds that will be affected in automation. Supplier C comments that the personal contact is already set aside. From this way of viewing the personal contact, one can make the conclusion that automation would do no difference for the regular personal contact that two people have, since there is not any.

From the findings, the authors draw the conclusion that in the end it all depends on what kind of information one try to automate. The personal contact does not have to change in a negative way. It might just be modified and concern other, more strategic, activities to be carried out face to face instead of unnecessary check ups or other administrative issues. However, supplier B puts forward that this will only occur if the personnel, whose administrative work is getting automated, is kept within the company and instead introduced to work in a proactive way. Supplier A stresses that one should reconsider if one deals with internal or external inefficiencies. In the first case, the personal contact should increase since it creates more time within the company to produce more proactive working towards suppliers, but in the latter case there might be a decrease in the personal contact since this is replaced by automatic links in. To conclude, what ever automation that is carried out, it is from the findings and theory proven to have an impact on the personal contact.

Power and Dependence: The common opinion for supplier B and supplier C is that the power balance in the automotive industry is uneven, to the suppliers' disadvantage. As supplier C put forward: *"The power balance is very unequal and the automotive industry know how to use it/ .../ on one side is Ford, a world wide group, and on the other side is supplier C"* (Supplier C, personal communication, 2005-11-17). Similarly supplier B says: *"It is of course not so good if you look from the supplier's perspective. A supplier is always a supplier with a subdominant position, except if you have a unique product that no one else have/ .../ but we have competitors and that is something that the buyer can use against the supplier"* (Supplier B, personal communication, 2005-11-16). This is obviously the situation in the automotive industry, if relying on the suppliers, and automation on the initiative of VCC and from their needs, could be seen as VCC gets more power since the supplier will be connected to their computer systems. If automation is handled this way it will for sure not give the suppliers more power and less dependence, rather less power and increased dependence. Cox et al. (2004) stress that this inappropriate relationship situation can be avoided if one or both parties change their behaviour. However, VCC points out that it is not that easy to change ones behaviour since the market requires to have certain behaviour to stay competitive. However, VCC do not fully agree on the suppliers' perspective, as them being dependent on VCC. They stated that they are dependent on their suppliers as well, and the more collaboration there will be between them and its suppliers, the more dependent one gets. Consequently when viewing both the suppliers and the buyer's

perspective on the balance of power the situation is a rather interdependent situation. Not to forget that a car is a system product and is dependent on high technology products, there is an obvious dependence on the strategic suppliers, even more if the supplier has a unique product.

Whether an automation would change the balance of power supplier A stressed: *"VCC could use this to gain more power/.../in some cases of an automation they could strengthen their power and position as well"* (Supplier A, personal communication, 2005-11-15). Supplier B share the same opinion and put forwards: *"It depends on what type of automation you look at/.../If you consider E-auctions, VCC could gain more power considering the price issue"* (Supplier B, personal communication, 2005-11-16). Both hesitate if it would be a good thing for VCC. Supplier A and supplier B argue that there would be a shift in power and dependence if the buyer creates an ultimatum where the supplier will have to adapt to their system. However, if the suppliers are taken into consideration one can build systems where both parties are getting dependent on each other, hence the balance of power should not necessarily change. From these findings, the purpose of automation seems to be crucial if there will be a shift in the power. If the purpose is to automate non - value creating activities or as supplier C stresses: *"how can we do this in a better way so that we erase the number of hours that we spend on the manual activities"* (Supplier C, personal communication, 2005-11-17), then it should not affect the power balance very much, and supplier C agree.

To sum up the chapter of buyer-supplier relationships and its effects of automation, the authors find these confirmed negative effects on the relationship to be a strong and important support to consider the degree of automation. This is how supplier A puts it: *"If VCC close the door and say; that from now on we will only communicate via automatic links, I think it would result in a weaker relationship"* (Supplier A, personal communication, 2005-11-15). Supplier B fills in: *"If the rationalization is driven to far so that you can not ask any questions and be creative, then I believe it would restrain VCC's and supplier B's development"* (Supplier B, personal communication, 2005-11-16).

6 Conclusions

In this chapter, findings from the analysis are summed up to present the most important aspects of the study, and to fulfil the purpose of the thesis.

To re-establish the purpose of this study the aim was to analyse how a purchasing process can be automated in a strategic relationship in the automotive industry, and also study its possible effects on the buyer-supplier relationship. To fulfil the purpose the authors aimed to examine what impact the type of product and supplier has concerning electronic solutions. Moreover, six attributes of a relationship were examined concerning the study of possible effects on the buyer-supplier relationship in case of automation.

