EVALUATING THE SUPPLY CHAIN OF
PLYMOVENT AB
- A REVIEW OF THE CUSTOMER’S ATTITUDE

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Master Thesis 2003:63
Linköping Institute of Technology
Department of Management and Economics
Industrial Economics
Evaluating the Supply Chain of PlymoVent – A Review of the customer’s attitude

This Master Thesis is a part of PlymoVent’s business to customer plot, with the aim to investigate how the consumers receive the services that PlymoVent provides.

With regard to PlymoVent’s business strategy and reference theory, the demands of how to receive and monitor a supply chain for a better customer satisfaction where targeted.

The findings refer to poor customer satisfaction due to obscure procedures in problem resolution and discrepancy handling, and vague transportation accuracy.

PlymoVent, Supply Chain Management, Logistics, Order Lead-time, Customer Care
Preface

In late August 2002, we were assigned to investigate whether or not PlymoVent faced problems of a logistics nature, as suspected by the senior management. It was the company’s belief that the lack in supply chain performance led to poor customer satisfaction, loss of sales, and damage to the company reputation. An evaluation of the current situation was deemed necessary, in order for PlymoVent to engage in the right measures to raise the customer satisfaction and supply chain performance.

Along discussions with our supervisors, Johan Ouchterlony and Jakob Rehme at the University of Linköping, a suitable purpose was gradually formed for this thesis.

The master thesis was carried out during four months in late 2002 and early 2003 for PlymoVent AB. It was with great anticipation and high ambition that the assignment was approached. Looking back a few months later, with the destination in sight, the study has been an educational journey; a journey which started with high hopes and ambitions, and ended with the courage of despair.

We would like to thank Lars-Erik Andersson for giving us the educational opportunity to conduct our Master Thesis at PlymoVent. It has been an interesting experience to learn the dynamics of PlymoVent and its business environment. It is our sincere hope that the study’s findings are taken serious and that they render a greater understanding of the supply chain characteristics, from a customer centric focus.

To the supervisors at the University, we gladly enjoy the acumen this project has given us and the help you have provided along the road.

We would like to thank all involved parties for your support during the ongoing process and assistance in keeping our eye on the trophy. The process has sometimes been hard and irritating, but you have all helped us to stay on track.

Finally we would like to thank our opponents, Tomas Almgren and Per Collin, who has given us thoughtful comments along the process and provided this thesis with remarks that makes it even better.

After 5 years spent at Linköping’s academic seat of learning, we have reached the very end of a long educational era and are about to embark on another one; learning never ceases.

Stockholm March 2003

Jesper Nilsson

Mathias Carlsson
Summary

Competition is getting stronger and stronger for every day. Suppliers have to cope with the fact that their customers are putting greater and greater demands on their services and product performance. Ever since Porter presented his famous Value Chain organizations begun to understand the true value of interaction which stretches outside the company borders. From the Value Chain stems the Supply Chain that contains all different logistics aspects that will enable a continuous flow of goods and information. The Supply Chain is a perfect tool for measuring the inbound characteristics and when working properly together in a seamless chain it will create a competitive advantage for the companies involved.

This Master Thesis focuses on the Supply Chain’s Logistics Service Elements and how they together can help a company to supply its customers with great products and profound service. PlymoVent is the company that initiated the thesis and enabled the study, which findings and measures hopefully will help PlymoVent in raising their customer service level.

PlymoVent AB develops, manufactures and markets products that deliver fresh air to the working area of human workers, i.e. products that are aimed at evacuating hazardous air pollutions. The company is suppliers of different markets such as the electronic-, welding-, mechanical-, plastic-, food processing-, and pharmaceutical- and chemical market. PlymoVent has its headquarters situated in Malmö, Sweden, and its plant in Lycke. As the environmental policies all over the world strive towards a pollution free working area, the demands for fresh air products grow instantly. In order to meet the market demands on international basis PlymoVent has issued a study to verify their performance towards its customers.

Primary raised targets from PlymoVent have been problems regarding the logistical organization such as; how to meet its customers with faster and more accurate deliveries. Therefore the focus on this study will be on how the customers evaluate PlymoVent as a supplier regarding the logistics service elements, derived from theories and interviews. Foremost primary data has been collected from actors in the supply chain, that enable to map the different processes –or factors that have impact on the overall service impression of PlymoVent.

Primary information, that enable mapping of the performance and further gives way for an analysis, is collected through an electronic questionnaire sent out to customers in the Swedish, German and American markets. This questionnaire has been developed throughout the process as theories was introduced and studied. The analysis is carried out in a comparative way and concludes with a correlative analysis that marks the critical factors.

When evaluating the supply chain, different factors that embrace the overall performance of PlymoVent have been derived. Each one of them follows its own characteristic area and contains several subjects. The factors are divided as follows; Product Information, Pre Order Placement, Post Order Placement, Shipment Accuracy, Shipment Content, Product Quality, Discrepancy Reports, Contact Quality, and Problem Resolution Quality.

To conclude the analysis these nine factors’ correlations towards the overall impression of PlymoVent performance have been measured. It has showed that it is a wide spread in both correlation and performance. To visualize the result of the analysis a matrix is presented.
where all the factors get a rating; performance vs importance. Divided into three areas, the ratings delivered are; good performance, poor performance, and peripheral. Factors that correlate to a certain degree have such an impact on the overall impression that they need certain and immediate care.

In order to establish PlymoVent as a competitive and respectable supplier on the market, the company must strive for high performance rating on all factors. However, the peripheral factors and their respective recommended measures should not be given any priority when considering improving the supply chain performance. The correlative matrix visualizes the result of the survey and gives PlymoVent an understanding of prioritized areas to enhance both the supply chain performance and the customer satisfaction.

The result of the study indicates that PlymoVent has problems with its Discrepancy Report, Post Order Placement, Problem Resolution, and Shipment Accuracy. Areas that perform well today are Contact Quality and Pre Order Placement. Furthermore, the survey indicates that PlymoVent provides high product quality with competitive pricing, whereas the service provided by PlymoVent seems to be lacking in performance. PlymoVent must find a way to enhance the level of service in order to be able to offer a complete product package to the customer.

In order to raise the supply chain performance and the customer satisfaction level, PlymoVent are recommended to take the following measures, presented in a prioritized order:

**Prioritized Improvement Areas**
- Revise the Claims Errand Policy.
- Implement Problem Resolution Procedures
- Evaluate the Handling of Discrepancy Reports.
- Evaluate the American Warehousing Management.
- Evaluate the Inventory Control and the Forecasting of Demand.
- Engage in a Closer Relationship with the Third Party Logistics Provider.
- Implement an Order Monitoring System.

**Peripheral Factors**
- Ensuring Technical Requirements.
- Prepare a Systems Designer’s Handbook.
- Make Greater Use of the Homepage.
- Making the Customers Aware of the Information at Hand.
- Compare Shipping Procedures.
- Establish Sales Personnel Symposium.

The changes presented will help PlymoVent in raising their supply chain performance and the customer service level. The measures are all derived from the customers’ own needs and wants. Hence, the customers will perceive them as enhancing the value of the product. Careful preparation and implementation of the measures will enable PlymoVent of the full enjoyment of a sound management in a sound supply chain. PlymoVent is urged to conduct a follow-up survey, to find out how the changes affected supply chain performance, and further improving the supply chain, according to the customer centric continuous supply chain improvement cycle, Figure 11.
Reader’s Guideline
The study is fairly extensive and different sections of the Master’s thesis may serve different readers’ interests. Thus, a guideline is presented according to different interests identified. The guideline is intended to be helpful when the reader gets acquainted to the study; it serves as a compass and a map.

All Readers
Before you start dusting down your old English dictionary, try your luck with our Glossary. It explains terms often used and provides a Swedish translation of the word, since a big share of the potential readers are Swedish.

Readers under Stress
The summary is truly a compressed version of the study. It states the background, execution of study, findings, and recommendations. If anything arouses curiosity; the reader is urged to look up the respective section and engorge the information at hand. The section Outline provides a brief explanation of the content in the chapters, which directs the reader to whatever arouse curiosity.

Readers Looking for the Diamond in the Rough
The study resembles a managerial handbook in maintaining a well-kept supply chain, complete with a case study. The case study aside; based on the literature review and the authors’ own experiences led to a questionnaire, which the survey was based upon. Similar studies can benefit from this report, if they use it as the point of departure. The supply chain improvement cycle; the questionnaire, and the correlative matrix are all worthy of examination.

Readers Concerned Only with PlymoVent Findings
Readers who only are interested in the findings of the evaluation of PlymoVent’s supply chain are urged to read chapters 5 through 8.

Cover-to-Cover Readers
Enjoy the acumen of 4.5 years of studying at Linkoping University, Master’s Programme.
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Introduction

This chapter will introduce the reader to the subject of this Master’s thesis. First, a background to the study is presented with the aim to provide an understanding of why the thesis is written and what particular issues will be dealt with. Thereafter, the purpose is stated and the chapter ends with an outline.

Background

Corporations have turned increasingly to global sources for their supplies. This globalization of supply has forced companies to look for more effective ways to coordinate the flow of materials into and out of the company. Key to such coordination is an orientation toward closer relationship with its suppliers (Mentzer et al, 2001). Furthermore, companies in particular and supply chains in general compete more today on the basis of time and quality. Getting a defect-free product to the customer faster and more reliable than the competition is no longer seen as a competitive advantage; but simply as a requirement to be in the market. Customers are demanding products consistently delivered faster, exactly on time, exactly the right amount and with no damage. Each of these demands necessitates a closer coordination with suppliers, distributors, and end-users.

Customer service represents a major component of the customer’s perspective of product value. A firm’s policies pertaining to customer service must be consistent with a firm’s long-range plans and must be developed in consideration of customer requirements and the firm’s resources. Companies today recognize the importance of high levels of customer service. One of the most difficult tasks of providing that service is often the determination of what the customer truly values. Traditionally, logistics organizations have done an excellent job of managing and moving inventory – the operational aspects of logistics. However, logistics managers often struggle to identify the value-added activities that customers desire – the customer value aspects of logistics. In other words, does the customer value (or even notice) this excellent logistics operational management? In the pursuit of competitive advantage, it is increasingly important to identify the demands and values of current and potential customers.

Kane and Fawcett (1993) suggest that manufacturers best able to contribute to the needs and desires of their customers will gain competitive advantage. Achieving competitive advantage in the global marketplace requires the development of a manufacturing system that begins with customer requirements. Every aspect of the organization must be directed at serving the customers while continuously striving to improve product value in the marketplace and eliminating anything in the system that does not add value to the product.

PlymoVent is an organization that is facing new demands from its board of directors. Demands of higher profitability have been raised, and as a result of this the company is looking at ways to cut costs, and at the same time improve customer satisfaction. The senior management has identified the company’s supply chain to be an area, where improvements could help the organization meet the new demands.

PlymoVent has never surveyed their customers, concerning their logistical needs and wants; thus the company’s marketing knowledge is only tacit. However, PlymoVent experiences that they encounter problems with its order fulfilment process, which results in loss of orders and low customer satisfaction. A strategic decision towards a managerial supply chain approach
has been taken. Thus, profound knowledge of the customers’ apprehension of the different logistics service elements is needed. Therefore, a customer oriented investigation has been issued, with the purpose that the outcome will provide PlymoVent with the information necessary to formulate a strategy for its supply chain management.

**Purpose**

The purpose of this master thesis is to determine the performance of the supply chain of today; based on the customers’ apprehension of different logistics service elements, and also of what importance they are to the customers.

**Outline**

This section directs the reader towards the different parts of the Master Thesis. The outline will serve as a briefing for those who want to choose among the different chapters.

1. **Introduction**

   The background to why this Master Thesis is conducted and the problems are presented along with the purpose.

2. **Presentation of PlymoVent AB**

   The background of the company PlymoVent AB is presented, with its history, organization, markets, product, and present situation. An analysis of the problems the company is facing today concludes the chapter.

3. **Frame of Reference**

   Relevant theories are presented in a broad literature study that works as the basis to define useful terms to help explain the purpose. Further, the Frame of Reference explains the importance of the linkage between logistics and marketing in achieving great customer value.

4. **Specification of Task**

   The purpose is broken down into specific research questions with the help of the presented theories. The questions lay the ground for the developed questionnaire, presented in Appendix A.

5. **Methodology**

   General ethics and scientific approaches when conducting an investigation of this kind are discussed. Information on how this thesis was practically carried out is presented.

6. **Evaluation of the Supply Chain**

   Presentation of the customers’ evaluation of the supply chain performance; based on
the market analysis the data is explained thoroughly and raised problems are stated and summarized.

7. Performance vs. Importance

The importance of the customers’ needs is linked to the actual performance of the PlymoVent supply chain. Further analysis regarding the problems and issues are introduced.

8. Recommendations

The results of the survey and the conclusions drawn are presented in accordance to the data collected. Necessary measures to take in order to raise the performance of PlymoVent’s supply chain are presented. The supply chain alterations are presented in an action plan, which will give PlymoVent guidance in how to proceed with improving the supply chain. Future actions/studies closely connected to this report and who would serve as complements to this study are presented.
**Presentation of PlymoVent AB**

*This chapter serves as a brief introduction to the company itself and the environment it exists in. First, PlymoVent AB is presented, followed by a presentation of the markets the company is serving. The chapter ends with a concise account of the problems from which the purpose of the study is derived.*

**PlymoVent AB**

PlymoVent AB develops, manufactures and markets products that deliver fresh air to the working area of human workers, i.e. products that are aimed at evacuating hazardous air pollutions. The company is suppliers of different markets such as the electronic-, welding-, mechanical-, plastic-, food processing-, and the pharmaceutical- and chemical market. PlymoVent has its headquarters situated in Malmö, Sweden, and its plant in Lycksele. The company also holds five, completely owned, subsidies in France, England, Germany, USA and Canada.

[Figure 1. The figure shows PlymoVent’s HQ and subsidies (blue), and distribution companies (red).]

PlymoVent is an organization with some 180 employees, where 105 work in Sweden (75 at the plant in Lycksele). The company has an estimated turnover (2002) of MSEK 250 where some MSEK 25 are assigned the Swedish market. North America is the single largest market with a total turnover of MSEK 150.

**History**

The company was first founded in the seventies but went bankrupt in 1984. From the very beginning the manufacturing plant was situated in Lycksele, the very northern part of Sweden. The headquarters with its sales departments for both the Swedish and the international markets was situated in Malmö, Sweden.

In 1984 when the company went bankrupt, two employees took over the business. The two, Gunnar Lindeström and Jan-Olof Fransson, worked within the marketing and production area. They started to develop adjustable absorption arms together with filters for dust polluted air, which were the main products. Later, the company developed filter systems for oil mist and vehicle exhaust to be used within the automotive manufacturing industry and automotive service industry. Products for the industry for emergency vehicle were also developed, where the systems worked as exhaust extraction systems in fire departments.

In the late eighties and early nineties, due to new market conditions and as a mean to better penetrate markets, PlymoVent established subsidies in Germany, United Kingdom, France, USA and Canada. The subsidies today hold a minor stock inventory for the market it is
serving. The organization suffered economical setbacks and had to turn to external financiers. In June 2000 MVI (Merchant Venture Investments) and Litorina Kapital together made substantial investments to enhance the financial position of PlymoVent. Today the ownership is divided in thirds among the three parties; MVI, Litorina and Gunnar Lindeström.

**Organization**

The headquarters of PlymoVent is situated in Malmö, the southern part of Sweden, where the management, the economic department, and the sales-and the marketing department reside. The headquarters handles strategic responsibilities such as; sales- and marketing responsibilities; and the domestic market sales function, it also answers directly to the stock holders, i.e. the owners.

The sales organization is divided into the Swedish market (Svensk Försäljning) and the international market, which embrace the markets where no subsidiary is represented. For the specific subsidiary markets, the subsidiary itself handles the sales and place orders directly to the plant in Lycksele. There are four people handling the complete systems solutions sales in Sweden and the domestic market is divided amongst the four. They are also responsible to educate the wholesalers of PlymoVent’s products.

Manufacturing of PlymoVent’s products takes place in the plant in Lycksele. Placed orders are managed by an order organizer in Lycksele, which in turn forwards the orders to the production planners. The order fulfillment process can be viewed in Figure 2.