From the results of the analysis it is possible to conclude what external activities that have the best potential to be automated. Although the respondents in the study call attention to an automation of the transactional activities in the purchasing process, they perceive a significant challenge related to applying E-procurement also for some strategically activities. However, the respondents agree on that the strategic activities are very much a human resource issue and should not be fully automated, but could be supported by some electronic means. The selection of supplier, which is a strategic activity, should according to the analysis not be automated, instead discussed in meetings. Even though the RFQ activity is seen as a strategic activity, this activity together with the signing of contract and placing of purchase order were the three most discussed activities among the suppliers, as possible to automate. This opinion is also supported by the buyer. The analysis further shows that the Covisint portal, that is already present in the automotive industry, or a similar portal, seem to be a suitable electronic solution that could support the three activities mentioned. A fundamental conclusion about the RFQ scenario regarding strategic products is that E-auctions are not recommended, since selecting strategic suppliers require discussions and evaluation. Covisint is actually a portal for E-auctions, but the analysis indicates that it is possible to send information and store information in is this type of portal as well. A web page could serve as an alternative solution to Covisint concerning the automation of information in the three activities discussed above: RFQ's, signing of contract and placing the purchase order. However, according to the analysis, to secure these activities on Covisint or a web page, it requires some sort of identification number that allows both parties to verify the identity of the sender of the data. However, it is proposed that an automation of these activities should be followed up by meetings and phone calls, which is probably already the case today. E-mail, as a follow up alternative, should be used with common sense, instead voice communication where the meeting is arranged by connection through phone and a web address is of interest, so that one can talk and at the same time look at the same document.

Moving on to the activities concerning placement of regular needs, delivery and receiving of goods and payment, they are all carried out through traditional EDI. From a security perspective traditional EDI was proven to be the most preferred. From a competitive perspective, web-EDI could be more preferred due to that it can allow and afford small suppliers to connect themselves to a large buyer. A small supplier can sometimes be as important as a large supplier since they can possess unique technology, a business opportunity that a large buyer could not afford to miss out of. However, from a cost perspective it can be argued for both traditional EDI and web-EDI. If relating the automotive industry, there is a great need of security in delivery, since one minute of a standstill in the assemble line results in heavy costs. However, the argument against traditional EDI is that there are high costs related to the implementation of a direct line to each supplier. In other words, secu-

rity cost money, but in the rapid technological development, web-EDI is probably improving and could in the future promise the same security as traditional EDI, but to a lower cost.

The receipt of goods is best automated by having a computer system where the receiving report can be filled in electronically and additional copies could be automatically sent to internal departments. This also facilitates when matching the delivery report to the invoice report to see that they correspond to each other. The delivery report from the supplier is received via traditional EDI, which could for the same reason as above be considered to be done via web-EDI. Lastly, payment which is in most large companies carried out with traditional EDI could as well be considered carried out through web-EDI instead. However, the authors want to point out that the possible uncertainty among companies to this is that web-EDI is too insecure to perform payment with large sums. If continuing with traditional EDI one can instead consider self billing instead of invoices. Self billing will erase unnecessary activities that arise if an invoice is not consistent with the delivery. This is avoided by self billing since here the buyer registers how many articles they received and pays for the agreed price.

To summarize this, the possibilities of automate transactions in a buyer-supplier relationship in the automotive industry; it was found several areas that still can be more efficient. Moreover, two technological drivers have been outlined. The analysis indicated that there are possibilities to further develop the Covisint portal to support more communication-based activities. Secondly, traditional EDI could be exchanged with web-EDI. Having a common place like Covisint or web EDI allow all actors to have access to the same information, and much information, that today is stored in folders. An evident conclusion from the analysis is that email is in some way inefficient since it does not add full security such as if the email reached the receiver, and that it often results in overflow of information.

Another aspect that was discussed in this thesis as having an impact on finding the most suitable electronic solution was the product and supplier classification. It was determined that strategic products and consequently strategic suppliers are best handled with EDI. Non-production material will probably continue needing suppliers worldwide to quote on equipment, while production material, or as in this thesis mentioned strategic products, will continue to need the basic supply relationships with a reduced number of suppliers.

It is perhaps not surprising that automated transactions save time and efforts that could be used in another field. Anyhow, the effects on time saving have to be evaluated against other consequences that arise, such as effects on relationships. From the results of the analysis it is possible to conclude that an automation of a purchasing process will have an effect on the buyer-supplier relationship, and also that the attributes of a relationship are dependent on each other. For instance, the level of trust will have an effect on willingness to share information, consequently the transparency. Low trust results in low degree of information sharing. The level of personal contacts is then crucial to the level of trust that will be present. For instance, decreased personal contact will demonstrably result in lower trust. This shows that all attributes in the relationship must be taken into consideration in an increased automation, since if one is affected it might affect the whole relationship and the attributes it involves. Proven in the analysis, the authors want to underline the personal contact to be central in a relationship. If the personal contact is replaced by too much automation, the study showed that it would decrease the ability to integrate due to that there is no face-to-face contact. It could further worsen the communication, since communication through automatic links would result in more misunderstandings than face-to-face communication. Since social interaction is the primary driving force for development of

trust, this would be affected negatively if the personal contact is taken away. E-procurement should therefore generate as a supportive tool in managing the purchasing process and at the same time the buyer-supplier relationships.

The concluding remark is that if a company wants to automate its purchasing activities to erase non value adding activities, it requires some sort of corporation between the buyer and supplier, this in order to manage and sustain supplier relationships. It is not problem – free to change purchasing routines and one must not forget the interdependency in relationships. However, as long as a company is aware of the consequences automation might lead to, then many problems that instead would arise along the way can be realised before, thus the authors argue for proactive thinking to be the key in the subject of matter.