![Figure 2. The figure shows the order fulfillment process.](image)

**Ventilation products**

Today there is a better understanding and a greater demand for fresh and clean air. In facilities
where production activities form mists and fumes of different kind there is a need for a better working environment. The working environment in industries of today offers a potentially big, global market. Where industries used to let out the fumes into the working environment, for the general ventilation system to take care of, the solution of today is to focus on the source of exhaustion to directly capture the polluted air for cleaning. The market consists of companies that have needs ranging from only one product to complete system solutions; PlymoVent has the knowledge and products to satisfy both needs. PlymoVent’s four major divisions of product segments are; Industry, Top Grade, Vehicle Exhaust and Fire House. The wide industry range of products solves air pollution problems in all types of manufacturing. The Vehicle Exhaust line eliminates exhaust emissions wherever vehicles are run indoors and the Fire House systems guarantees Clean Fresh Air in fire- and emergency vehicle stations. In all the areas PlymoVent offers projecting, sales, installation, service, maintenance, and guarantee.

Customers

The customers of PlymoVent are mainly composed of manufacturing-, service-, and public organizations. In the USA, Fire Departments are one of the most important customers. During the last years they have become a most considerable customer of the PlymoVent organization. Sixty per cent of the departments investing in clean air solutions choose products from PlymoVent. Manufacturing industry is another big customer segment. The welding industry has in the past been a large customer of the industry products. The problem for welding companies is the fume produced in the welding process, which is best removed with a local extraction system, and not using the general ventilation. In machining environments, the problem is the generated oil mist which is removed in the same way. New customers, still of minor importance, are the chemical- and pharmaceutical organizations. They demand a better quality level that PlymoVent provide with its Top Grade products. At present time, the Top Grade range has to be further developed to please the new customers.

Markets

PlymoVent’s Line of Business

PlymoVent is today competing at an international level. Its potential customers are mostly

![Image](image-url)
manufacturing companies within electronic-, welding-, mechanical-, plastic-, food processing-, and the pharmaceutical- and chemical market. Also fire departments, mostly in the USA, are a substantial customer of its products. The product range enables customer of practically every size to buy its products since everything from a simple tube to a complete system can be bought.

In Sweden there is one other competitor, Nederman, which competes on the same level. Nederman is situated with its headquarters, assembly plant, and distribution center in Helsingborg, with the sales organization in Eskilstuna. Like PlymoVent, Nederman has several subsidies in different countries in Europe, and one in the USA. In Europe, especially Germany, there are several manufacturers of similar products but none that can be categorized as an equal regarding the system solutions that PlymoVent offers.

After some efforts on the American market PlymoVent has developed a close relationship with the public authorities for the Fire Departments. They deliver Fire House products to the majority of the fire departments that invest in clean environmental air.

**The Domestic Market**
The domestic market stands for approximately ten percent of PlymoVent’s overall turnover. Historical PlymoVent has been working in different ways. During the last years the market has been penetrated by in-house sales personnel. PlymoVent believed that they were able to serve the market themselves, and four sales persons have had the responsibility to serve the market with direct sales to customer. This was first adopted in order to acquire a greater profit margin for each product, but declining figures have made PlymoVent look for a new strategy. Today, Ahlsell has been acquired as the main wholesaler in Sweden, which will enable PlymoVent to reach over seventy of Ahlsell’s stores. The customers are offered over night shipment of standard products. In this way PlymoVent opens the market to new customers and at the same time enhances the service to its customers.

**The International Markets**
PlymoVent has a total of five subsidies, as mentioned earlier, located in Germany, United Kingdom, France, Canada, and USA. From the beginning they worked closely together with local distributors. In the past, these markets have generally showed weak figures. Due to the small and feeble distributors the sales have not met the objectives set and changes had to be done. From the beginning of 2002 a new philosophy in the matter of distribution has been adopted in the subsidiary markets. More powerful distributors have been connected to PlymoVent and indications point at increased sales figures only after six months. The markets where PlymoVent has no subsidiary represented are supplied by the export office in Malmö. In the near future this feature will be represented in a new company called PlymoVent International. There will be no significant difference from the work today. However, more powerful distributors will be established on specified markets.

**Problem Analysis**
As mentioned earlier in chapter Introduction, PlymoVent experiences that they encounter problems with its order fulfilment process, which result in loss of orders and low customer satisfaction. Furthermore, PlymoVent has never surveyed their customers, concerning their logistical needs and wants, and thus the company’s marketing knowledge is only tacit. This tacit knowledge find its expression in differing opinions, amongst the management of
PlymoVent, concerning which logistics processes that demands the most and immediate attention, in order to raise customer satisfaction. A managerial supply chain approach has been identified as a strategic direction to be taken, as to overcome the problems. In order to formulate a supply chain strategy, which supports the true, and not the expected, logistical needs and wants of PlymoVent’s customer, the management of PlymoVent has issued an investigation, in order to fully explore the possibilities of raising the customer service level and cutting costs. As such, the investigation is meant to be used as source material when redesigning the present supply chain in a cost effective- and customer preferred manner.
Frame of Reference

Relevant theories are presented in this broad literature study that will work as the basis to define useful terms and to help the explanation of the purpose. Further, this chapter will explain the importance of the link between logistics and marketing in achieving a great customer value.

Logistics
Swiss Baron Antoine Henry Jomini, in his 1838 Summary of the Art of War, made the first significant use of the term “logistics” by defining it as the practical art of moving armies. Admiral Henry Eccles, in his 1959 book, Logistics in the National Defense, states that the word “logistics” is an abstraction like the other abstractions of “strategy, tactics, economics, or politics.” Thus, logistics is not susceptible to a single, simple, and permanent definition, see Table 1. It is a broad field of endeavour consisting of many interdisciplinary activities … that, when applied together, constitute the art and science of logistics. John Mosher adds that logistics is an ancient art and an emerging science. (Defense Acquisition University, 2001)

<table>
<thead>
<tr>
<th>Definitions of the Term Logistics</th>
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<tbody>
<tr>
<td>Logistix Partners Oy, Helsinki, FI, 1996</td>
</tr>
<tr>
<td>(business definition) Logistics is defined as a business planning framework for the management of material, service, information and capital flows. It includes the increasingly complex information, communication and control systems required in today's business environment.</td>
</tr>
<tr>
<td>JCS Publication, No. 1, 2002</td>
</tr>
<tr>
<td>(military definition) The science of planning and carrying out the movement and maintenance of forces…. those aspects of military operations that deal with the design and development, acquisition, storage, movement, distribution, maintenance, evacuation and disposition of material; movement, evacuation, and hospitalization of personnel; acquisition of construction, maintenance, operation and disposition of facilities; and acquisition of furnishing of services.</td>
</tr>
<tr>
<td>Websters Dictionary</td>
</tr>
<tr>
<td>The procurement, maintenance, distribution, and replacement of personnel and material.</td>
</tr>
<tr>
<td>American Heritage Dictionary</td>
</tr>
<tr>
<td>1. The branch of military operations that deals with the procurement, distribution, maintenance, and replacement of materiel and personnel. 2. The management of the details of an operation. [French logistiques, from logistique, logic (perhaps influenced by loger, to quarter), from Medieval Latin logisticus, of calculation.]</td>
</tr>
<tr>
<td>The process of planning, implementing, and controlling the efficient, effective flow and storage of goods, services, and related information from point of origin to point of consumption for the purpose of conforming to customer requirements.” Note that this definition includes inbound, outbound, internal, and external movements, and return of materials for environmental purposes.</td>
</tr>
</tbody>
</table>
Table 1. The table shows various definitions of the term Logistics, compiled and adopted from World of Logistics (2002).

Encyclopædia Britannica suggests that logistics in business is the organized movement of materials and, sometimes, people. The term was first associated with the military but gradually spread to cover business activities. Logistics implies that a number of separate activities are coordinated. In 1991 the Council of Logistics Management, a trade organization based in the United States defined logistics (and for the purpose of this thesis and the given literature review, this definition will be accepted and used throughout this paper) as:

“…the process of planning, implementing, and controlling the efficient, effective flow and storage of goods, services, and related information from point of origin to point of consumption for the purpose of conforming to customer requirements.”

The last few words limit the definition to business enterprises. Logistics also can be thought of as transportation after taking into account all the related activities that are considered in making decisions about moving materials. Thus, logistics includes all of the management activities involved in making a product and getting it to the client, beginning with the flow of materials from the initial source and ending with delivery to the end user. In the broadest definition, the logistics system includes the total flow of products, from the acquisition of raw materials to the delivery of finished goods to users, as well as the related flow of information that both controls and records the movement of those products. Central to a successful logistics system is a customer service focus. A logistics system strives to provide excellent customer service by ensuring the quality of three basic elements: storage, transportation, and service delivery points. As part of a customer-service focus, a logistics system must fulfill the following seven rights:

“...the right product in the right amount at the right place at the right time for the right customer in the right condition and at the right price”. (Bloomberg, Murray & Hanna 1998)

From acquiring raw materials to delivering finished products to end users, logistics operations include all the activities along the logistics cycle, or, as commonly referred to in logistics circles, from “the suppliers’ supplier to the customer’s customer.” This is the supply chain. In a well-functioning supply chain, at every link, each unit should treat the next unit as a customer, always focusing on service to the ultimate customer, the end user or client. Effective supply management is achieved when customers are the focal point for all logistics
operations. For further explanation on the term supply chain, and its management, the reader is directed to the chapter Supply Chain Management.

A well-functioning supply chain staff consciously strives to anticipate and satisfy customers’ needs. Supply chain managers, in addition to their primary customers, also have important intermediate customers, each with special needs and expectations.

Service providers are the final link in the long supply chain that stretches from manufacturers to customers. Because they directly link logistics operations to the ultimate customer, service providers are the most important “intermediate customers.” Service providers must be given the products they need. Their fundamental concern is quality of their service, and they understand the logistics system’s contribution to their ability to provide such service. Service providers need the logistics system to deliver a dependable supply of quality products and other supplies for their clients, which means they need convenient and regular replenishment of stock with minimal additional work.

Warehouses and stores in the distribution chain are also intermediate customers that demand logistics systems resources (staff, storage space, and transport), regular and predictable re-supply of all products from the next higher level, and technical support and problem-solving assistance, when needed. The uninterrupted flows of information between the different entities within the logistics system, such as accurate data on stock levels etc, are a necessity for a functional logistics system. While a logistics system may be required to satisfy a variety of internal or intermediate customers, the most successful supply chains unwaveringly focus on satisfying end users.

**Domestic**

The discussion to this point has emphasized domestic logistics, i.e. which is carried on within the borders of one nation. However, companies of today often compete on a global market, which leads to a more complicated matter; international logistics. It involves movements across borders, and these movements are considered more complex for several reasons. First, there are delays at the border. Goods must be inspected, and often import duties, or charges, are assessed. Additional inspections at the border may be conducted to determine whether the goods meet that nation’s health, safety, environmental protection, and labelling standards. Most nations of the world, although not the United States, insist that metric measurements be used. Many documents are required for international shipments, and often the logistic efforts involved in assembling the documents are more challenging than those in moving the product. Usually all documents must be present at the point where the goods are passing through the importing nation’s customs and inspection posts. Many international movements go aboard ship, and the process of moving through ports and being at sea is more time-consuming. Differences between time zones limit the hours when communications can take place.

**Supply Chain Management**

An interrelated term to logistics is *Supply Chain Management* (SCM). This chapter defines the concept of the supply chain and discusses the evolution of supply chain management. Firms can no longer effectively compete in isolation of their suppliers and other entities in the supply chain. Interest in the concept of supply chain management has steadily increased since the 1980s when companies saw the benefits of collaborative relationships within and beyond their own organization (Lummus & Vokurka 1999).
There are many reasons for the popularity of the concept. Specific drivers may be traced to trends in the competing on the global arena; an emphasis on time and quality-based competition, and their respective contributions to greater environmental uncertainty. Corporations have turned increasingly to global sources for their supplies. This globalization of supply has forced companies to look for more effective ways to coordinate the flow of materials into and out of the company. Key to such coordination is an orientation toward closer relationship with its suppliers (Mentzer et al, 2001). Furthermore, companies in particular and supply chains in general compete more today on the basis of time and quality. Getting a defect-free product to the customer faster and more reliably than the competition is no longer seen as a competitive advantage; but simply as a requirement to be in the market. Customers are demanding products consistently delivered faster, exactly on time, exact amount and with no damage. Each of these demands necessitates a closer coordination with suppliers, distributors, and end-users.

Despite the popularity of the term Supply Chain Management, both in academia and practice, the term itself leaves considerable confusion as to its meaning. It has been noted that discussions of SCM often use complicated terminology, thus limiting the reader’s understanding of the concept and its effectiveness for practical application (Ross 1998). On the other hand, the definition of Supply Chain seems to be more comprehensible and more occurring than the definition of Supply Chain Management. La Londe and Masters (1994) proposed that a supply chain is a set of firms that pass materials forward. Normally, several independent firms are involved in manufacturing a product and placing it in the hands of the end user in a supply chain. Figure 7 illustrates this definition of supply chain.

Lambert et al (1998) gives a similar definition of supply chain; the alignment of firms that brings products or services to market. Both of these definitions include the final consumer as part of the supply chain.

Another definition views the supply chain as the network of organizations that are involved, through upstream and downstream linkages, in the different processes and activities that produce value in the form of products and services delivered to the ultimate consumer (Christopher, 1992). In other words, a supply chain consists of multiple firms, both upstream (i.e. supply) and downstream (i.e. distribution), and the ultimate consumer.

Given these definitions, for the purpose of this thesis, a supply chain is defined as:

“...a set of three or more entities (organizations or individuals) directly involved..."
in the upstream and downstream flows of products, services, finances, and/or information.”

Figure 8 shows a conceptual supply chain, or rather how it could be viewed upon. Note that the figure also shows the complexity an ultimate supply chain can reach. In some cases there might be a third party financial provider providing financing, assuming some of the risk, and offering financial advice; a third party logistics provider may be performing the logistic activities between two entities; an external market research firm may be providing information about the ultimate customer to the organization; supplier’s supplier, and customer’s customer, etc. The interrelations between the different entities acting within the supply chain quickly becomes rather complex. This illustrates how some of the many functions that complex supply chains can do and perform. However, it is important to realize that with this definition it is a fact that the supply chain exists, as a phenomenon of business, whether they are managed or not. Thus, we draw a definite distinction between supply chains as phenomena that exist in business and the management of those supply chains. The former is simply something that exists, often also referred to as distribution channels, while the latter requires managerial efforts by the organizations within the supply chain.

![Ultimate Supply Chain](image)

Figure 5. Ultimate Supply Chain, adopted from Mentzer et al (2001).

Although definitions of SCM differ across authors, see Table 2, they can be classified into three categories (Mentzer et al. 2001);

- a management philosophy,
- implementation of a management philosophy, and
- a set of management processes.

The alternative definitions and the categories they represent suggest that the term supply chain management present a source of confusion for those involved in researching the phenomena, as well as those attempting to establish a supply chain approach to management. Research and practice would be improved if a single definition were adopted (ibid).
<table>
<thead>
<tr>
<th>Author(s)</th>
<th>Definition of Supply Chain Management (SCM)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monezka, Trent and Handfield (1998)</td>
<td>SCM requires traditionally separate materials functions to report to an executive responsible for coordinating the entire materials process, and also requires joint relationships with suppliers across multiple tiers. SCM is a concept, “whose primary objective is to integrate and manage the sourcing, flow, and control of materials using a total systems perspective across multiple functions and multiple tiers of suppliers.”</td>
</tr>
<tr>
<td>La Londe and Masters (1994)</td>
<td>Supply chain strategy includes: “…two or more firms in a supply chain entering into a long-term agreement; …the development of trust and commitment to the relationship; …the integration of logistics activities involving the sharing of demand and sales data; …the potential for a shift in the locus of control of the logistics process.”</td>
</tr>
<tr>
<td>Stevens (1998)</td>
<td>“The objective of managing the supply chain is to synchronize the requirements of the customer with the flow of materials from suppliers in order to effect a balance between what are often seen as conflicting goals of high customer service and low inventory management, and low unit cost”</td>
</tr>
<tr>
<td>Houlihan (1998)</td>
<td>Differences between supply chain management and classical materials and manufacturing control: “1) The supply chain is viewed as a single process. Responsibility for the various segments in the chain is not fragmented and relegated to functional areas such as manufacturing, purchasing, distribution, and sales. 2) Supply chain management calls for, and in the end depends on, strategic decision making. ‘Supply’ is a shared objective of practically every function in the chain and is of particular strategic significance because of its impact on overall costs and market share. 3) Supply chain management calls for a different perspective on inventories which are used as a balancing mechanism of last, not first resort. 4) A new approach to systems is required, integration rather than interfacing.”</td>
</tr>
<tr>
<td>Jones and Riley (1985)</td>
<td>“Supply chain management deals with the total flow of materials from suppliers through end users…”</td>
</tr>
<tr>
<td>Cooper et al. (1997)</td>
<td>Supply chain management is “…an integrative philosophy to manage the total flow of a distribution channel from supplier to the ultimate user.”</td>
</tr>
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</table>

Table 2. The table shows the different author’s definition of the term Supply Chain Management respectively (Mentzer et al. 2001).

For the purpose of this thesis, and based on the literature review, the definition of supply chain management will be as Stevens (1998) defined it:

“The objective of managing the supply chain is to synchronize the requirements of the customer with the flow of materials from suppliers in order to effect a balance between what are often seen as conflicting goals of high customer service and low inventory management, and low unit cost”
As a philosophy, SCM takes a system approach to viewing the supply chain as a single entity, rather than as a set of fragmented parts, each performing its own function (Ellram & Cooper 1990; Houlihan 1988; Tyndall et al. 1998). In other words, the philosophy of supply chain management extends the concept of partnerships into multiform effort to manage the total flow of goods from the supplier to the ultimate customer (Ellram 1990, Jones & Riley 1985). Thus, SCM is a set of beliefs that each firm in the supply chain directly and indirectly affects the performance of all the other supply chain members, as well as ultimate, overall supply chain performance (Cooper et al. 1997).

SCM as a management philosophy seeks synchronization and convergence of intra-firm and inter-firm operational and strategic capabilities into a unified, compelling marketplace force (Ross 1998). SCM as an integrative philosophy directs supply chain members to focus on developing innovative solutions to create unique, individualized sources of customer value (Mentzer et al. 2001). Langley & Holcomb (1992) suggest that the objective of SCM should be the synchronization of all supply chain activities to create customer value. Thus, SCM philosophy suggests the boundaries of SCM include not only logistics but also all other functions within a firm and within a supply chain to create customer value and satisfaction. In this context, understanding customers’ values and requirements is essential (Ellram & Cooper 1990; Tyndall et al. 1998). In other words, SCM philosophy drives supply chain members to have a customer orientation.

Mentzer et al. (2001) propose, that SCM as a management philosophy has the following characteristics:

- A systems approach to viewing the supply chain as a whole, and to managing the total flow from the supplier to the ultimate customer;
- A strategic orientation toward cooperative efforts to synchronize and converge intra-firm and inter-firm operational and strategic capabilities into a unified whole; and
- A customer focus to create unique and individualized sources of customer value, leading to customer satisfaction.

In adopting a supply chain management philosophy, firms must establish management practices that permit them to act or behave consistently with the philosophy. As such, many authors have focused on the activities that constitute supply chain management. Mentzer et al (2001) suggest the following activities necessary to successfully implement a SCM philosophy, see Table 3.

<table>
<thead>
<tr>
<th>1. Integrated Behaviour</th>
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<tbody>
<tr>
<td>2. Mutually Sharing Information</td>
</tr>
<tr>
<td>3. Mutually Sharing Risks and Rewards</td>
</tr>
<tr>
<td>4. Cooperation</td>
</tr>
<tr>
<td>5. The Same Goal and the Same focus on Serving Customers</td>
</tr>
<tr>
<td>6. Integration of Processes</td>
</tr>
<tr>
<td>7. Partners to Build and Maintain Long-Term Relationships</td>
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</tbody>
</table>

Table 3. The table shows activities necessary to successfully implement a SCM philosophy (Mentzer et al. 2001).
In context of performing the above mentioned activities properly, it is essential to know what the customers value and desire. Note that the customer, as mentioned earlier, is an integral member of the supply chain. Due to the purpose and the boundaries of this thesis, we choose not to further explain the mentioned activities; we merely want to point out the importance of knowing what makes your customers tick. Instead, we urge the interested reader to look up the following references: Cooper et al. 1997; Cooper, Lambert, and Pagh 1997; Ellram and Cooper 1990; Tyndall et al. 1998; Bowersox and Closs 1996; Mentzer et al. 2001.

As opposed to a focus on the activities that constitute supply chain management, other authors have focused on management processes. Davenport (1993) defines processes as a structured set of activities designed to produce specific output for a particular customer or market. La Londe and Masters (1994) proposes that SCM is the process of managing relationships, information, and materials flow across organizational borders to deliver enhanced customer service and economical value through synchronized management of the flow of physical goods and associated information from sourcing to consumption. Ross (1998) defines supply chain process as the actual physical business functions, institutions, and operations that characterize the way a particular supply chain moves goods and services to market through the supply pipeline. In other words, a process is a specific ordering of work activities across time and place, with a beginning, an end, clearly identified inputs and outputs, and a structure for action.

Lambert, Stock, and Ellram (1998) propose that, to successfully implement SCM, all firms within a supply chain must adopt a process approach. Thus, all the functions within a supply chain are recognized as key processes. The critical differences between the traditional functions and the process approach are that the focus of every process is on meeting the customers’ requirements and that the firm is organized around these processes (Cooper et al. 1997). Lambert, Stock, and Ellram also suggest the key processes typically include customer relationship management, customer service management, demand management, order fulfilment, manufacturing flow management, procurement, and product development and commercialization. In the context of processes, again, it is essential to know the customers’ requirements.

To summarize this chapter it can be said that supply chain management coordinates and integrates all of these activities into a seamless process. It links all of the partners in the chain including departments within an organization and the external partners including suppliers, carriers, third-party companies, and information systems providers. Managers in companies across the supply chain take an interest in the success of other companies. They work together to make the whole supply chain competitive. They have the facts about the market, they know a lot about competition, and they coordinate their activities with those of their trading partners. It encompasses the processes necessary to create, source, make to, and to deliver to demand. They use technology to gather information on market demands and exchange information between organizations. A key point in supply chain management is that the entire process must be viewed as one system. Any inefficiencies incurred across the supply chain (suppliers, manufacturing plants, warehouses, customers, etc) must be assessed to determine the true capabilities of the process. The success of adopting, implementing, and the carrying out of the different supply chain managerial processes stands on the foundation of a firm’s understanding of its customers’ needs, wants, and requirements.
Chapter 3

Frame of Reference

Linking the Value Chain to SCM

Every firm is a collection of activities that are performed to design, produce, market, deliver, and support its product. Competitive advantage cannot be understood by looking at a firm as a whole. It stems from the many discrete activities a firm performs designing, producing, marketing, delivering, and supporting its product (Porter, 1985). Each of these activities can contribute to a firm’s relative cost position and create a basis for differentiation. A cost advantage, for example may stem from such disparate sources as a low-cost physical distribution system, a highly efficient assembly process, or superior force utilization. Differentiation can stem from similarly diverse factors including the procurement of high quality raw materials, a responsive order entry system, or a superior product design. A systematic way of examining all the activities a firm performs and how they interact is necessary for analyzing the sources of competitive advantage. According to Porter the value chain disaggregates a firm into its strategically relevant activities in order to understand the behaviour of costs and the potential sources of differentiation.

The different activities can be represented using the value chain. A firm’s value chain and the way it performs individual activities are a reflection of its history, its strategy, its approach to implementing its strategy, and the underlying economics of the activities themselves (Porter, 1985). The activities of an organization are all interrelated and these interrelationships must be understood and considered in management decision making. Porter refers to the organizational activities collectively; he states “...the value chain is not a collection of independent activities but a system of interdependent activities”. The value chain with extended boundaries is referred to as the firm’s value system, and it is this value system that creates the value of the product in the market place.

Primary Activities

There are five generic categories of primary activities involved in competing in any industry, as shown in Figure 9. Each category is divisible into a number of distinct activities that depend on the particular industry and firm strategy:

- **Inbound Logistics**: Activities associated with receiving, storing, and disseminating inputs to the product, such as material handling, warehousing, inventory control, vehicle scheduling, and returns to suppliers.
- **Operations**: Activities associated with transforming inputs into the final product form, such as machining, packaging, assembly, equipment maintenance, testing, printing, and facility operations.
- **Outbound Logistics**: Activities associated with collecting, storing, and physically distributing the product to buyers, such as finished goods warehousing, material handling, delivery vehicle operation, order processing, and scheduling.
- **Marketing and Sales**: Activities associated with providing a means by which buyers can purchase the product and inducing them to do so, such as advertising, promotion, sales force, quoting, channel selection, channel relations, and pricing.
- **Service**: Activities associated with providing service to enhance or maintain the value of the product, such as installation, repair, training, parts supply, and product adjustment.

Each of the categories may be vital to competitive advantage depending on the industry. For a distributor, inbound and outbound logistics are the most critical. For a service firm providing
the service on its premises such as a restaurant or retailer, outbound logistics may be largely nonexistent and operations the vital category. For a bank engaged in corporate lending, marketing and sales are a key to competitive advantage through the effectiveness of the calling officers and the way in which loans are packaged and priced. For a high speed copier manufacturer, service represents a key source of competitive advantage. In any firm, however, all the categories of primary activities will be present to some degree and play some role in competitive advantage.

Support Activities

Support value activities involved in competing in any industry can be divided into four generic categories, shown in Figure 9. As with primary activities, each category of support activities is divisible into a number of distinct value activities that are specific to a given industry. In technology development, for example, discrete activities might include component design, feature design, field testing, process engineering, and technology selection. Similarly, procurement can be divided into activities such as qualifying new suppliers, procurement of different groups of purchased inputs, procurement of core competence and ongoing monitoring of supplier performance.

Customer Oriented Value Chain

A fully integrated Value Chain is today the best practice to support the customer. The statement “take care of the consumer or someone else will”, is a lesson for all of us to remember. When companies have to increase sales and profit it all starts with the consumer. Products must be in the right place, at the right time, at the right price, and still make a profit. Therefore, the merging of Supply with Demand and providing the closed loop visibility of the integrated processes is of greatest concern, see Figure 10. It takes all the value chain components to make for an efficient supply chain to support a consumer centric culture.

Companies that have a clear migration plan building the fundamental practices to link consumer to supply chain execution are laying an infrastructure to build on. However, many see supply chain management as being the responsibility of “those distribution folks” and not a total company effort linking demand with supply. This leaves supply chain reacting to the rest of the company rather than being a part creating consumer satisfaction and value. The foundations, pillars, and infrastructure of an organization need to be built on a cross-functional set of tactics, initiatives, and strategies based upon a transformational vision. This

Figure 6. The model indicates the activities to be included in the company’s value chain, divided into Support-, and Primary Activities (Porter, 1985).
vision is creating a consumer driven value chain.

**Linking Logistics and Marketing**

The interface between logistics and marketing is critical to the delivery of customer service. Researchers have long recognized the importance of customer service in achieving customer satisfaction. Indeed, organizations often succeed or fail depending on their levels of customer service (Eloranta, 1998). However, achieving outstanding customer service levels is complex and challenging because it involves interfunctional co-ordination, especially between the logistics and marketing functions. Without the successful link of logistics and marketing customer services, the firm may be unable to meet customer expectations, resulting in an unsatisfied customer or a lost sale. Logistics customer service activities provide place, time, and form utility, by ensuring the product is at the right place, at the time the customer wants it, and in an undamaged condition (Coyle et al., 1992). Marketing customer services facilitate possession utility by creating awareness of the product, offering a mechanism such as price, by which the buyer-seller exchange can take place, and often offering follow-up service and warranty on the product. Interfunctional co-ordination is important since outstanding customer service requires all of the above activities. According to the literature review, most previous research has often examined customer service in the context of only one functional area, such as logistics or marketing. Limited attention has been given to the investigation of customer service, where both the logistics and marketing functions are integrated.

To provide a conceptually clear difference between logistics and marketing customer service, marketing customer service activities are those “outside the context of the order cycle” including price, product quality, guarantees, and sales support (i.e. the competence and integrity of sales and customer service personnel). On the other hand, logistics customer service activities are those which take place during the individual order cycle, from order placement to product delivery. The logistics dimensions include availability of the product or service, timeliness of delivery, and quality of delivery, i.e. providing shipment of the correct goods without in-transit damage (Mentzer et al., 1989). This study proposes an addition of communication. For the purpose of this study, communication is defined as the accurate, timely transfer of appropriate information between supplier and customer. Communication is an important part of logistics customer service because it facilitates the flow of information between the seller and the customer. Information is essential in today’s business environment for a number of reasons. The pressure to accomplish things faster requires accurate and continuous information. Perreault and Russ (1974) argue that: “Information is essential for efficient, effective operations”. With the strategic importance of alliances, information is the key to improving co-operation between firms. It is suggested in academia literature that customer service measures are industry-specific and that they can differ. This study will use the linkage between logistics and marketing to achieve an appropriate customer value.

**Product and Service**

The formulation of a product is of importance for the competitiveness in the business. The product can be compounded of many different services except from the physical product itself. Intangible characteristics can be prestige, quality, image, service and customer service, just to mention a few. The services surrounding the product are most often hard to measure and demonstrate. A company that wants a high demand of their products has to build a positive view of the company and its products and services. Upon achieving this it is crucial
to formulate and monitor strategies mostly descended from a marketing point of view. Later research also emphasizes on operations management (materials, manufacturing and logistics). Operational effectiveness is achieved by extending value creation into the implementation of the customer. It is crucial for suppliers in competitive dynamic industries to find ways to retain strategically important business customers. It has been stated by focusing on customer value strategies, which involves anticipating and responding to changes in customers’ desired value – what customers want from suppliers. Anticipating and responding to such changes require a deep understanding of how changes occur. Logistic literature, primarily within the customer service area, suggests that logistics plays a key role in creating value for business customer. In a study Mentzer (2000) stated that logistics has a key role;

“Our findings suggest that suppliers need to leverage the logistical expertise in order to respond to these changing desires.”

Suppliers will win to adopt the role of “marketing” to both internal and external customers from the very initial stages of supplier-customer relations. This is due to the unique ability to understand the logistical values, traditional marketers and sales personnel may not recognize. Supplier logisticians have an important role of helping marketers understand, anticipate and respond to important shifts in customers’ desires. With continuous response to changing customer needs, businesses have great hope of long-term customer relations.

**Customer Service**

As mentioned earlier, customer service represents a major component of the customer’s perspective of product value. Customer service involves an array of activities to keep existing customer satisfied, and should be of such nature as to attract potential customers. A firm’s policies pertaining to customer service must be consistent with a firm’s long-range plans and must be developed in consideration of customer requirements and the firm’s resources. In a study of US and European manufacturing firms, White and Pearson (2001) found the determination of objectives for customer service performance levels was the responsibility...
of sales management, and when customer service policy is established by sales in a manufacturing firm, decisions concerned with maximizing sales occur rather than decisions that maximize overall performance for the enterprise. Unfortunately, the functional barriers in most organizations may lead to a dysfunctional approach for defining customer service levels; consequently, this can negatively impact organizational performance.

Eloranta (1988) suggests that the most important aspects of customer service are delivery time promised and performance, and that customer service should be the primary objective of production management efforts. Two studies about customer service, examined by Eloranta, provide evidence about the fallacy associated with traditional operations management to improving delivery time. According to Eloranta, the findings suggest that increasing inventory levels or increasing the slack in dispatching does not improve the delivery performance of orders. The researcher proposed that organizational responsiveness to customer demand is the critical element for achieving overall organizational effectiveness. Even though Eloranta acknowledges that much research is still needed in this area, he presented the following strategies as requirements to achieve overall system effectiveness:

- focus orientation of the organization toward customer service;
- continuous system effort toward reduction of throughput time, and;
- motivational adaptation of the organization to achieve high levels of customer service.

Bowersox et al. (2000) in an article indicate that a supply chain based on relationships drives end-customer behavior. These relationships create relevancy for the customer. Relevancy along with the traditional value created by economies of scale, assortment and convenience are important to the customer. However, in the future relevancy will take precedence and make a real difference in how customers work and live.

**Logistics Service Value**

For the purpose of further clarifying the value logistics activities add to the products, this paper will present literature reviews of logistics service value.

There are many definitions and descriptions of how logistics creates value. The most traditional are based on the attributes of the creation of time and place utility (Mentzer et al., 1989). The so called “Seven Rs” describes the attributes of the company’s product/service offering that lead to utility creation through logistics value, i.e. part of a product’s value is the company’s ability to deliver the right product in the right amount at the right place at the right time for the right customer in the right condition and at the right price (Coyle et al., 1992; Shapiro and Heskett, 1985; Stock and Lambert, 1987). This definition implies that part of the value of a product is created by logistics service, i.e. the attributes of the process by which the item gets to the end user. Examples of historical, attribute-based measures of logistics customer service are per cent of items in stock, per cent of orders delivered on time, per cent of delivered items undamaged, etc. (For a more complete list of these attribute based measures, see (Mentzer et al., 1989).) These attributes were considered the “value” provided by logistics service’s dimensions of availability, timeliness and condition (Mentzer et al., 1989).
As the business environment has changed, the attribute-based definitions of logistics service have evolved. The basic concept of utility creation became inadequate to express fully the value created by logistics. The idea of value has been broadened to include numerous value-added tasks: packaging, third party inventory management, barcoding, information, etc. (Ackerman, 1989; Mentzer, 1993; Mentzer and Firman, 1994; Witt, 1991). The value-added concept has expanded the traditional time and place utilities to include form utility (e.g. final assembly of bulky product at the market) (Ackerman, 1991), but is still an attribute-based concept. More recent definitions of logistics value focus more on the marketplace, customer service, core competences and competitive advantage. Logistics value is an important component of customer service just to maintain the status quo. Value-adding is the extra service that provides competitive advantage in the marketplace (Gordon, 1989). Both the value and value-added concepts contain the basic logistics attributes. However, the more current concepts include the service and financial trade-offs involved to perform the additional services to provide exceptional customer service. The literature suggests that logistics customer service is often defined as a component of, or used as a substitute for, logistics value (Langley and Holcomb, 1992). However, customer service has been just as difficult to define as value. The meaning of “customer service varies from one company to the next” (Stock and Lambert, 1987). La Londe and Zinszer (1976) provide a good description of how customer service adds logistics value through three components:

1. an activity to satisfy customers’ needs;
2. performance measures to ensure customer satisfaction; and
3. a philosophy of firm-wide commitment.