7 Final Discussion

The authors will in this chapter put the results in a wider context and reflect over findings that have come forward from the study, but are yet not related to the purpose of this thesis. The chapter will also present a critical review of the study in its totality. Finally, the chapter will give guidance for future research.

The thesis has discussed important variables to take into consideration in automation, such as product and supplier type, and the relationship effects. However, the authors know that the variables studied in this thesis will not be enough to form the basis of an automation of a purchasing process. There are instead a number of issues that have to be resolved and equally effects to be considered to find the most suitable solution in a certain case. For instance, one fundamental decision is when to give priority to one or more suppliers considering automation.

In this thesis the authors have drawn the conclusion that companies should not rush into things such as automation. The analysis has proven that this would result in negative effects in the relationships. Much attention should therefore be paid to the question what degree of automation that can be allowed before it will have a negative effect on the relationship.

The motive with this study was to identify general purchasing activities and general electronic solutions, in order to create a frame that can be applicable in whichever purchasing organisation within the automotive industry, to some extent also to other manufacturing industries. All companies have a purchasing process and relations, and by using the theories in this study it should be possible to view some similarities.

7.1 Criticism of the frame of reference

A study of an automation of a purchasing process and its effects on relationships is a fairly broad purpose. Many variables should be taken into account in this purpose but the authors had to do limitations due to the timetable of carrying through the study. Still the authors consider the chosen theory to be a good base to initiate an automation of a purchasing process.

Considering the subject that is studied, some literature used may be taken as too old and out of date. Regarding the importance of buyer-supplier relationships and the characteristics of it has been around for many years and when comparing literature from today and a few years back there are not many new conclusions made. Therefore the authors do not think about this theory to be out of date. This argument holds for the purchasing process and its characteristics as well. Concerning E-procurement and electronic solutions there are theories used from early 2000. The technology do change rapidly, but even here it can be recognised that the basic concepts within E-procurement from a few years back still can be found in the literature of today, however with innovations in some areas, such as new standards in EDI. At the same time there might be electronic solutions from a few years back, which is still present and suitable, but might have been overlooked by some companies.

Moreover, the theoretical framework might be regarded as weak concerning possible electronic solutions to acquire. Since the authors are not any technical experts this study had no intention to make any deep study and explain the whole area of available electronic solutions, but instead point out well established and used solutions and how these could be improved instead.

To evaluate different purchasing portfolio models, the classical model of Kraljic (1983) have been used. Kraljic's model is based on two dimensions in order to classifying a firm's purchased products. Kraljic was according to Dubois and Pedersen (2002) the first to bring the portfolio models into the purchasing area, and it is seen as an important breakthrough in the field of purchasing and supply management. The portfolio concept has been recognised as having viable applicability in other fields, such as purchasing and marketing.

However this model is quite narrow and it have to be used together with other kinds of models to be able to broaden the analysis. Gadde and Snehota (2000) put forward that if we are to understand the interactive nature of customer- supplier relationships in business markets and their dynamics, the scope of analysis needs to be broadened. Kraljic's model is not related to the industrial network approach of the buyer - supplier implications, which is a limitation. Theories concerning relationships in a network context have been developed to expand the framework and concepts, which complement the understanding and give a broader view to the studied area (Gadde & Snehota, 2000).

The critics argue that the complexity of business decisions do not consent to this simple recommendation, and how is it possible to deduce strategies from a portfolio analysis that is based on just two basic dimensions (Dubois & Pedersen, 2002). By simplifying the issue of buyer-supplier relationships in this way, portfolio models fail to capture vital aspects, such as the context of networks (Dubois & Pedersen, 2002), and the interdependencies between products (Ritter 2000). However despite all of these theoretical problems, there is limited empirical proof to the usefulness of Kraljic's purchasing portfolio models (Carter, 1997; Gelderman & Van Weele, 2002).

The authors of the thesis have chose Kraljic's model in combination with other purchasing theories fore several reasons. First Kraljic's model emphasizes and recognizes the managerial perspective as an important issue within the purchasing area. In accordance to Dubois and Pedersen (2002), one other aspect is that it clearly makes it possible to distinguish between different purchasing situations, thereby give logical and clear recommendations how to take action.

7.2 Criticism of the methodology

The validity of this thesis has already been discussed in chapter 3 (Methodology). However, when coming to an end of the thesis there are some further reflections to make. The authors want to comment and defend the purpose chosen, and consequently the extent of the thesis. There has been an extensive empirical study reflecting both the buyer's and the suppliers' perspective on an automation of the purchasing process and its effects on buyer-supplier relationships. Furthermore, the theoretical framework is massive since the possibilities to automate have been studied from a broad perspective, which relates to product and supplier type, but it has also been studied from a detailed perspective, which relates to examine each activity. However, the authors do think that the reader can acquire the separate sections since the authors have a relatively clear structure. Although, one might argue that the thesis could have been more demarcated to only look at one perspective, or exclude the buyer-supplier relationship effects. However, the authors are of the opinion that the different parts were interrelated to each other, which explains why no part was excluded. Moreover, to achieve a high trustworthiness of the broad study, the authors believe that the extent on the theoretical framework and empirical findings were required. Since the scope of the thesis, the outcome has become more of an introduction to view how the

purchasing process can be automated, and not a practical guide how to conduct automation

The authors further consider that a qualitative approach have been an appropriate choice. By choosing a qualitative method, the authors have been able to get more precise and deep opinions from the respondents in order to analyse how the purchasing process can be automated and its effect on the buyer-supplier relationship.

7.3 Criticism of the empirical study

This study covered a broad purpose; to study an automation of a purchasing process and its effects on buyer-supplier relationships, viewed from both the buyers and three suppliers perspective. So due to the broad purpose and timeframe, this study is posed by several limitations. First, the result of the study relies on limited empirical data. The empirical data has been collected from four interviews at VCC and there is a possibility that the observations do not reflect the actual circumstances for the purchasing process. Moreover, the observations made at the suppliers are connected to one person's statements. Secondly, the study is limited to examine one car manufacturer and its purchasing process. Thereby, performing another study might obtain other empirical findings and other conclusions. Lastly, the authors have chosen to obtain an overall view of the purchasing process at VCC. The authors are aware of that it is not sufficient in order to find specific activities that can be automated. So this study is broad rather than deep.

The reason why this study included not only to analyse the purchasing process at VCC from the theory, but also from the buyer's and the suppliers perspective is motivated by that the authors find it interesting to analyse if their thoughts are supported by theory and if the buyer's and the suppliers' thoughts are in line with each other. So the purpose of it was not to facilitate for the analysis, the authors still have had a discussion around the subject and give their own comments of how an automation could be carried out.

7.4 Suggestions for future research

The results from this thesis indicated that developments of existing electronic solutions within a company, for instance, changing traditional EDI towards web-EDI, could be an option in an automation of the purchasing process. A suggestion to further research could be to evaluate web-EDI. It could be done by studying a specific company in the manufacturing industry that uses web-EDI towards their strategic suppliers and what the effects have been on both the managing of purchasing activities and the effects of the relationships, if there are any such cases. This could demonstrate if web-EDI is a solution to consider, and if it is, then in what activities it is most suitable.

Even though this study has addressed many interesting theories and concepts, on how a purchasing process could be automated, the study still deal with an overall view on how the purchasing activities could be automated concerning the main activities. However, this thesis did not penetrate each activity. The authors think that it would be interesting to study only one activity in the purchasing process and get deep into how this activity could be automated.

8 References

- Axelsson, B. (2004). Inköp – en komplex funktion. In L.A Samuelson (Red.), *Controller-handboken* (pp. 683-712). Stockholm: Industrilitteratur AB.
- Axelsson, B., & Wynestra, F. (2002). *Buying Business Services*. UK: John Wiley & Sons Ltd.
- Baatz, E. (1999). Online auctions start to pick up steam. *Purchasing*, 127(6), 46-56.
- Bannister, F. (2004). *Purchasing and financial management of information technology*. Oxford: Butterworth-Heineman.
- Block, M.P., & Block, T.S. (1995). *Business – to – Business market research: identifying, qualifying and understanding your customers*. United States of America: Richard D.Irwin.
- Bryman, A. (1997). *Kvantitet och kvalitet i samhällsvetenskaplig forskning*. Lund: Studentlitteratur.
- Bygdesson, J., Gunnarsson, L., & Onyango, M. (2000). *Elektroniska marknadsplatser B2B. Företagens verktyg för effektivare handel*. Stockholm: Exportrådet.
- Cap Gemini Ernest & Young. (1999). *E-procurement....Redefining the rules*. Gemini Consulting.
- Carter, J.R. (1997). Supply Positioning at SGX Corporation. *Best Practices in Purchasing & Supply Chain Management*, 1(3), 5-8.
- Carter, J.R., & Narasimhan. R. (1996). Is Purchasing Really Strategic?. *International Journal of Purchasing and Materials Management*, 32(1), 20-28.
- Chesher, M., & Kaura, R. (1998). *Electronic Commerce and Business Communications*. London: Springer-Verlag London Limited.
- Collis, J., & Hussey, R. (2003). *Business research: A practical guide for undergraduate and postgraduate students* (2nd ed.). New York: Palgrave Macmillan.
- Cox, A., Watson, G., Lonsdale, C., & Sanderson, J. (2004). Managing appropriately in power regimes: relationship and performance management in 12 supply chain cases. *Supply Chain Management*, 9(5), 357-371.
- Datar, S., Jordan, C., Kekre, S., Rajivi, S., & Srinivasan, K. (1996). New product development structures. *Journal of Product Innovation Management*, 13(), 325-333.
- Day, M. (2002). *Gover Handbook of Purchasing Management*. England: Day Publishing Limited.
- Deeter-Schmelz, D.R., Bizzari, A., Graham, R., & Howdyshell, C. (2001). Business-to-Business Online Purchasing: Suppliers Impact on Buyers Adoption and Usage Intent. *Journal of Supply Chain management*, 37(1), 4-10.
- De Toni, A., & Nassimbeni, G. (1999). Buyer-Supplier operational practices, sourcing, policies and plant performances: Result of an empirical research. *International journal of production*, 37(3), 597-619.
- Dobler, D.W., & Burt, D.N. (1996). *Purchasing and Supply Management* (6th ed.). Singapore: McGraw-Hill Companies, Inc.