All three of these components are attribute-based. In their later work, La Londe et al. (1988) did broaden their definition to include “value-added benefits”.

Relating customer service in the logistics service context, Mentzer et al. (1989) argue that there are two elements in service delivery: marketing customer service (MCS) and physical distribution service (PDS). The authors recognized the complementary nature of the two elements to satisfy the customer and proposed an integrative framework of customer service. This view is shared by others (Rinehart et al., 1989) and is thought of as an intellectual base for integrating marketing and logistics activities. Explication of the PDS dimensions and integrating those into overall customer service evaluation are necessary to meet customers’ expectations and needs (Mentzer et al., 1989). This view is consistent with the concepts of service response logistics. Service response logistics puts logistics capabilities as the core competency of the firm in achieving customer value and satisfaction.

According to Flint et al. (1999) businesses have moved beyond viewing logistics as merely an area for cost improvements to viewing logistics as a key source of competitive advantage within a firm’s total market efforts. The authors state that customer service has been a key focal area of research in the logistics discipline for several years. The research shows that logistics service capabilities can be leveraged to create customer and supplier value through service performance; increased market share; enable mass customization; create effective customer response-based systems; positively affect customer satisfaction and, in turn corporate performance; provide a differentiating competitive advantage; and segment customers. The last area, customer segmentation, offers powerful possibilities. If customer segments indeed vary in their in their logistics desires, it should be possible to customize logistics programs to different customer segments, which would improve both effectiveness.
and efficiency. If, in contrast, customers view logistics services similarly across segments, and if that view consistently affects outcomes such as customer satisfaction in the same way across segments, suppliers should be able to create logistics services that appear identical across customer segments, enabling them to leverage economies of scale. In a study by Flint et al. (2001) they show that:

- Logistics service quality might best be conceptualized as a process of nine interrelated quality constructs, see Table 4;
- These nine distinct constructs are reliable and valid across customer segments; and
- The emphasis placed on each of the constructs differs across some customer segments, which suggests that suppliers should customize their logistics services to the desires of individual customer segments.

<table>
<thead>
<tr>
<th>Quality Construct</th>
<th>Specifics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Personnel Contact Quality</td>
<td>• The designated contact person makes an effort to understand the customers’ situation.</td>
</tr>
<tr>
<td></td>
<td>• Problems are resolved by the designated contact person.</td>
</tr>
<tr>
<td></td>
<td>• The product knowledge/experience of supplier personnel is adequate.</td>
</tr>
<tr>
<td>Order Release Quantities</td>
<td>• Requisition quantities are not challenged.</td>
</tr>
<tr>
<td></td>
<td>• Difficulties never occur due to maximum release quantities.</td>
</tr>
<tr>
<td></td>
<td>• Difficulties never occur due to minimum release quantities.</td>
</tr>
<tr>
<td>Information Quality</td>
<td>• Catalogue information is available.</td>
</tr>
<tr>
<td></td>
<td>• Catalogue information is adequate.</td>
</tr>
<tr>
<td>Ordering Procedures</td>
<td>• Requisitioning procedures are effective.</td>
</tr>
<tr>
<td></td>
<td>• Requisitioning procedures are easy to use.</td>
</tr>
<tr>
<td>Order Accuracy</td>
<td>• Shipments rarely contain the wrong items.</td>
</tr>
<tr>
<td></td>
<td>• Shipments rarely contain an incorrect quantity.</td>
</tr>
<tr>
<td></td>
<td>• Shipments rarely contain substituted items.</td>
</tr>
<tr>
<td>Order Condition</td>
<td>• Materials received are undamaged.</td>
</tr>
<tr>
<td></td>
<td>• Damage rarely occurs as a result of the transport mode or carrier.</td>
</tr>
<tr>
<td>Order Quality</td>
<td>• Substituted items sent by the supplier work fine.</td>
</tr>
<tr>
<td></td>
<td>• Products ordered meet technical requirements.</td>
</tr>
<tr>
<td></td>
<td>• Equipment and/or parts are rarely non-conforming.</td>
</tr>
<tr>
<td>Order Discrepancy Handling</td>
<td>• Correction of delivered quality discrepancies is satisfactory.</td>
</tr>
<tr>
<td></td>
<td>• The report of discrepancy process is adequate.</td>
</tr>
<tr>
<td></td>
<td>• Response to quality discrepancy reports is satisfactory.</td>
</tr>
<tr>
<td>Timeliness</td>
<td>• Time between placing requisition and receiving delivery is short.</td>
</tr>
<tr>
<td></td>
<td>• Deliveries arrive on the date promised.</td>
</tr>
<tr>
<td></td>
<td>• The amount of time a requisition is on back-order is short.</td>
</tr>
</tbody>
</table>

Table 4. The table shows the nine dimensions to the term logistics service quality, derived from a study by Flint et al. (2001).

Foggin (1991) applied total quality management (TQM) statistical tools to quantify and close the gaps between customer desires and delivery performance, discussing how TQM measures
could help managers to define, benchmark, redesign, control and monitor the results of a company’s customer service programs (Ibid). This technique combines operational measures with the newer concepts of customer service and value, but still takes an attribute-based approach in that the gaps are defined by the company’s delivery program.

The service quality or “gaps” model (Parasuraman et al., 1985) is an attempt to understand customer satisfaction from the perspective of what the customer values, not just in terms of the attributes the company delivers. The gaps model provides a method to measure some of the differences between customer perceptions and actual customer service on various attributes and to reduce those attributes to dimensions of value that are defined by the customers.

Despite some limitations of the gaps model, logistics researchers began to examine if the gaps model could be used to measure the value of the logistics service. Modifications were made to the original model by developing logistics attributes that fit into the previously customer-defined value dimensions and identifying additional gaps that could be applied to the logistics service context (Lambert et al., 1990). These views of services and logistics provided the building blocks to create a customer-based foundation for better definitions and measures of the value of logistics.

This use of customer-based definitions of customer satisfaction as a part of logistics value brings physical distribution research, that traditionally focused on more physically observable attributes of the phenomena, more in line with marketing which has advanced further in understanding such non-observables as customers’ perceived value. Therefore, logistics practitioners are beginning to recognize the requirement for a method to understand better the needs of their customers beyond a set of readily measurable service attributes (Mentzer et al., 1997).

All of these methods hold satisfying the customer through the delivery of relevant attributes as the cornerstone in successful logistics strategies. These techniques attempt to define accurately the value of logistics service attributes and measure the impact on the customer and the firm. Companies are moving beyond the simple concepts of utility and logistics as a cost centre (Novack et al., 1995). Note, however, that all these expanded definitions still take a perspective of what the company provides, i.e. they are still attribute-based (an operational definition of customer value). Little treatment is given to defining customer value from the perspective of what the customer values, i.e. a customer-based definition of customer value. Consequently, none of the research models in the reviewed literature would be of value for the purpose of this study. In the words of Mentzer et al. (1997):

“Customers seek attributes only as a means to achieve their already established desired benefits (which were, in turn, determined by their already established values), not the other way around.”
Specification of Task

This chapter aims to break down the purpose into more specific research questions. Statements made earlier in the thesis is defined and analyzed, in order to clarify the study’s reasoning and stand, which leads to the specific research question.

“Customer knowledge is the foundation which all business success rests upon.”

Specification of Purpose

With the globalization of markets today, competition is hardening. Getting a defect-free product to the customer faster and more reliably than the competition is no longer seen as a competitive advantage; but simply as a requirement to be in the market. Customers are demanding products consistently delivered faster, exactly on time, exactly the right amount and with no damage. In order to achieve a competitive edge, corporations today are looking at ways to adopt a supply chain management approach.

The purpose of the thesis is:

“...to determine the performance of the supply chain of today, based on the customers’ apprehension of different logistics service elements, and also of what importance they are to the customers.”

For the purpose of this study, and on the basis of the literature review, the definitions of logistics and supply chain management, presented in chapters Logistics and Supply Chain Management respectively, are:

“Logistics is defined as the process of planning, implementing, and controlling the efficient, effective flow and storage of goods, services, and related information from point of origin to point of consumption for the purpose of conforming to customer requirements.”

“The objective of managing the supply chain is to synchronize the requirements of the customer with the flow of materials from suppliers in order to effect a balance between what are often seen as conflicting goals of high customer service and low inventory management, and low unit cost”

To further clarify the purpose of this thesis, a brief explanation of some statements, made in the purpose follows:

- “The performance of the supply chain of today” refers to what degree the logistical needs and wants of the customers are satisfied. Logistical needs and wants of the customers can be satisfied by shaping the different logistics service elements in a manner as desired by the customer. Furthermore, how are they managed today?
- “The customers' apprehension of different logistics service elements” by breaking down the supply chain performance into attributes, which aggregated are aimed at creating additional value to the customer, an understanding of the performance of the supply chain is created, on a more specific level. Furthermore, the evaluation of the service elements will be made by the customer, thus a customer centric focus is achieved.
- “Of what importance the service elements are to the customers” refers how
important the different logistics service elements are to the customer. Do the customers even notice all of the efforts made by the supply chain?

- “…compare performance to importance.” by putting the importance in context of the performance of the supply chain of today, the need for improvements will evident. Furthermore, the improvements necessary will be the foundation upon which the future design of the supply chain rests upon, i.e. by putting the customer in focus.

The Path

The path, towards further specifying the task, consists of three interrelated steps. Each step is dependent on the previous one being carried out correctly. Figure 11 below, shows The Customer Centric Continuous Supply Chain Improvement Cycle, which has been developed by the researchers of this thesis and for the purpose of this study. It is basically an implementation of the PDSA cycle (Bergman and Klefsjö, 2001) to the supply chain, from a customer perspective. It consists of four steps, where the first three can be derived from the purpose. The fourth step, Redesigning of the Supply Chain, lies outside the boundaries of this thesis; thus it will be excluded in our analysis.

![Figure 8. The figure shows the customer centric continuous supply chain improvement cycle.](image)

The first step is to present the Customers’ Evaluation of Supply Chain Performance, based on the customers’ apprehension of how the logistics service elements are shaped today. This is done due to the first part of our purpose, which is to establish the supply chain performance from a customer oriented focus. Furthermore, the managing of the logistics service elements needs to be stated, and connected with logistics theories in order to find out how they affect the supply chain. The logistics service elements have to be processed, segmented, and analyzed; by letting the customer grade how well they are performed today by the supply chain. The next step, Importance Grading of the Logistics Service Elements, refers to the second part of the purpose. An analysis, to what extent the different service logistics elements correlate to the overall impression of the products and services provided by PlymoVent, is
Specification of Task

carried out. Further, by letting the customers state to what importance the different logistics service elements are to their organization a tool for supporting the correlative analysis is provided. This enables the third step in the improvement cycle. The third step, Performance vs. Importance, compares the performance of the logistics service elements to their respective importance. This is done in order to find out as to which degree the logistical needs and wants of the customers are satisfied. By using this information obtained, necessary actions to improve the performance of the supply chain can be established, thus raising the customer satisfaction, and hopefully lower inventory- and unit cost. This leads to the fourth and final step, Redesigning the Supply Chain, which as mentioned earlier, lies outside the boundaries of this thesis. Furthermore, if a first customer survey does not render the necessary information; additional qualitative interviews should be conducted in order to process the data correctly. It is important to notice that this model describes a continuous process. As time changes, so do the preferences of the customers.

Logistics Service Elements

The starting point of this thesis is the customers’ evaluation of supply chain performance, based on the customers’ apprehension of different logistics service elements. In order to determine the different logistics service elements, this study presents quality constructs of logistics that needs further investigation. Since PlymoVent has a strategy of adopting a managerial supply chain approach, the identified quality constructs needs to reliable and valid across customer segment, as to enable a formulation of a managerial philosophy.

The quality constructs of logistics presented by Flint et al. (2001), see chapter Logistics Service Value, constitute the point of departure for further investigation. These nine dimensions capture the aspects of physical distribution service quality; availability (in terms of order release quantities), timeliness, and condition. But they also encompasses other aspects of logistics services covered in academia literature; personnel quality, information quality, discrepancy handling. In addition, order completeness is conceptualized as three distinct components, that is order accuracy, order condition, and order quality, because qualitative research suggests that they differ yet are all considered when customers evaluate whether received orders are complete.

- **Personnel contact quality** refers to the customer orientation of the supplier’s logistics contact people. Specifically, customers care about whether customer service personnel are knowledgeable, empathize with their situation, and help them resolve their problems.
- **Order Release Quantities** are related to the concept of product availability. Suppliers can challenge customers’ requests to ascertain the need behind their volume requests. Customers should be most satisfied when they are able to obtain the requests they desire. The importance of product availability has long been realized as a key component of logistics excellence. Although stock outs are believed to have significant impact on customer satisfaction and loyalty, it is difficult to quantify the financial impact of these lost sales (Keebler et al. 1999).
- **Information quality** refers to customers’ perceptions of the information provided by the supplier regarding products from which customers may choose. This information is often contained in the supplier’s product catalogue. If the information is available and of adequate quality, customers should be able to use the information to make decisions.
• **Ordering procedures** refer to the efficiency, effectiveness, and the user-friendliness of the procedures followed by the supplier.

• **Order accuracy** refers to how closely shipments match customers’ orders upon arrival. This includes having the right items in the order, the correct number of items, and no substitutions for items ordered.

• **Order condition** refers to the lack of damage in orders. If products are damaged, customers cannot use them and must engage in correction procedures with supplier and/or other vendors, depending on the source of damage.

• **Order quality** refers to how well products work. This includes how well they conform to product specifications and customers’ need. Whereas order accuracy addresses the complete set of products in the order (i.e. the accuracy of the kinds and quantities of the products in the order) and order condition addresses damage levels of those items due to handling, order quality addresses manufacturing of products.

• **Order discrepancy handling** refers to how well the supplier addresses any discrepancies in orders after the orders arrive. If customers receive orders that are not accurate, in poor condition, or of poor condition, or poor quality, they seek corrections from the supplier. How well the supplier handles these issues contributes to customers’ perceptions of the quality of their services.

• **Timeliness** refers to whether orders arrive at the customer location when promised. More broadly, timeliness also refers to the length of time between order placement and receipt. This delivery time can be affected by transportation time, as well as back-order time when products are unavailable.

Based on the definitions of the nine quality constructs, in a customer centric focus, and for purpose of this thesis, one could argue that the supply chain performance is all about five statements:

• the customers’ impression of PlymoVent’s performance in providing information on the products customers need to order;
• the customers’ experience ordering material from PlymoVent;
• shipments from PlymoVent depots and PlymoVent vendors to customer activities;
• the customers’ impression of the quality of PlymoVent products and services; and
• the customers’ impression of the contacts they have with PlymoVent.

This division is not as specific as the nine quality constructs presented by Flint et al. (2001), but rather provides a general view of the customer perspective of supply chain management. It is the opinion of the authors that these five statements well describes the customers’ interaction with the supply chain, and consequently makes up for the opportunities where the supply chain creates additional rise- or decrease in the product value, from a customer centric focus. Furthermore, this division suggests that they are interrelated, and together strives to create customer satisfaction. Metaphorical speaking, the supply chain performance could be visualized as a tree, which consists of the stem; the actual supply chain, main branches; the five statements, from which the leaves sprouts; the different logistics service elements. This analogy is suitable for a number of reasons. The stem makes up for the foundation of the tree; it strives to create a stable environment. However, in order to do so it needs to have healthy main branches, i.e. well-managed branches. Furthermore, the success of the main branches is dependent on the leaves reaching the sunlight; i.e. that the logistics service elements are noticed, and are managed as preferred by the customer (sun). Another reason for using this analogy is that the leaves changes with season, meaning that the five statements makes up for
the generics, which in turn reveals additional congeneric logistics service elements. As time changes the needs and wants of the customer changes as well, and consequently the logistics service elements do too. As an example; the advent and market penetration of the internet created additional logistics service elements, or more poetic; new leaves sprouted on the tree of supply chain performance. As such, new logistics service elements should be identified, -if any, before evaluation of the supply chain performance begins. The last reason for choosing this analogy is that the whole is greater than the sum of parts.