- Dubois, A., & Pedersen, A.-C. (2002). Why relationships do not fit into purchasing portfolio models - a comparison between the portfolio and industrial network approaches. *European Journal of Purchasing and Supply Management*, 8(1), 35-42.
- Ejvegård, R. (1996). *Vetenskaplig metod*. Lund: Studentlitteratur.
- Emiliani, M.L. (2000). Business-to-business online auctions: key issues for purchasing process improvement. *Supply Chain Management*, 5(4), 176.
- Eneroth, B. (1984). *Hur mäter man vackert? Grundbok i kvalitativ metod*. Stockholm: Akademi-litteratur.
- Ericsson, D. (1969). *Inköpsfunktionens mål och metoder – En introduktion*. Malmö: Hermods.
- Ericsson, F. (2000). Elektronisk handel – En möjlighet till effektivare affärsprocesser och relationer. In P. Oscarson, F. Prenkert, & K. Åhlgren (Red.), *Elektroniska affärer i integrerade nätverk* (pp. 49-67). Linköping: UniTryck/LTAB Linköpings Tryckeri AB.
- Eriksson, L.T., & Wiedersheim-Paul, F. (1999). *Att utreda, forska och rapportera* (6th ed.). Malmö: Liber Ekonomi.
- Essig, M., & Arnold, U. (2001). Electronic procurement in supply chain management: an information economics-based analysis of electronic markets. *Journal of Supply Chain Management*, 37(4), 43-49.
- Fredendall, L.D., Hopkins, C.D., & Bhonsle, A. (2005). Purchasing's Internal Service Performance: Critical External and Internal Determinants. *Journal of Supply Chain Management*, 41(2), 26-38.
- Fredholm, P. (2002). *Elektroniska affärer* (5th ed.). Lund: Studentlitteratur.
- Gadde, L.E., & Håkansson, H. (1998). *Professionellt inköp* (2nd ed.). Lund: Studentlitteratur.
- Gadde, L.E. & Håkansson, H. (2001). *Supply Network Strategies*. UK: John Wiley & Sons Ltd.
- Gadde, L.E., & Snehota, I. (2000). Making the most of supplier relationships. *Industrial Marketing Management*, 29(), 305–316.
- Gelderman, C.J., & Van Weele, A.J. (2002). Strategic Direction Through Purchasing Portfolio Management: A Case Study. *International Journal of Supply Chain Management*, 38(2), 30-37.
- Giunipero, L.C., & Sawchuk, C. (2000). *e-purchasing plus: Changing the Way Corporations Buy*. United States of America: United States Copyright Act.
- Goldkuhl, G. (1998). *Kunskapande*. Linköping: Institutionen för datavetenskap Universitetet och Tekniska högskolan Linköping.
- Heinritz, S.F., Farrell, P.V., & Smith, C.L. (1986). *Purchasing-Principles and Applications* (7th ed.). New Jersey: Prentice Hall International Editions.
- Holme, I.M., & Solvang, B.K. (1997). *Forskningsmetodik – om kvalitativa och kvantitativa metoder*. Lund: Studentlitteratur.
- Håkansson, H., & Wootz, B. (1978). *Effektivt Inköpsarbete*. Stockholm: Norstedts.

- Hörndahl, R. (2000). *Den nya ekonomin – Elektroniska affärer i svensk industri*. Stockholm: Industriförbundet (rapport).
- Jonsson, S. (2004). *Strategic Sourcing in the Age of E-Business: Prerequisites in Manufacturing Industries*. Linköping: UniTryck.
- Kalakota, R., & Robinson, M. (1999). *e-Business – Roadmap for success*. United States of America: Addison – Wesley Longman, Inc.
- Keats, D. M. (2000) *Interviewing: a practical guide for students and professionals*. Buckingham: Open University Press.
- Kim, K.C., Im, I., & Kang, M.S. (2005). The Effects of IT on Supply Chain Management in the Automobile Industry. In N. Shin (Red.), *Strategies for Generating E – Business Returns on Investment* p. 86-101). United States of America: Idea Group Publishing (an imprint of Idea Group Inc).
- Kraljic, P.(1983). Purchasing must become supply management. *Harvard Business Review*, Sept./ Oct, 109-117.
- Kvale, S. (1997). *Den kvalitativa forskningsintervjun*. Lund: Studentlitteratur.
- Lamming, R. C., Caldwell, N.D., Harrison, D.A., & Phillips, W. (2001). Transparency in supply relationships: Concept and practice. *Journal of supply chain management*, 37(4), 4-10.
- Lankeford, W., & Johnsson, J. (2000). EDI via the Internet. *Information Management & Computer Security*, 8(1), 27-30.
- Larsson, P.D., & Kulchitsky, J.D. (1998). Single Sourcing and Supplier Certification. *Industrial marketing management*, (27), 73-81.
- Lekvall, P., & Wahlbin, C. (1993). *Information för marknadsföringsbeslut* (3rd ed.). Göteborg: IHM förlag.
- Lundahl, U., & Skärvad, P.H. (1992). *Utredningsmetodik för samhällsvetare och ekonomer*. Lund: Studentlitteratur.
- Macleod, M. (2000). Survival Tactics. *Supply Management*, 5(16), 36-37.
- McIvor, R., & Humphreys, P. (2005). The potential of B2B Commerce for Competitive Advantage. In N, Shin (Red.), *Strategies for Generating E – Business Returns on Investment* (pp. 102-124). United States of America: Idea Group Publishing (an imprint of Idea Group Inc).
- Merriam, S.B. (1994). *Fallstudien som forskningsmetod*. Lund: Studentlitteratur.
- Neef, D. (2001). *E-procurement: From Strategy to Implementation*. New Jersey: Prentice Hall, Inc.
- Noyce, D. (2002). eB2B: analysis of business-to-business e-commerce and how research can adapt to meet future challenges. *International Journal of Market Research*, 44(1), 71.

- Patel, R., & Davidson, B. (2003). *Forskningsmetodikens grunder. Att planera, genomföra och rapportera en undersökning*. Lund: Studentlitteratur.
- Ritter, Th. A. (2000). Framework for Analyzing Interconnectedness of Relationships. *Industrial Marketing Management*, 29(4), 317-326.
- Saunders, M., Lewis, P., & Thornhill, A. (2003). *Research methods for business students*. England: Prentice Hall.
- Skoog, U., & Widlund, C. (2001). *Proffs i inköp?! Skapa lönsambet i industriella inköp*. Falköping: Elanders Gummessons.
- Spens, K. (2001). *Managing critical resources through supply network management- A study of the finish blood supply network*. Helsingfors: Svenska handelshögskolan.
- Taylor, S.J., & Bogdan, R. (1984). *Introduction to Qualitative Research Methods – The search for meaning* (2nd ed.). New York: John Wiley & Sons Inc.
- Trent, R., & Monczka, R. (1998). Purchasing and supply management: Trends and changes throughout the 1990s. *International Journal of Purchasing and Materials Management*, 34(4), 2-11.
- Trost, J. (1997). *Kvalitativa intervjuer*. Lund: Studentlitteratur.
- Turban, E., Lee, J., King, D., & Chung, H.M. (1999). *Electronic Commerce – A Managerial Perspective*. New Jersey: Prentice Hall, Inc.
- Van Weele, A.J. (2002). *Purchasing and supply chain management: Analysis, Planning and Practice* (3rd ed.). UK: Thomson Learning.
- Vigoro, M. (1999). Are internet auctions ready to gear up?. *Purchasing*, 126(2), 85-87.
- Waurzyniak, P. (2001). Automotive network shifts into gear. *Manufacturing Engineering*, 126(1), 62-68.
- Weil, M. (2000). Back to the future. *Manufacturing Systems*, 18(10), 46-50.
- Whipple, J.M., & Frankel, R. (2000). Strategic Alliance Success Factors. *The Journal of Supply Chain Management*, 36(3), 21-28.
- Yin, R. K. (2003). *Case study research: Design and methods* (3rd ed.). London: Sage Publication.
- Yu, Z., Yan, H., & Cheng, T.C. (2001). Benefits of information sharing with supply chain partnerships. *Industrial management & Data systems*, 101(3), 114-119.
- Volvo Car Corporation. (2005). *Homepage*. Retrieved 2005-12-03, from <http://www.volvocars.com/AboutVolvo/CorporateInfo/default.htm>
- Kongsberg Automotive (2005). *Homepage*. Retrieved 2005-12-03, from <http://www.kongsbergautomotive.com/About%20us.aspx>
- Sapa (2004). *Homepage*. Retrieved 2005-12-03, from <http://www.sapa.se/templates/Page.aspx?id=246>
- Autoliv Inc. (2005). *Homepage*. Retrieved 2005-12-03, from <http://www.autoliv.se/>

Appendix 1: Interview guide to Volvo cars corporation

1. Personal questions

Name

Position

Area of responsibility

Name of the Company/ Industrial sector

How long have you been employed at Volvo Cars Corporation?

How long have you been working with purchase towards production suppliers?

How many people are involved in the relation with all the production suppliers?

What is your function in this relationship?

2. Examination of today's purchasing activities towards the strategic suppliers

Can you shortly describe how the communication (transfer of information) is pursued when Volvo Cars Corporation conduct business with the strategic suppliers?

With regard to the following activities:

- Selection of supplier
- Request for quoting
- Signing of contract
- Placing and dispatching the order
- Delivering and receiving of goods
- Payment

3. Electronic solutions in the present purchasing process activities towards the strategic suppliers

What do you mean when you talk about different electronic solutions in this business relationship?

What kind of electronic solutions do you use towards the strategic suppliers?

To what extent, or how, are these different electronic solutions applied on these strategic suppliers?

When are these different electronic solutions used?

4. The future automation of the purchasing process activities towards the strategic suppliers

What activities in this work attempt would you consider to be more automated?

How would you like this automation to be in that case?