Customers’ Evaluation of Supply Chain Performance

In order to create an understanding of the performance of the supply chain today, in-depth interviews with the management of PlymoVent were conducted. This was also done in order to find out if there were any problems that demanded extra attention, and to create an understanding of how the different logistics service elements were managed. The interviewees held five different key positions in the organization and were chosen on the basis of their position and for the purpose of this thesis. The interviews were recorded and lasted each approximately one hour and a half.

The interviewees all acknowledge that problems of logistics nature are holding back the success of PlymoVent, and that the resolution of the problems experienced should be given a high priority. However, upon determining the biggest logistics problem, from a customer oriented perspective, and the underlying reason, opinions differed amongst the interviewees:

- “The biggest problem, from a logistics perspective, is that the delivery time is all too long. The reason being that the synchronization of the inbound logistics and the planned manufacturing of products fail.”
- “The order discrepancy handling process is inadequate. When the delivery date is postponed due to deviation in the production plans, the customer is not informed. This causes additional costs for the customer if an installations firm has been scheduled to operate that day.”
- “Timeliness is the biggest issue, due to the fact that the third party logistics providers do not keep its promises, when it comes to the delivery date promised and the order monitoring process.”
- “The delivery time to customers abroad is all too long, due to the geographical positioning of the manufacturing plant. A central DC in Europe would be of value.”
- “One of the biggest issues is order accuracy and order condition, not seldom are orders received by the customer containing damaged, wrong, or missing goods. Damage occurs due to inadequate packing procedures/materials.”

Note, that the interviewees identify different logistics service elements as the weakest, and respectively demand the greatest attention. Furthermore, the differing answers reflect the interviewees’ opinion on what efforts would have the biggest impact on creating customer satisfaction. It is also important to notice that a managerial supply chain approach would take all the mentioned issues into consideration, see chapter Supply Chain Management.

Furthermore, as mentioned in earlier chapters every successful supply chain puts the customer in focus. Thus, a sound supply chain management requires a deep customer knowledge, which truly reflects what the customer values. In the case of PlymoVent it can not be said that one opinion holds validity over another. If the customer also experience the same problems, they all demand attention. The interviews also suggest that the order monitoring process is
discontinuous, meaning that it is only possible to trace the order until it is due for shipment. After that PlymoVent looses control, and furthermore PlymoVent are not notified when the shipment reaches the customer.

During the interviews it was established that PlymoVent’s customer service level does not reach the levels intended, due to an inadequate governing of the logistics service elements. The logistics problems experienced by PlymoVent also brings synergy effects, such as a lack of trust between the different entities in the supply chain. When abroad customers place an order, the subsidies add additional two or three weeks to the delivery date promised by PlymoVent, just to be sure that the delivery will arrive on the date set. This leads to higher inventory levels, and thus a lower working capital ratio, if the delivery arrives the day promised. Furthermore, when this behaviour of the subsidies is acknowledge by the other entities in the supply chain one could expect that their respective activities is not given the adequate priority, since the customer probably does not expect the goods to arrive for another two or three weeks. Note, the key word here is probably, i.e. the members of the supply chain start to work in a manner where intuition, and not fact matters. The authors of this thesis issues a warning of this kind of behaviour being encourage, fearing that the effects could lead to a downwards spiral, causing steadily increased order fulfilment lead time and increased capital tye-up.

The interviews renders that a thorough customer survey should be made, which is to cover all the identified logistics service elements. However, this does not reveal whether or not the efforts are appreciated by the customer.

**Importance Grading of the Logistics Service Elements by the Customer**

The interviews mentioned in the previous chapter, suggests that the management of PlymoVent differs in opinion on which logistics service element is of greatest importance to the customers. This lack of customer knowledge alone motivates another survey, where the customer is asked to grade the importance of the logistics service elements. Such a survey could also reveal valuable information; i.e. certain preferences shared within different customer segments. This information could enable customized supply chains, as a mean to achieve a competitive edge.

The customers need to evaluate the impact the different logistics service elements have on their business. Are the service elements of importance, or are they barely noticed by the customers? To create additional understanding of what the organization is doing right and wrong, the performance of the supply chain needs to be put in context with the importance of logistics service elements.

**Performance vs. Importance**

The third step, *Performance vs. Importance*, is a necessity in order to establish whether or not the needs and wants of the customers are satisfied through the different logistics efforts. By positioning the studied system’s activities in different logistics service elements, and putting them in the context of their respective importance, from a customer based perspective, the comparative study will reveal deficiencies in the supply chain. Since the performance will
be based on the customers’ own experiences with the supply chain, this will generate issues that need resolution if PlymoVent’s supply chain is to reach its full potential. The information obtained and previous experiences constitute strategic directions PlymoVent needs to follow in order to obtain a successful supply chain management approach. Furthermore, the comparison will show whether or not the needs and wants differs across customer segments. This could enable a customized supply chain management for some segments, thus providing PlymoVent with a competitive advantage. And more important, it will answer the question whether or not the customers even recognize the logistics efforts made by PlymoVent.

The problems are assigned proper action to be taken, which leads to implementation.

Redesigning the Supply Chain

The fourth step, which lies outside of the boundaries of this study, is all about implementing the changes identified as necessary to achieve a higher supply chain performance.

Research Questions

The previous chapters raise questions that need to be answered in order to be able to follow the described path. In order to be able to complete the study and to reach the goal set, there is a couple things that is important to keep in mind, see Figure 12. This model is especially useful when conducting customer analysis.

The purpose of the study is directly connected to the outcome of the study; or rather what the outcome is intended to be used for. Sample answers the question of choosing the right respondents. The respondents should constitute a representative sample. Question design stands for what kind of questions are of relevance in order to reach the goal set. Data collection raises the question of how the survey should be shaped; i.e. the very format of the survey. The survey should be shaped in a manner that facilitates as high answering frequency as possible. Analysis refers the choosing the most appropriate analysis methods. It is not to be confused with choosing an analysis model; it deals with the very processing of the obtained data. There is a vast amount of analysis’s that can be conducted, e.g. factor-, cluster-, descriptive analysis, etc. However, the analysis’s chosen should be of relevance; containing information that is deemed to be useful. Presentation refers to the very presentation of the outcome of the study. Presentation of the data obtained should be shaped in a fashion that makes it comprehensible, easy to understand even without the profoundest understanding of

Figure 9. The figure shows important questions that need resolution in order to conclude the study (CMA, 2003).
mathematical statistics. *Conclusion* stands for the knowledge that can be drawn from study; i.e. what to do with information obtained.

The sample chosen to participate in the survey is customers on the Domestic-, American-, and German markets respectively. This constitutes a representative sample of PlymoVent’s customer. The markets are biggest markets of PlymoVent’s business, turn-over wise and consequently the most important.

When conducting a survey of this sort, Figure 13 provides a useful insight to the concept of customer analysis. The figure was obtained during an interview with Norén (2003). Norén is a market analyst, who specializes in customer knowledge and is an employee of CMA (Centre for Market Analysis). The figure represents the cornerstones of customer analysis. The figure has a strong resemblance to the analysis model which was developed for this study, merely coincidental though. It provides guidance when continuing on path chosen for this study. The differing statements made by the interviewees when asked about the biggest logistics problems, suggests that PlymoVent’s customer knowledge is only tacit. Hence, a thorough market research ought to be conducted, i.e. all logistics service elements identified up to date should be included. Furthermore, are there any logistics service elements that are critical, i.e. drive the customer to the competition? What is the customers’ overall opinion of PlymoVent? Based on the discussion in previous sections, the following groups of questions are of interest:

- *the customers’ impression of PlymoVent’s performance in providing information on the products customers need to order;*
- the customers’ experience ordering material from PlymoVent;
- shipments from PlymoVent depots and PlymoVent vendors to customer activities;
- the customers’ impression of the quality of PlymoVent products and services;
- the customers’ impression of the contacts they have with PlymoVent; and
- the customers’ overall opinion of the service PlymoVent provides.

The specific logistics service elements identified can be viewed in Appendix A, all too comprehensive to be presented here.

A market research or a customer survey should be shaped in a fashion that takes into account that when asking a person/organization to participate, one really asks to take up his/its time. Since time is money, the research or the survey needs to consist of questions that are apprehensible, relevant and easy to answer. According to Ouchterlony (2002), academia literature and previous research suggests that as little as 30 per cent of the participants will act as respondents in the end. To facilitate an acceptable level of respondents, one realizes that the selection of media should be based on its readiness, user friendliness and market penetration. Internet and e-mail could be considered to be such a media. One could argue that a clickable, e-mailed survey constitutes a media that is easy to use, demands little or no knowledge and are not all too time-consuming. Furthermore, translating the questionnaire into the respective mother tongue should further facilitate a higher answering frequency.

**Delimitation**

Upon writing a master’s thesis and specifying the study, delimitations have to be made in order for the study to reach a reasonable scope, which refers to the fact that the study is conducted during a limited time frame. The delimitations have been made in conformity with the directives given by the commissioner PlymoVent;

- **Market delimitation:** this study will focus on the domestic, German, and the American markets. They are considered by PlymoVent to be markets with the greatest potential. Investigating additional markets would demand considerable efforts in tracking down customers, an all too time consuming process.

- **Cultural delimitation:** cultural aspects will not be taken into consideration. The customer service survey have the same shape and form, no matter what market is investigated. The quality constructs, which the survey is based upon, are considered reliable and valid across markets and their respective segments.

- **System delimitation:** the studied system excludes the second tier suppliers, which can be regarded as weakness in the study. The behaviour of the suppliers has a great impact on the ultimate supply chain performance. A successful supply chain management takes all members of the supply chain into account. Consequently, a benefit with a supply chain management is to redesign the suppliers’ processes, in order to establish a convergence with the other entities processes, to reduce order fulfilment time and capital tie-up. In redesigning a supply chain, the mentioned suppliers must be taken into consideration to fully gain the advantages a supply chain management brings. However, this is not the task set upon this study. Furthermore, In order to obtain a reasonable scope and a conductible study, the thesis will view organizations as customers when the ownership of the products is transferred. It can be argued that this a weakness in the study as the service/product providers are the final link in the long supply chain that stretches from manufacturers to customers.
Although this may be true, it can also be argued that the success of these businesses is interdependent, meaning that inappropriate business behaviour cuts both ways.
Methodology

This chapter describes the relation towards scientific research and the models that are chosen. The reader is to be enlightened in theoretical thinking on how to understand and evaluate the research process, from decisions made upon different theories. To create credibility, further details on the choices of method are given. The chapter completes with an explanation on how the study was practically conducted.

Science - the approach

Scientific knowledge can be used in describing the reality, and it can also be placed under an empirical, i.e. based on observation, test or measurement. There are two main approaches on how to regard science and how to obtain reliable scientific results, positivism and hermeneutics (Arbnor and Bjerke, 1994).

The term ‘positivism’ derives from ‘philosophie positive’, which in this context means real and true. Positivism has its origin in the way research is performed in science, as the way to find the general in the specific. The term has also been interpreted as a person’s aim at the development of his own strategic status in the world, i.e. the aim of surviving in the world controlled by the laws of nature. Positivism emphasizes that the purpose of science is to study the reoccurring and uniform features that happen under the laws of nature. The phenomena that best fit the laws of nature are those that also describe the reality best. Characteristic for this approach is that theories should be based on a large amount of observations, which are quantitative and often rely on statistics. Positivism emphasizes the unity of science, i.e. all the science is of same entity and its explanations are under the same laws. According to the positivistic approach the researcher proposes claims that then must be tested and proved either right or wrong. In its purest form, the positivistic thinking understands the science in a way in which the reality is free of values and consists only of facts. The status of the researcher in this kind of situation is problematic; his own subjective value structures may distort the results. Thereby, the researcher needs to carefully analyze his personal values and attitudes, and to try to eliminate then, since only the facts can be included into the scientific research. Accordingly the researcher has to be seen as a complete observer to the object studied. Positivism makes a clear division between the sense and sensibility. Sensibility, or emotions, do not belong to science, the sense does.

On the other hand there is the hermeneutic tradition of science, sometime mentioned as spiritual science. In this approach the field of research is considered from a large perspective, including all influencing factors, in order to find reliable results. Hermeneutics can be seen as a science of interpretation since it advocates a qualitative approach where all “truth” is relative to the system in which it is being used. A researcher using this approach includes his personal experiences and feelings in the observations. Hermeneutics emphasizes the relation between the facts and values, on the contrary to positivism, which excludes values from the scientific thinking. There is a significant difference between explaining the nature and understanding the culture (Arbnor & Bjerke, 1997). The objective for all research is therefore to understand and interpret events on the basis of personal experience, not to explain them. Thereof, the understanding is subjective and considered to be an advantage within the research process (Patel & Davidson, 1994).

Often science of business is positioned in between these two views; also our research will be
done with a combination of both positivism and hermeneutics. There are rather few scientists that follow one view to all its content since the very strictness of the approaches. This study states that ones own assumptions, thoughts, experiences and values will matter a great deal when conducting a study like this one. Due to interaction with other people one creates and forms the environment surrounding us all. Therefore, it would be hard to be completely objective. Though in order to make a realistic and truthful report one have to keep the mind as objective as possible. Then again one can not totally reject the hermeneutic thoughts and believes.

In some cases there is a need to make assumptions about reality in order to describe, simplify and understand it. One could argue that social structures and values have had a deep effect on reactions among individuals and companies, during interviews. In other words, this study has taken into consideration personal opinions, which implies that this study have a hermeneutics view, although not the full extent.

**Methodological approach**

Assumptions are often made to enhance the understanding of the reality. A methodological approach provides assumptions and forms the basis for a study. As various approaches make different assumptions this means that observations, collection of data and results are determined by the chosen approach. According to Arbnor & Bjerke (1997) there are three general approaches, the analytical approach, the systems approach and the actors approach. The figure below shows how the different methodological approaches are positioned against the scientific approaches. The figure below describes how the different methodological approaches are positioned to the traditions of scientific, according to Arbnor & Bjerke (1997).

![Figure 11. The relationship between the three approaches.](Arbnor & Bjerke, 1997, p.44)

**The Analytical Approach**

The analytical approach assumes that reality is independent and objective of its observers. Verifying or falsifying certain hypotheses makes theory. Descriptions and explanations are to be general and absolute. Hypothesis is often used as a starting point and the formal logic is to verify or falsify it. These hypotheses reveal certain objective facts and together they describe the objective reality.

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The Systems Approach

The systems approach also assumes the reality as objective but diverges some from the analytical approach. It states that reality is a compound of interdependent components and cannot be summed up, i.e., reality is organized in such way that the whole is not the same as the sum of its components. This means that the different parts are important themselves but also together they may contribute to synergy effects.

When conducting an investigation, the proper boundaries, internal and external, have to be identified for scaling the assignment into a necessary size. The scope of the task has to fit within the boundaries and should be possible to execute in the time set. According to Persson et al. (1991), systems theory is a suitable frame when analyzing relationships inside and outside a company. Every problem does not have to be considered as unique, since it is a part of a bigger problem according to system theory. A system can have different levels, for instance, different functions, departments, companies, and markets etc. This yield that systems can be divided into subsystems, where the structure of the system theory claims that all systems are part of a superior system, Figure 4.

![Figure 12. System illustration, adopted from Persson et al. (1991).](image)

Two important subsystems can be defined in the larger system, the horizontal and the vertical, see Figure 5 and Figure 6 respectively. The difference between the systems and other components, from a company’s point of view, is that the company is a part of and can affect the systems, but experience difficulties in controlling them. The horizontal system is a system involving competitors at different levels depending on differences in the relationships. The vertical system is a system that begins with the supplier and ends with the final customer. Internal and external systems, are those who build up the vertical system. The difference lies in the possibility of controlling them.

![Figure 13. The figure shows the horizontal system, adopted from Persson (1991).](image)
The internal system lies within the boundaries of the company, whereas the external system consists of suppliers and customers. If the vertical system has the same management, it should be considered an internal system. It is important to understand that there is not a common approach as how to describe a system. Determining the boundaries for the system and the components that are a part of it, is a pragmatic process where the purpose of the task controls the shape of the system.