What different electronic solutions could be utilized and suitable for this?

- Selection of supplier
- Request for quoting
- Signing of contract
- Placing and dispatching the order
- Delivering and receiving of goods
- Payment

Do you see any obstacles in an increased automation of the business relationship towards the strategic suppliers?

Has any further electronic solutions been recognized during the last 3-5 years in the business relationship between Volvo Cars Corporation and its strategic suppliers?

5. The relation between Volvo Cars Corporation and the strategic suppliers

What do you mean with long-term relations?

How important is it for you to have good relations with your suppliers?

How would you briefly describe your relationship with the strategic suppliers?

What kind of relationship do you prefer to have with the strategic suppliers? Why?

How is the balance of power today in this business relationship?

6. Relationship influence

What is power in your perspective?

Do you feel that you are powerful in the relation to the product suppliers?

Can you give some examples to when this power advantage makes any difference?

Would an increased automation in the business relationship between Volvo Cars Corporation and the strategic suppliers change the balance of power and the dependence in this relationship?

Do you consider that an automation would result in a deepened or weakened relationship to the product suppliers?

7. Other

What new trends do you see in the use of electronic solutions in the future?

What more possibility are there to explore in further automation of the relationship?

Is there anything more to add to this?

Appendix 2: Interview guide to the suppliers

1. Personal questions

Name

Position

Area of responsibility

Name of the Company/ Industrial sector

How long have you been employed at XXXX?

How long have you been working with sales at XXXX?

2. Product Classification

What types of products delivers your company to Volvo Cars Corporation?

How often does this sale of product X occur to Volvo Cars Corporation in comparison to other sales activities at your company? Is it high or low sales frequency?

How long have you been delivering product X to Volvo Cars Corporation?

Is there any other supplier that also manufactures similar products as these? That is how does the competition in this industrial sector for product X look like?

3. The relation between XXXX and Volvo Cars Corporation

What do you mean with long-term relations? How do you define it?

How important is it for you to have strong relations with your costumers?

How would you briefly describe your relationship with Volvo Cars Corporation?

What kind of relationship do you prefer to have with Volvo Cars Corporation? Why?

Does your business relationship contain a high or low grade of trust? In which way?

How much insight does XXXX have in Volvo Cars Corporation today?

What kind of information do you require form Volvo Cars Corporation?

How much insight has Volvo Cars Corporation in XXXX today?

What kind of information does Volvo Cars Corporation inquiry by XXXX?

How does the personal contact look like with Volvo Cars Corporation?

How is the balance of power today in this business relationship?

4. Electronic solutions in the sales process

What are your opinions to those costumers who would like to automate the transactions parts in the business relation?

What is your opinion to further automation of today's working-process when you construct business with Volvo Cars Corporation?

What activities in this working process do you consider to automate further?

How would you like this automation to be in that case?

Do you see any obstacles to carry through automation in a business relationship?

5. Relationship influence

Would a further automation in the business relationship between XXXX and Volvo Cars Corporation change the relationship? Specifically on the following factors:

- Integration
- Communication
- Security and Trust
- Transparency
- Personal Contact
- Power and Dependence

Would automation lead to a deepened or weakened relationship to Volvo Cars Corporation?

6. Other

What new trends do you see in the use of electronic solutions in the future?

What more possibility are there to explore in further automation of the relationship?

Is there anything more to add to this?

Appendix 3: Volvo cars corporation

Gustav Larson and Assar Gabrielsson founded Volvo in Gothenburg, Sweden, and the first car left the factory in 1927. In 1999 Ford Motor Company bought VCC and is since then entirely owned by Ford Motor Company. Along with Aston Martin, Jaguar and Land Rover, VCC is part of Ford's Premier Automotive Group (PAG). VCC and Volvo Group own the Volvo brand in a joint trademark company.

VCC has sales and service network covered in 120 countries, comprising 1400 sales outlets and service workshops around the world, including about 1,500 in Europe and 400 in North America. VCC's four largest markets are the USA, Sweden, UK and Germany. VCC has major plants in Sweden and Belgium and in the Netherlands. The production of vital components, such as engines, and body components, is mainly based in Sweden. There is also an engine plant in Belgium. VCC's headquarter and other corporate functions are based in Gothenburg, Sweden.

There are more than five million Volvo car owners around the world. Parts and service operations consist of more than 100 million business transactions carried out every year in the VCC organisation. Moreover VCC manage more than 7,500,000 order lines every year. For emergency situations the organisation in Gothenburg is open 24 hours a day. The total amount of employees, year 2004 was 27.575, of which Sweden amounted for 19.681. VCC was manufacturing 466,036 cars in 2004 at the manufacturing units in Sweden, Belgium and the Netherlands. There are also assembly units in South Africa, Thailand and Malaysia. In Sweden main components are manufactured at Volvo plants in Skövde (engines), Olofström (body components) and Floby (connecting rods and brake discs), and there are also an engine plant in Ghent, Belgium.

VCC functions as a "Center of Excellence for Safety" within the Ford Motor Company and as a "Center of Excellence for Telematics" within PAG. This means that safety research carried out by VCC has a strong influence on all car brands within the Ford Group. VCC mission statement is to create the safest and most exciting car experience for modern families, and the vision is to be the world's most desired and successful premium car brand (VCC, 1995).

Information was retrieved from Volvo Car Corporation (2005).

Appendix 4: Kongsberg automotive

Kongsberg Automotive AS (KA) was founded in 1987 out of the Automotive Parts Division of Kongsberg Våpenfabrikk. Production originally commenced in 1957 under an agreement with Volvo to produce brakes for Volvo trucks. Since then, many components and systems have been added to the product range, and in the early 1980s KA started developing its own products. KA develops, manufactures and markets systems for gearshift, clutch actuation, seat comfort, stabilising rods, couplings and components. As a tier one supplier, these products are delivered directly to VCC. However there are some products that are first delivered to another tier one supplier who in turn deliver to VCC. KA is headquartered in Kongsberg, Norway. They have manufacturing activities in Norway, Sweden, England, Poland, USA, Mexico, Brazil, Korea and China. KA also has sales and R&D centres in Germany and the United States, and sales offices in France and Japan.

The Group has almost 2,600 employees and annual sales in 2004 of approximately NOK 2.75 billion. The company has currently 18 units in 12 countries around the world. Leading customers include DAF, Mercedes-Benz, Opel, Peugeot/Citroen, Renault, Saab, Scania, Toyota and Volvo.

The vision and scope: The international automotive industry is our market. We aspire to maintain a leading position in gearshifts, seat comfort and commercial vehicle systems, focusing on business areas with considerable growth potential (Kongsberg, 2005).

Information was retrieved from Kongsberg Automotive (2005).

Appendix 5: Sapa

Sapa started in Vetlanda, Sweden in 1963. The two founders had a few years earlier recognised the potential in manufacturing of aluminium profiles, when they conducted on-site studies of competitive production methods. They brought this insight to Sweden and started production of profiles. Sapa is the world's third largest manufacturer of aluminium profiles, with special focus on creative aluminium solutions for its customers.

Sapa is one of a few companies established in Sweden the last decades that had been developed into a global company. After a long period of steady organic growth in 1976, Sapa was sold to Gränges. Electrolux, in turn, acquired Gränges, in 1980, who in 1997, made a spin off to its shareholders, and Gränges became an independent public company. The name was changed to Sapa in 2000.

Today, Sapa is an international company specialised in value-added aluminium profiles, building systems and aluminium heat-exchange strip, with 7,800 employees in 25 countries. The turnover was 14 billion SEK (2004). Production sites are located in Sweden, Denmark, Poland, England, Germany, the Netherlands, Belgium, France, Portugal, USA, China and Lithuania. Sales: In the above and in Austria, Estonia, Finland, Italy, Canada, Latvia, Lebanon, Norway, Switzerland, Slovakia, Spain, South Korea, Czech Republic, Turkey.

Sapa automotive is one business segments within Sapa, and the main customers are car and truck manufacturers and their subcontractors worldwide. The products they offer is innovative vehicle components based on extruded aluminium profiles. Sapa has since 1990 supplied VCC with products such as fuel distribution pipes, engine brackets, and load retainer slides. Sapa's global production resources also allow them to supply fully assembled components or sub-systems.

The business concept is to offer the market innovative, value-enhancing solutions based on profiles and strip in the lightweight material aluminium (Sapa, 2005).

Information was retrieved from Sapa (2004).

Appendix 6: Autoliv Inc.

Autoliv Inc. was started in 1997 as a merger of Europe's leading automotive safety company, Autoliv AB of Sweden, and Morton ASP (Automotive Safety Products), the leading airbag manufacturer in North America and Asia. Autoliv AB pioneered seat belt technology in 1956, while Morton ASP had been a leader in airbag development and was involved in the launch in 1980 of the first airbag system that became a commercial success. They have supplied VCC with products since 1960s-1970s.

In 1992, Autoliv began manufacturing textile cushions for driver airbags using its new one-piece-weaving (OPW) technology. This patented technology has turned out to be instrumental for the inflatable curtain, which was introduced in 1998. Throughout the 1980's and the 1990's, Autoliv expanded through a number of acquisitions of seat belt manufacturers. Today Autoliv Inc. is an international company with 34,500 employees in 30 different countries, distributed over about 80 wholly or partially owned manufacturing facilities. The turnover accounted for about 6,5 billion US Dollars (2004). Autoliv is the world's biggest supplier in its business segment. 50-70 percent of the total turnover in the Swedish business in Vårgårda is delivered to VCC.

Since major automotive manufacturers are continually expanding production into more countries, it is Autoliv's strategy to have manufacturing capacity where the major vehicle manufacturers have or are likely to set up production facilities. Autoliv's manufacturing is highly automated, which allows for low-cost production in high-wage countries where its largest customers are located. Autoliv's production lines are developed and manufactured by Autoliv itself. This strategy assures high quality as well as maintaining proprietary production technologies, and also standardisation in production.

The vision is to substantially reduce traffic accidents, fatalities and injuries, and the company missions are to create, manufacture and sell state-of-the-art automotive safety systems (Autoliv, 2005).

Information was retrieved from Autoliv Inc. (2005).