Churchman (1968) tries to provide an understanding to the word system. Although there exist many definitions, it can be said that a system consists of different parts working together to achieve certain goals. The aim of the system analyzer, according to Churchman, is to describe the system in detail; in terms of its structure, environment, and goal. When dealing with the system and determining its boundaries, five areas have to be considered; system goals, system environment, system resources, system components, and system management.

The similarities between the two system approaches is that both state that relationships are important to consider, both internal and external systems, since the whole system is of interest and not the different subsystems. Note, that it is necessary to consider what can be affected and controlled in the supply chain. Thus, in this study the systems theory will be used as a tool for describing a studied system in. As both system approaches suggests; it is important to consider the relationships among the different subsystem in the studied system. However, it would be too big of a task to consider the whole, since all systems are part of something greater.

**The Actors Approach**

The actors approach assumes that reality is socially constructed and therefore interpretations made by the observer or actor are essential for the result. Finding contradictions in the discourse, or interpretations of the discourse, develops the knowledge. Also the relations and the characteristics of the specific parts of the reality are used for the understanding. When using the actors approach in a study, like this one, the parts looked upon would be the communication and social relations among people. How would new implementations of technology affect people in the business?

The three approaches are also connected to the six different aspects of ontology, mentioned in Figure 14. However, one can take another approach in finding the most efficient view of reality for your research. This means that you should use a view from which you are trained to analyze the research object. For the purpose of this thesis, the systems approach will be well suited for solving the research objectives, and is the approach which we are familiar with.
**Induction & Deduction**

In the same way that science can be approached in different ways there are differences in choosing and developing knowledge. In logic there are two broad methods of reasoning, the deductive and inductive approaches (Patel & Davidson, 1994).

Deductive reasoning works from the more general to the more specific. This could be seen as a “top-down” approach. The researcher draws conclusions and analyzes the facts derived from separate events based on existing theories. Basically, begin with thinking up a theory about the topic of interest. After that, narrow down the theory into more specific hypotheses that can be tested. After further delimitation, collect observations to address the hypotheses. This finally leads to test the hypotheses with specific data - a confirmation (or not) of the original theories.

Inductive reasoning works the other way, moving from specific observations to broader generalizations and theories, sometimes called a “bottom up” approach. Inductive work is of more explorative nature. An object can be studied without regard to the researcher has established knowledge in relevant theory. One begins with specific observations and measures, detecting patterns and regularities, formulating some tentative hypotheses to explore, and finally ends up developing some general conclusions or theories (Patel & Davidson, 1994).

These two methods of reasoning have a different feel when you are conducting research. Inductive reasoning, by its very nature, is more open-ended and exploratory, especially at the beginning. Deductive reasoning is narrower in nature and is concerned with testing or confirming hypotheses. Patel and Davidson (1994) mean that one method excludes the other. However, this study argues that even though a particular study may look like it is purely deductive (or inductive); most social research involves both inductive and deductive reasoning processes at some time in the project. In fact, it does not take much to see that one could assemble the two graphs above into a single circular one that continually cycles from theories down to observations and back up again to theories.
Figure 17. Induction and Deduction (Patel & Davidson, 1994).
Research Approach

The technical formulation of a research is based on three dimensions (Lekvall & Wahlbin, 1993). The dimensions have to be considered according to what type of research is being conducted. One has to decide the depth, broadness or if it is a study done over time. This involves the characteristics of what is studied. The second dimension is connected to the collected data. Qualitative data is not to be quantified in numbers. Most often the research is carried out with small selections of respondents who are carefully interviewed. In contrast, the quantitative data include many respondents and is often measured in numbers for further analysis. The last dimension is whether the data used is gathered by you (primary) or available from other sources (secondary), such as databases or statistics.

**Figure 18.** Dimensions in a research approach, adopted from Lekvall & Wahlbin, 1993.

**Type of research**

*Case studies* are studies where the aim is to give detailed and often a very deep analysis of a specific problem. Case studies is therefore suited for explorative studies where the aim is to achieve a detailed conception about different processes, where it not on beforehand is possible to tell what is of greater importance (Lekvall & Wahlbin, 1993). Case studies are also commonly used in descriptive research where the issue is known from the beginning. Characteristic for most case studies is the focus on detailed and versatile descriptions of the specific problems, which can be an individual, an organization or a situation. *Broad studies* are applied when several cases are studied at the same time. It is not unlikely that hundreds of objects are involved. These objects can not be studied as detailed as when a case study is used. The data is used more in a way to compare several objects to each other not to get a broad and deep understanding of a single one. *Time series* signifies that the study is made over time on the same objects. Sometimes this approach is used in combination with one of the other. This is used when the researcher wants to analyze the same factors over time.

This study aims to give the broad picture of the customers’ apprehension of logistics service value today, and to find out the differences between the main beliefs of the customers and of PlymoVent itself. Recommendations on how to proceed with managerial approach to supply chain will be presented. Since the time of the realization is rather short, the possibility to analyze over time is not an option. Detailed work on one company with its surroundings often refers to the case study approach. What differ a case study from a broad study is that one problem is analyzed thorough and in-depth. The fact that several organizations are considered in the study does not contradict the theories according to Patel & Davidson, (1994). As this study premise from a broad view, where it is hard to tell on beforehand what is important and what is not, the chosen path of research is to be of descriptive nature. The descriptive
Primary and Secondary Data

Data that is collected by yourself, most often through observations, interviews, questionnaires etc. is named primary data. Data from other material and sources than your own, statistics etc. is named secondary data. When using secondary data it is of great importance to notice that it might have been collected for other purposes and that the validity might not be applicable at all times.

In this study, such as most others, the data used is of both features. At the beginning mostly secondary data is used for the theoretical framework and specification of task. Along with the progress more primary data is collected through interviews and observations with the company. The primary data is to be used as a foundation for the elementary analysis and to raise the questions presented in chapter Specification of Task.

Practically Performance

This is a report written in academically manners. To assign the report its well-arranged structure and readability, the model presented by Lekvall & Wahlbin (1993), called the “U”, is used. This model gives guidelines on how to structure the report on the different logical levels, what the key elements of the report are, and how the different parts are connected to each other. The reason for choosing this model is that it will provide a dependable structure where the parts are properly connected together and it presents a path to conduct the parts in a correct order.

Figure 19. Logical levels in a report, the “U-model”. Lekvall and Wahlbin (1993).
The research process – an overview

Upon writing such a report it is important to do the right things at the right time. Therefore a 4-phase model for how to proceed during the work and to obtain the best possible outcome is set up. The key-elements are recognized from the “U”-model.

Pre Study Phase
At the very beginning the intention was to obtain as much knowledge as possible about PlymoVent AB. In order to be able to develop an understanding for the management and its behaviour in the market is was important to gain a vast knowledge of essential literature theories. Mainly by collecting secondary data for the specified objectives, the understanding and insight demanded was achieved. Interviews with PlymoVent’s chief executive Lars-Erik Andersson were held to understand the problem situation of PlymoVent. The first direction of purpose for the thesis was introduced. Parallel to the literature studies, close discussions with supervisor Johan Ouchterlony at Linköping University was held to obtain and form a suitable purpose for this study. This resulted in the chapter Introduction with the sections Background and Purpose. The chapter Presentation of PlymoVent follows after collecting information about the company.

The chapter will work as an introduction and to gain a deeper knowledge of PlymoVent. Interviews and literature research founds the basis of the chapter.

Derived from the above mentioned, a structure for the composition of the thesis is formed. Focusing on the problems as experienced by PlymoVent, the Purpose and the Frame of Reference is created. Thus, the starting point and the direction of thesis are formed.

Specification Phase
In order to present a Frame of Reference, distinguished theories has been studied and introduced. A broad literature study works as the basis to define terms such as Logistics, Supply Chain Management, and Customer Service, all suited to help explain the purpose. Further, the Frame of Reference is explaining the importance of the link between logistics and marketing in achieving great customer value. The outcome for completing the purpose of this thesis is the questionnaire (see Appendix A) and the interviews. In order to see the true values of the purpose and to complete with an accurate analysis; a specification of task follows.

The frame of reference is created to support the Specification of Task. The purpose is given
a more distinct explanation, and the factors of supply chain management are presented regarding the logistical- and customer demands and values. The most important demands within the logistics- and marketing area that correspond to PlymoVent’s needs are further specified.

Based on these set of topics the questionnaire is put together for the collection of data. This will be the raw material to analyze in a descriptive way. In order to verify the data in the questionnaire, interviews with customers are made. Thus, the needs and wants set on the supply chain by the customer are ascertained.

The specification of task can be inaccurate or misguiding, resulting in an unfulfilled purpose, if the purpose does not correspond to the specification part. Although some research questions might have been omitted, resulting in insufficient support during field study and analysis; though the most relevant ones are to be included. The possibility of inappropriate delimitations, that will prevent areas with considerable impact on the system from being analyzed, could thereby influence the result substantially. These kinds of errors will be avoided by the various discussions with Johan Ouchterlony at the University and PlymoVent, and the thorough literature review.

**Data Collection Phase**

In the third phase; “Data Collection”, the data, needed for answering the research questions in the Specification of Task, is obtained. Chapter Primary and Secondary Data describes how primary- and secondary data is used and gathered. Moreover, the chapter Methodology proceeds with the explanation of the study formation and the choices made for solving the assignment. Information is collected through an in-depth case study at PlymoVent. The actors involved are people representing the leading management; product authorized supervisors, and sales personnel at the headquarters in Malmö. The current function of each actor was shortly described with the vital activities, relevant to the purpose of this thesis. This mapping of information is of significant importance to establish the initial foundation to work from. The studied system, Figure 2, is based upon the obtained information of the interviews. When looking into customer satisfaction, various questions need to be answered related to the research questions (see Appendix A, Questionnaire), in order to enable an analysis of the research questions.

When conducting the study, with the research questions as a starting point, the information is collected from many different customers of PlymoVent. The data collected in the questionnaire are to be analyzed in a descriptive way. The descriptive statistics will be used to describe the basic of the data in the study. They shall provide summaries about the sample and the measures. This analysis is used to present quantitative descriptions in a manageable form. Though, trying to describe a large set of observations with a single indicator will enhance the risk of distorting the original data or losing important details. Even given these limitations, descriptive statistics will provide a powerful summary that will enable comparisons across units of different matters. Together with simple graphics analysis, they form the basis of the quantitative analysis. Though, to verify and broaden the data in the questionnaire and to perceive a deeper understanding of the customer relationships, deeper personal interviews are made. Different customers with extensive knowledge of working together with PlymoVent in various projects are given the possibility to express their feelings and thoughts in the matter. Though, they have not always been able to give precise answers to the problem but to present a different view.
Errors may appear when the procedure of measurement does not yield true measures. The people interviewed have been very open to the questions and discussions; they have also generated a lot of new insight to different problems. Difficulties in understanding each other have not occurred when performing the interviews. To reduce the inferential errors efforts have been made to interview as many people as possible.

**Result Phase**

In the last phase of this thesis the conclusions and recommendation is presented to the reader. The determinations made from the data processed earlier will work as basis for the final statements in this report. The evaluation is based on the processed data that was collected in the different interviews and questionnaires. Comparison and conclusions are made where the presented theories acts as central function for the concluded evaluation.

The analysis, made with help of the data analyzing tool SPSS, consists of the following steps:

- Organizing the data;
- Describing the data; and
- Evaluating the data

**Organizing the data** involves checking or logging the data; checking for accuracy; entering the data into the computer; transforming the data; and developing and documenting a database structure that integrates the various measures.

**Describing the data** will provide the paper with simple summaries about the sample and the measures. Many different measures will be used such as mean- and standard deviation.

**Evaluating the data** will investigate the questions, models and relationships stated in the paper. An evaluation will be drawn from the sample data and judgments are made of the probability that e.g. an observed difference between groups is a dependable one or one that might have happened by chance in this study. Thus, inferences from the data will enable to set more general conditions, not only to use descriptive statistics to simply describe what is going on in our data.

The conclusions will extend beyond the immediate data alone. In order to see interacting relationships, the questions are set up in sections concerning the same topic, e.g. the information providing performance of PlymoVent. One question that magnitude the importance for the customer will be compared with the means of the questions corresponding to this group of questions. A link between the inferential analysis to the research questions that were raised in the *Specification of Task* will be made. The extensive analysis details are appropriately relegated to appendices, reserving only the most critical analysis summaries for the body of the report itself. Dealing with data that might be analyzed in an incorrect way will present incorrect conclusions. The reasons might be choices of unsuitable model of analysis, fault in handling of data, or insufficient logic or knowledge. The very last section in the paper will provide the management of PlymoVent with useful information and recommendations.
Sources of Error

When conducting a study one passes through a number of steps each of one that can lead to sources of error. These errors can mislead the researcher and provide uncertain information. These sources of errors have therefore to be carefully controlled in order to obtain a study with high quality. According to Lekvall & Wahlbin (1993), the decision analysis and the specification of task is where the information relevance is set i.e. how relevant can the information become. The coming parts decide the information level that one actually achieve i.e. how well is the information taken care of.

![Diagram showing sources of errors]

Figure 21. Compilation, Sources of Errors, (Lekvall and Wahlbin, 1993).

Collection of data is something that we do every day. It is of interest to know that this data is valid and useful for us. We must know that we really collect the information of what we aim to study, i.e. the validity of the information. We must also collect the information in a reliable way, i.e. the reliability of the information. These two terms are according to Patel & Davidson (1994) in relation to each other and lets us not to focus on only one. They set up three main rules of thumbs:

- High reliability is no guarantee for high validity.
- Low reliability gives low validity.
- Complete reliability is a condition for complete validity.

Validity

To know what is being studied is an understanding of what we are proposing to study and what we in fact are studying. Does the method of research really measure the properties that are considered to measure? The difficulty with the validity is, according to Lekwall & Wahlbin (1993), that there is no measure to decide whether a method is valid or not.

To measure the content validity, Patel & Davidson (1994) suggests a logical analysis of the instrument used. This is done by a third person with a clear grasp of the problem. It is obvious that it is hard to put a measure on the term validity; forms and respondents have to be carefully chosen when conducting a research.

Reliability

The second term measures how well the instrument resists random influences of different kind. Every respondent gives a value that contains the real value plus a margin of error. Patel & Davidson (1994) argues that a document is reliable when the error is reduced to
get closer to the true value. It is hard to add a measure to the reliability; often this is up to the interviewer and the observer. Sometimes it can be of relevance to have more than one observer for collecting the data said in an interview. Low reliability can be caused from different factors. Apart from the true values there can be differences in:

- Variable qualities at the individual’s; health, stress, motivation etc.
- The situation; contact with the interviewer, distracting environment etc.
- How the question is put to the respondent

Generally the reliability becomes low when the measurement method is not defined strictly enough. The more clear and unambiguous the questions are the better likelihood it is to get a good reliability.

When conclusions are drawn from a study and applied to reality; there might occur inferential errors. Inferential errors are common in surveys; where the target population may not correspond to the selected population and the peril to investigate an awry reality arise. This will lead to generalized results that are not valid for the target population. To reduce the inferential errors as many people as possible has been asked to participate. Also there has been a great desire to choose correct participants. The questionnaire is developed to provide information about the respondent himself and his relations to PlymoVent to prevent incorrect kind of people to participate.

Errors may also appear when the procedure of measurement does not yield true measures, and consequently when the true situation at the specific occasion is not reflected by the result. Other interview errors may occur when questions are put in an inappropriate way and difficulties in understanding will be prevented by a list of explanation made in different languages for the respondent. Great desire has been put towards minimizing the errors that might occur.

**Presentation of Customers’ Evaluation**

The customers’ evaluation of the supply chain performance will be presented in diagrams, showing the share of customers and their respective opinion on the performance of the specific logistics service elements. Cultural differences and distance to customer may render in widespread conception of the performance of the supply chain. This makes it necessary to conduct a comparative analysis; where the preferred analysis would be a significance test. However, considering the number of respondents and the scale of marks, with a normal approximation could prove to be misleading. Hence, the comparative analysis will consist of reviewing the opinions market wise; i.e. comparing the share of the opinions market to market. If there is a significant difference in opinions across markets, the difference will be presented in consecutive order in the text. The interested reader is urged to view Appendix A for the exact numerical result. However, a mental reservation is in order; the numbers of respondents matters a great deal when conducting such an analysis, to be able to state a fact with a specific certainty. Is the differing opinions accidental; a mere toss-up, or is it truly a difference in opinions? To further validate the result of the questionnaire in-depth interviews was conducted. Hence, the only fact stated in this study will be that the survey indicates certain directions of customer opinions.
Chapter 5

Reviewing Customers’ attitude

It is essential to know what the customers value and desire. As mentioned earlier, the customer is an integral member of the Supply Chain where the supplier and the customer have a close relationship. Supply Chain Management is a process of managing relationships, information, and materials flow across organizational borders, all to deliver enhanced customer service and economic value for both parties. As for this thesis, which focuses on the customer and the value a supplier can give its customers, a break down of the characteristics is made. The questionnaire, used for the collection of data, breaks down the characteristics even further into specific questions and statements. The outcome elements are used as a base for the survey and the interviews made.

A market survey performed for an international company where the customers are globally present needs special consideration. This specific market survey is conducted in three countries, Sweden, Germany and USA. A variety of statements within specific fields are given a five-graded scale for the customers to mark their opinion. For each specific field a number of questions are stated in relation to the performance PlymoVent offers today. In the last part of the questionnaire another group of questions, which correspond to the earlier ones, asks the customer whether or not the different logistics service elements are of importance to their business. Further a group of question asks about the overall service that is provided by PlymoVent. In addition to those, a correlation analysis measuring the correlation to the overall opinion of the service PlymoVent provides is carried out. The correlation analysis will provide the measure to what degree the supply chain of today manages to satisfy the customers’ needs. For further clarification on how the processing of the survey is conducted, see Figure 22 which illustrates the process. Note that only a few aspects of the supply chain performance are provided in the figure.

![Figure 22](image)

Figure 22. The figure shows how the data obtained from the survey will be analyzed.

When gathering the data, the analyzing tool SPSS is used. SPSS will provide a profound descriptive and correlative analysis to the result. Statistic tables and diagrams will help
describe the picture of PlymoVent’s supply chain.

During three weeks the customers were able to answer the questionnaire, thus providing us with useful information. It was estimated that a 30 per cent answering frequency was reasonable and obtainable. Nevertheless, the number of customers who received the questionnaire was 300 in Sweden, 250 in the USA, and 200 in Germany. The number of actual respondents ended up being only 25 in both Sweden and USA, and 5 in Germany. Even though two reminders, urging the customers to participate in the survey, were sent out the number of respondents did not reach a change worth speaking of. The reasons for such a low answering frequency are probably due to an inappropriate list of customers given by PlymoVent. The list contained names of customers who bought products from PlymoVent years ago, thus making them unable to recollect their experience when dealing with PlymoVent. Furthermore, customers of that status who act as respondents will only render in answers how the supply chain worked ages ago, not how the supply chain works today. Another reason for the low answering frequency could be due to the very nature of the products PlymoVent supplies. Customers buying a complete systems solution probably do not see themselves as reoccurring customers, the system is a probably viewed as a one-time investment. Consequently, the customers show little or no interest in PlymoVent raising their customer satisfaction. Another reason for the low number of respondents can be that the questionnaire, at a first glance, may seem to be comprehensive, thus all too time demanding. Since the survey lack German respondents it is necessary to delimit the study to only encompass the Swedish and the American markets. There was no possibility to conduct telephone interviews with the German customers due to linguistic problems. The delimitation has to be considered to be a weakness in the study since the German market well would represent a central European market.

The low answering frequency made it necessary to conduct in-depth interviews in order to obtain the goal set for this study. The interviewees were chosen on the basis of their respective customer segment; market belonging and type of customer. Since the study is conducted in two markets; American and Swedish markets, customers from each market were chosen. The type of customer refers to the customer being the actual end-user, a contractor, using PlymoVent as sub-contractor, or a component buying customer. The criteria were chosen to get a group of interviewees who well represents the customers of PlymoVent. In order to make it possible to use the already obtained answers, i.e. from customers who in fact acted as respondents in the first survey, the interviews were based on the questionnaire. Furthermore, the interviewees were asked what their opinions were based on, e.g. why a specific PlymoVent behaviour is unsatisfactory or why is a specific logistics service element of importance to the customers activities. The abroad customers were interviewed over the phone, due to travelling, cost, and time restrictions. Some of the domestic interviews were conducted at the customers’ facilities, in person, and others over the phone. The interviews lasted from one hour up to two hour. Some of the customers also expressed wishes to remain anonymous. These wishes are honoured and when quoting such a source they are simply named an American customer, or a Swedish customer.
Evaluation of the Supply Chain Performance
Evaluation of the Supply Chain Performance

This chapter will present the customers' evaluation of the supply chain performance, based on the Research Questions. The questions break down the Research Questions into more specific levels, and aggregated answers to whether or not the need and wants of the customers are fulfilled. Furthermore, the present governing of the different logistics service elements will be explained.

Evaluation by Means of Logistics Service Elements

Product Information

In order to establish whether or not PlymoVent provides its customers with satisfactory information on the products they need to order, the following five questions were deemed to be of relevance; the availability and adequacy of the catalogue information, the availability of price change information and product change information, and the availability of information for new products.

Today PlymoVent provides its current and potential customers with paperback catalogues, CD, and product information is also made available via the web. The information is comprehensive and up to date. The product information on the web is sorted in areas where the products are intended to be used.

![Figure 23. The figure shows the opinions the questionnaire respondents holds on different aspects of the product information supplied by PlymoVent.](image)

Information on new products

The first statement rendered in differing opinions across the American and Swedish markets. Only about 30 per cent of the American customers agree with statement, whereas 60 per cent of the Swedish customers agree. Since the majority of the Swedish customers agree, one could argue that this is an issue of making the customers aware of the information available.
Chapter 6

Information concerning product changes
The question concerning product changes shows a rather big discontent in the American market whilst the Swedish market is of a more neutral opinion. When interviewing customers it was apparent that Americans have a bigger need to be informed of every discrepancy from original agreements and statements. The Swedish were more of the nature that as long as the products and/or system work as agreed and without price changes, they do not really care.

Price change information
The rating of the issue concerning price changes does not differ all too much across the markets. Again, the Americans are more dissatisfied than the Swedish.

Catalogue Information adequacy and availability
The adequacy of the information raises suspicions. Half of the Americans agree while the rest disagree. Either the customers are treated different and are given different catalogues or -more likely- the customers make different demands on catalogue information. Jack Rossman (2003) at Air Cleaning Specialists says: “PlymoVent needs adequate specification data to submit to engineers for planning and specification on jobs. Furthermore, they need adequate product manuals for architects and engineers to adequately get specified for a job”. Another american customer states: “No current operating manuals or technical data on new firehouse systems and no engineering manuals.” A third american customer states that product information is received for some products and some not. The interviews conducted with the American customers rendered that most of them are dissatisfied with inadequacy -or lack of information. The Swedish customers are not as demanding. The interviews could be represented by one statement; customers who buy complete system solutions are rarely interested in the product information. Clasén (2003) at Scania expressed it as: “We rely on the expertise of PlymoVent’s system designers. However, it exist a certain need for product information for maintenance purpose. However, that need is of outmost importance to us. The products are essential for production activities, and our maintenance department needs that information.” Andersson (2003) at Intercut expressed his opinion as: “I was very impressed with the product information provided by PlymoVent. I have never seen such comprehensive and contemporary product information. But as far as I am concern, it is not necessary since I rely on the expertise of PlymoVent.” When it comes to the availability of catalogue information the ratings between the markets are somewhat equal.

Product Information Summary
To conclude the evaluation of PlymoVent’s performance in providing the customers with information on the products they need to order it can be said that it is insufficient. Furthermore, the result of this survey indicates that the Americans are more demanding than the Swedish when it comes to product information. This is probably due to difference in conducting business in the USA and in Sweden. However, when conducting the interviews and when analyzing the questionnaire, the feeling of the American customers being more true and frank than the Swedish occurs. The reason might be cultural differences; it is not in the nature of the Swedish to complain. However, not complaining does not translate into customer satisfaction; the customers should at least agree with statements made in order to be able to say that efforts made are sufficient. To finalize this conclusion; the interviews and the result of the questionnaire indicates a greater need for comprehensive product information in the American market then on the Swedish, or simply the Swedish sales division puts a greater
effort in providing the customers with information on products they need to order compared to the American sales division. However, the latter is not the conclusion drawn; a difference in the way of conducting business is the plausible reason for a diversified product information need.

**Ordering Experiences**

In order to ascertain the ordering experiences of the customers, every aspect of ordering procedures have to be taken into account. The following questions were identified as possible customer desires when ordering material:

- effectiveness and user-friendliness of requisitioning procedures;
- availability of inventory information,
- unchallenged requisitioning quantities,
- availability of required products,
- order status information,

The order fulfilment process can be followed in Figure 24, as well as the actors involved. The studied system and the actors within it, makes up for a business-to-business relationship since the customers are companies and governmental departments such as Fire Departments. The second tier suppliers’ impact on the overall performance of the ultimate supply chain is of utmost importance, since they supply PlymoVent with the components and materials necessary for manufacturing the products. Thus, their activities are a part of the product
package. By delimiting them, which is done in accordance to the directives given, their logistics processes will not be investigated. Therefore, the outcome of this thesis will not have taken the suppliers into consideration.

In order to be able follow the order fulfilment process with a greater ease, the customers of PlymoVent can be divided into three groups, namely:

- **Domestic and complete systems buying customers.** Customers who buys both the expertise and the complete ventilation systems from PlymoVent. These customers are often considered as key accounts. When placing an order, they turn to one of the four vendors working the domestic market. They have the knowledge and the experience of designing a fully adequate ventilation system, for the situation given.

- **Domestic and component buying customer.** Domestic customers who only buys a small selection of products from PlymoVent, such as a hose or a fan, turns to PlymoVent’s wholesaler, Ahlsell. They are situated at some 75 locations in Sweden. However, PlymoVent only deliver their products to Ahlsell’s distribution center (DC). When the products arrive at Ahlsell’s DC the ownership is transferred from PlymoVent to Ahlsell.

- **International customers.** Abroad customers turns either to one of PlymoVent’s subsidies on their local market or to PlymoVent International, which is situated in Malmö. The subsidies all have storage capacity, intended both for component buying customers and complete systems buying customers. If stock-kept components are on backorder, the requested items can be purchased from an external supplier, in order to complete a delivery. However, this is not applicable in every situation imaginable, since there may be issues of conformance. Where the requested goods are not kept on stock and not available from external suppliers, the customers have to wait for a delivery to arrive from Lycksele. However, in situations where a standard stock kept product is on backorder, the customer is guaranteed delivery within a week the customer by the Quick Ship Programme.
The results of the questionnaire and the interviews indicate that opinions on difficulties due to minimum and maximum release quantities do not differ all too much across the markets. However, the Americans are of more neutral opinion than the Swedish. When it comes to minimum release quantities the dissatisfaction is a mere 10 per cent. On the other hand, maximum release quantities prove to cause more problems. According to the customers, this is due to lack of production capacity. One of the American customers expressed it as: “We could not get all of the products we needed on the date we wanted them, due to the fact that PlymoVent did not stock the required items and the production time of these items could not be encompassed by the desired total delivery time.” This is a question of priorities; low capital tie-up, cost of transportation mode and customer satisfaction, i.e. cost versus customer satisfaction.

Challenging of requisition quantities
Even though difficulties may occur due to requisitioning quantities, it seems to be the customers’ opinion that PlymoVent tries to solve them to best of PlymoVent’s ability. Again, the Swedish customers are somewhat more satisfied than the Americans.

Availability of inventory information
The interviews conducted indicate that the aspect of inventory information is of truly minor importance to the customer. Online information concerning PlymoVent’s inventory levels is non-existing. However, if customer needs to order a product, PlymoVent can tell them whether or not they keep it on stock. The need for such a service arise when the need for the products are imminent. This is seldom the case of PlymoVent’s customer, whom often plans months ahead when placing an order with PlymoVent.

Requisitioning procedures
The result of the survey indicates that the requisitioning procedures are both easy to use and effective. It may seem to be trivial, but it is of outmost importance to the customer that the customer can place an order without any hassle.
requisitioning procedures not are a source of irritation.

### Post Order Placement

![Post Order Placement](image)

*Figure 26. The figure shows the opinions the questionnaire respondents holds on different aspects of the experience the customers have had when placing an order with PlymoVent.*

#### Order status information

The order status information available today consists of the information where the order is in production line and if it has been shipped to the customer or not. The information concerning the whereabouts of the order after shipment from the manufacturing facility is not available. As can be seen in Figure 24, PlymoVent uses third party logistics provider when transporting the goods from the manufacturing facility to the customer. This causes PlymoVent to lose control of the whereabouts of the order. During the interviews with the management at PlymoVent it was stated that third parties often make promises on monitoring possibilities, but this has proven to be a promise which seldom is kept. Consequently, PlymoVent loses monitoring control, which also causes the customer to lose monitoring control over the order. When it comes to delivery within Sweden, this lack of monitoring causes little or no problem since transportation often is over night. On the other hand, shipping to American customers takes two- to three weeks, and consequently the lack of monitoring control causes problems to arise. Hence, the Americans show a greater dissatisfaction than the Swedish customers, both in availability and adequacy.

#### Availability of required items

The meaning of the statement “Required items are usually available” seems to have been misunderstood. It refers to whether or not PlymoVent carries the required items in their product assortment. During the interviews it was apparent that the customers interpreted the question as “Required are usually available immediately”, which refers to PlymoVent’s stock-keeping and not to the variegated degree of PlymoVent’s product assortment. Since the meaning of the statement diversifies amongst the customers it is impossible to analyze the...
meaning of the survey result.

**Backordered items**
The domestic component buying customers turns to PlymoVent's retailer, Ahlsell. They have the possibility of getting the required item immediately. But, as mentioned earlier, they are not encompassed in this survey since the ownership of the products is transferred upon delivery to Ahlsell. Hence, it is a matter of Ahlsell to predict the demand and to ensure that the goods required is available to the customers. The Swedish customers are excluded from the two last items since they do place their orders prior to production; i.e. the goods are not shipped to the customer until the order is complete. The statements are issues that Ahlsell should take under consideration. Therefore, the result of the questionnaire indicates that the stock-keeping in the USA can be said to be in need of a better prediction of demand and inventory control.

**Ordering Experiences Summary**
The ordering experience differs across the markets, probably mostly due to PlymoVent’s respective distance to the markets. The following two examples summarize the different market opinions well. Tommy Clasén at Scania says there has been no problem at all when requisitioning information and quotations to the planned project for the new assembly line in Södertälje. He is very satisfied with the response time and updated information. The most crucial part was to get the line up and working by the 5th of August, 2002. PlymoVent kept the deadline for the complete system; only one fan was not installed. Instead a standard fan was used for the first weeks and later replaced. Clasén says: “PlymoVent handled the complete installation perfectly and holds a great trust in the company.” One of the American customers declares, “Typical orders are handled very well! When we do have a rush order, we don’t get the cooperation that is required”.

**Shipments to Customers**
Concerning the shipment quality from PlymoVent and its vendors depot, the following questions have to be addressed;

- order documentation,
- damage of material,
- quantity accuracy,
- correct requested items, i.e. no substitution or obsolete items,
- actual delivery time, and
- accuracy of estimated delivery dates.

The shipping of PlymoVent’s products is provided by third party logistics provider, in order to achieve economies of scale and more frequent shipping, thus making the transporters an integral part of the supply chain, and its performance. As can bee seen in Figure 24, they deliver to both complete system solution buying customers and vendors. Upon delivery to the vendors, the ownership of the products is transferred to the vendors. As mentioned earlier, this study will view them as customers of PlymoVent. The choice of mode of transport within Europe is trucks, whereas transatlantic deliveries are made by ships. The actual time of transport within Europe ranges from a couple days up to a week, transatlantic deliveries takes about 14 days, depending on the departures of the ships. The products delivered from PlymoVent ships off from the manufacturing plant, situated in the very northern part of Sweden. From a geographic-strategic perspective, this location is not well-suited for
PlymoVent’s transport activities, since the greater number of the customers is located in the more southern part of Europe and overseas. The time to get the goods to the southern parts of Sweden, where the goods are either shipped overseas or taken further south in Europe on trucks, reaches up to two days. Furthermore, the Swedish market has the geographically advantage of being closer to the plant which gives the customer a relative shortened delivery time.

**Shipments Accuracy**

![Figure 27. The figure shows the opinions the questionnaire respondents holds on different aspects of shipment accuracy.]

**Backorder requisitioning time**
The Swedish customers are excluded from the two first statements since they place their orders prior to production. The result of the survey indicates that the American customers shows little or no satisfaction when it comes to requisitioning backordered items. Not one respondent agrees with the first statement. Thus, the requisitioning time of a backordered item is somewhat stochastic. It is notable that the amount of time an item is on backorder is considered to be all too long.

**Delivery date accuracy**
The statement rendered in a large amount of the respondents disagreeing. As many as 60 per cent of American customers disagreed and 40 per cent of the Swedish customers disagreed. However, the notion obtained from the survey is that the margin of error is bigger for the American customers than the Swedish customers, probably due to differences in distance. Furthermore, since the goods provided by PlymoVent often are crucial to the activities of the customers, problems of this nature causes obvious irritation with the customer.

**Delivery time**
The statements concerning the time between placing a requisition and receiving a delivery converges across the markets. The difference lies in that Swedish customers considers the
actual delivery time to be more acceptable than the American customers. Both markets show the same result when it comes to whether or not the delivery time varies. There is a widespread meaning of the delivery time being the same every time or not, half of the respondents concur with the statement whilst the other half do not.

**Estimated delivery date**
In order to avoid confusion; this statement concern the estimated delivery date when the customer asks for a quotation, not the date agreed upon when actually closing the deal. This statement rendered in results with significant difference across the markets. The share of American customers that disagrees is as much about 70 per cent, the rest agrees. The Swedish market shows quite the opposite result. Again, the distance to the customer is probably the reason for the differing opinions.

**Shipment Accuracy Summary**
The result of the survey indicates that the performance of the supply chain is insufficient, according to the customers. Those who are dependent on the products from PlymoVent in order to sustain its production, focus hard on short delivery times. Tommy Clasén at Scania says: “It is of greatest importance that the production line is up and running when planned and that product and spare part deliveries are short and accurate.” Jack Rossman at Air Ventilation Specialist expressed it as: “There is nothing more annoying when you expect goods to arrive at a certain date and they don’t. Of course I can understand discrepancy in promised delivery dates, but what I can’t accept is the not knowing. I need to be informed when such discrepancy occurs and preferably a new estimated delivery date.” The Americans display discontent with the accuracy of promised delivery dates, both in the questionnaire result and in the interviews conducted. One customer puts it like: “You never know just when the actual delivery date will be”. Another says: “8 weeks is a long time to expect a customer to wait. I would appreciate a delivery date or shipping date that is actually correct.” A third states: “PlymoVent’s delivery time and accuracy is truly poor. Getting products out of Sweden is getting tougher and tougher.”
Chapter 6

Shipment Content

Figure 28. The figure shows the opinions the questionnaire respondents holds on different aspects of shipment content.

Shipment Content Summary
Since the opinions somewhat converges across the markets across all statements, there is no need to present them statement by statement. Thus, the statements will be presented aggregated, the results are still obvious to the reader. Where the customers disagree with statements presented it is the Swedish customers’ opinions, except for the statement concerning materials received from PlymoVent depots. The share of the opinions does not differ across markets. However, it is hard to understand why the accuracy of the domestic shipment seems to be lower than those overseas. The interviews gave no further understanding to this matter. Again, a mental reservation is necessary; it could prove to be a result that is purely haphazard due to the low number of respondents since the procedure when shipping an order to a customer does not vary across markets.

Product Quality
In order to evaluate the perceived quality of the products PlymoVent provides, the customer were asked about:

- the package,
- the product performance,
- the conformance of parts,
- substituted items, and
- the price.
Figure 29. The figure shows the opinions the questionnaire respondents holds on different aspects of the product quality.

**Product price and performance**
The opinions do not differ all too much when it comes to product performance. The Swedish customers are a bit more negative than the American customers; some 25 per cent of the Swedish respondents disagree whilst about 10 per cent of the American customers disagree. One American customer states: “I have had experiences where the hose does not live up to its performance rating. PlymoVent needs adequate specification data.” When it comes to the price both market respondents shows 10 per cent disagreement. However, the American customers are of a more neutral opinion than the Swedish customers.

**Packaging and damage**
The result of the package marking statement correlates well with the shipment accuracy statements. Therefore, the Swedish respondents show a more negative attitude towards the statement. When it comes to the degree of protection, which the packaging sees to, the American respondents takes a more neutral stand, not too surprising as the goods are loaded and reloaded more frequent on its way to the customer. Damage as a result of the transport mode rendered the same result across markets.

**Conformance and performance**
The conformance of parts rendered a result with a bit more neutral stand made by the Swedish customer than the Americans, whom is bit more negative with 15 per cent disagreeing. When it comes to the products meeting the technical requirements the Swedish respondents shows a share of some 40 per cent disagreeing whilst all the American respondents concur with the statement. When it comes to the substituted items it is even worse; almost 60 per cent of the Swedish respondents disagree with the statement. This is in line with the experience of both
Andersson at Intercut and Clasén at Scania. They received substituted parts which did not live up to the technical requirements set. Some 15 per cent of the American respondents disagree. The largest share takes a neutral stand.

**Product Quality Summary**
The survey indicates that PlymoVent needs to put more effort in ensuring that the goods delivered meet the technical requirements. Interviews conducted on both markets indicate that PlymoVent original products are very competitive. It seems to be the performance of the substituted items that are inadequate. The interviews conducted further supports the result of the questionnaire. Furthermore, the interviews indicate that the pricing of PlymoVent’s products are competitive. None of the interviewees expressed discontent with the price.

**Discrepancy Reports**
When there is a report of a quality discrepancy, the contact man at PlymoVent leaves the errand to the claims manager at the manufacturing plant in Lycksele. The claims manager handles the errand himself or coordinates it to the product technology manager. Reports of discrepancies are usually made verbally, during conversations between the customer and their designated contact man, often the vendor who sold the product. The contact man at PlymoVent handles, to the best of his abilities, the discrepancy and tries to correct it. If he lacks the capability to resolve the issue he turns to the manufacturing unit in Lycksele for expertise. The documentation from PlymoVent says; if a discrepancy is reported to PlymoVent within seven days from customer detection, minor problems are taken care of immediately. Normally a misrepresented item is given highest priority to be sent to the customer. The item will be invoiced as a normal order and when PlymoVent receives the damaged item and asserts the error, the customer will be credited. In the case where the customer does not receive an ordered item, PlymoVent will after receiving the claim check its delivery reports and send the item immediately. If the carrier is involved in a damaged package, PlymoVent will charge them for the damage, and send a new item to the customer directly. In all of the cases the customer only has to contact the vendor or the claims manager at PlymoVent in Lycksele.

![Discrepancy Reports](image)

Figure 30. The figure shows the opinions the questionnaire respondents holds on different aspects of the discrepancy report.

**Quality discrepancy reports**
Quality discrepancy reports concerns the performance of products delivered by PlymoVent. The statement concerning the process differs in the sense that Americans takes a more neutral
stand, whilst the Swedish customers agree to bigger extent. The amount disagreeing is the same across markets. When it comes to the correction of problems the opinions do not differ across markets. The discontent with the resolution of problems was also evident during the conduction of interviews. Andersson at Intercut was dissatisfied with the handling of the quality discrepancy problem experienced by him. He said: “The fan did not work as it ought to. I filed a quality discrepancy report, which was first handled by the claims manager in Lycksele, whom directed the issue to the technical manager. However, the technical manager was on sick leave so the errand was left unsolved. The discrepancy was of the magnitude that the production could not proceed, which caused additional cost to us. The customer should not be afflicted by an employee of PlymoVent being on sick leave!”

Quantity discrepancy reports
The process meet little approval with the Swedish respondents, as much as 50 per cent disagrees with the statement, whilst 30 per cent of the American respondents disagree. As one Swedish customer expressed at as: “There is too much bureaucracy; filing this and that instead of solving the problem at hand immediately”. When comes to actual correcting the problem the respondents answers equally negative across markets. However, the Americans agree to a bigger extent than Swedish customers, whom are of a more neutral opinion.

Discrepancy Reports Summary
The result of the survey indicates that PlymoVent’s problem solving processes is inadequate. The discrepancy reports and processes is somewhat regulated through the standard ISO 9001. This bureaucracy may some times end up as a disadvantage to the customers. Many of the American customers have stated that the response time to technical questions needs to be improved. Jack Rossman further says: “Problem solving takes too long! Getting answers to questions that need immediate response can take too long because the appropriate contact person is not available.” Problems arise since PlymoVent only has one responsible person to answer questions and resolve problems. Consequently, if that person is not availiable, it can causes the customer problems.

Contact Quality
Questions concerning the customers’ impression with the contact they have had with PlymoVent can be argued –justly– to be a sub-heading to Discrepancy Reports. However, the questions concerning the contact quality is on a deeper, more specific level and was deemed to be of such importance to the overall impression of PlymoVent’s performance it demands its own grouping. In order to ascertain the customers’ experiences with the contact they have had with PlymoVent, two things need to be considered; the level of communication and the following behaviour. The level of communication refers to how well the involved parties communicate; do they understand each other? Is the contact person empathic, available, and uses the same vocabulary? Since contact often arises when one of the communicating parties needs something from the other, there often is a following behaviour after the specific contact. If the involved parties can not communicate, there is little or no hope to achieve the goal set for the initiated contact. Thus, the level of communication and the following behaviour are strongly interrelated. The customers were asked about how issues were solved, by whom, and how quickly.
Figure 31. The figure shows the opinions the questionnaire respondents holds on different aspects of the contact quality.

**Contact Quality Summary**

The result of the survey when it comes to contact quality correlates well with the perceived product performance and the discrepancy reports questions. The competence of PlymoVent’s personnel is perceived as inadequate by those who have received substituted items, which do not work as agreed upon. Hence, the Swedish respondents display more negative opinions on every statement. The statement concerning the level of empathy shown by PlymoVent’s personnel shows no difference in opinions across markets.

**Problem Resolution Quality**

PlymoVent provides installation as a part of the product package, but uses third party installations firms. This further complicates the matter when a situation arises where the responsibility is challenged. This makes up for a time consuming relationship, due to the fact that the question of responsibility needs resolution first, before the actual –customer perceived– problem is taken care of.
Evaluation of the Supply Chain Performance

Figure 32. The figure shows the opinions the questionnaire respondents holds on different aspects of problem resolution.

Problem resolution procedures
The Swedish customers answered 60 per cent agreeing while 40 per cent disagrees. The understanding of the procedures seems to bigger with the American customers; 20 per cent disagrees, the rest agrees or takes a neutral stand.

Response and resolution time
The opinions do not differ across markets when it comes to response and resolution time. Both the questionnaire and the interviews rendered in obvious discontent with issue at hand.

Problem resolution
When it comes to the question of the contact person being the one who sees to it that the problem reaches a resolution the Swedish respondents answer with a staggering 55 per cent disagreeing and a mere 15 per cent agrees, whilst the rest stands neutral. The Americans on the other hand answers with 10 per cent disagreeing. The difference is probably due to the fact that the contact man in the subsidiary in the USA finds it hard to redirect the errand to the manufacturing facility in Sweden. It is probably easier for a Swedish sales man to direct the errand to Lycksele since no language barrier exist. When comes to the actual resolving of the problem, less than 10 per cent of the Americans disagrees. 55 per cent of the Swedish respondents claim that the problem is left unresolved, only 15 per cent agrees with statement.

Problem Resolution Quality Summary
The survey indicates that the performance in problem resolution is truly insufficient. During the interview with Intercut’s founder and president, Mr. Anders Pettersson, it showed that problems of a quality discrepancy nature arose after the completion of an installation. The problem consisted of insufficient suction in a plasma-cutting table, as the installed system did not meet the technical requirement, the problems begun. At first, the fan was deemed not to have sufficient capacity for the installed system. At the cost of PlymoVent, the fan was immediately replaced with another fan, this time with a capacity which was assumed to be sufficient. However, the problem remained. This time the cutting-table itself proved to leak,
and the leakage was resolved by the manufacturer of the table. Still, the problem remained. By now, the pipes were suspected to leak, thus making it a matter for the installations firm to deal with. The installations firm maintained that the pipes were not leaking. This lead the parties involved to raise suspicion towards the new fan’s capacity. The contact man at PlymoVent left the errand to the claims manager at the manufacturing plant in Lycksele, who in his turn forwarded to the product technology manager, who was on sick leave. Consequently, the problem remained unresolved. By this time, the customer was confused and irritated over the complicated relationship between the parties involved to reach a resolution. The products that PlymoVent provides can sometimes be critical equipment, i.e. malfunctions cause the production to stop. If a PlymoVent product malfunctions, it could cause the working environment to be unhealthy for humans. This was the case with Intercut; the production facility could not be taken in use before the problem was resolved. The inability to solve the problem quickly, cause the customer to question PlymoVent as a trustworthy supplier. Although the case with Intercut is true, interviews with Tommy Clasén, chassis process manager at Scania, reveals a more efficient problem resolution. Problems of the same nature arose, not as fully complicated as the case of Intercut, at Scania after the final installation. The quality discrepancy was reported to Scania’s contact man, who together with the product technology manager solved the problem immediately. The problem was reported on Wednesday and by Monday it was resolved. This time Scania was in direct contact with PlymoVent personnel and did not involve the third part installer. The quick resolution impressed Scania, who would not hesitate to do business with PlymoVent again. Interviews conducted with American customers rendered a lot of negative statements. An American customer says: “Good products, but when something goes wrong it is almost impossible to get it straightened out. Plymovent customer service and the shipping department always blames someone else and never considers that they may have made an error. This cover up policy has lost us several good customers over the years. If it wasn’t for the fact that Plymovent makes good products, we would probably discontinue selling Plymovent.” Another states that it is imperative to their customer that the response time in technical inquires will be improved. A third says: “A problem arose and ended up in numerous service calls on our end and additional costs was unavoidable.”
Summary

As a conclusion the total measure of the customer value is presented in a table summary, divided into the different markets. This total measure can be presented in many ways, though mostly by an aggregated mean value as in this case. In many cases the explanation to the result refers to the distribution in differences between subgroups. The presented values are separated by market i.e. in this case country. It can also be done in other ways such as business area, product area etc. The table will show the performance of the different markets and can hopefully stimulate competitiveness between the subsidies.

<table>
<thead>
<tr>
<th>Product Information</th>
<th>Pre Order Placement</th>
<th>Post Order Placement</th>
<th>Shipment Accuracy</th>
<th>Shipment Content</th>
<th>Product Quality</th>
<th>Discrepancy Reports</th>
<th>Contact Quality</th>
<th>Problem Resolution Quality</th>
<th>Total Impression*</th>
<th>General Impression**</th>
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<td>3.21</td>
<td>3.47</td>
</tr>
</tbody>
</table>

*Mean value of specific arguments
**Value of customers’ opinion

Table 5. The table shows the mean value of the respondents’ opinions market by market. The opinion "strongly disagree" equals the numerical value 1; "disagree” equals 2; "neutral" equals 3; etc.
Importance Grading of Logistics Service Elements

This chapter will present the customers' opinion on the various logistics processes they deem as crucial or not to the performance of the supply chain. This chapter focuses on the customer itself and how they want the service to be carried out. The importance of the different logistics service elements are graded and later on linked to the actual performance of PlymoVent as a supporting tool where needed.

Logistics Service Elements

Specific logistics service elements prior stated are given to the customer for individual importance grading to further clarify the impact they have on the overall performance of the supply chain. For each group of questions, one summarizing statement is submitted to grade the individual relevance, see Appendix A. The answers will be analyzed as a support for the correlation analysis carried out. The mean value for the statements will be compared to the preceding performance questions. By doing so it will be possible to find out what the different customers want and strive for in a supplier. A great deal of effort can be put into serving a customer, but not always ending with the customer satisfaction one strives for. Given the market, business, and the environment a customer resides in, it is important to determine what the customer deems as crucial for its satisfaction, a task not too trivial even for the customer itself.

Consequently, this study will conduct a correlative analysis on the specific logistics service elements versus the overall opinion on the supply chain performance, see next chapter. The importance grading will be used in parallel to the correlative analysis as a supporting tool where needed, to verify whether or not the specific logistics elements really are of importance to customer, if any doubts are raised.

Furthermore, the importance grading presentation is presented in the very same way as the correlation scheme where the importance matches the performance. Likewise the generated blocks have a perfect match to the blocks aggregated for the correlation analysis. This will generate the support needed for the correlation analysis. When using the correlation analysis some uncertainties of the outcome may arise. The inbound characteristics may have great support in the importance grading but not in the correlation analysis. The importance grading will in those cases suit as verification for the inbound characteristics.

By manually comparing the answer grading to the correlation of the overall opinion it will be possible to determine if the customer has been true in hi/hers answers. Figure 33 shows the opinions in percentage.
Figure 33 shows ten different blocks of statement that will in the correlation analysis. Though the correlation analysis will only fit eight blocks, since there is no useful translation for all ten. The observations show very small percentages of disagreeing customers; possible reasons will be discussed later on.

Many of the logistics service elements are self-explanatory, whereas the raison d’être of others may need further elucidation. The information constitutes one of the cornerstones in the decision making process, concerning whether or not to use PlymoVent as a supplier, and involves what items to purchase. It does not only involve information on available products, and their respective price, but also technical information such as capacity to evacuate air, conformance with other products, etc. Likewise it is possible that complex and incomprehensible ordering procedures decrease the chance of the customer becoming a reoccurring one. Furthermore, it is of outmost importance that the order placement is understood by PlymoVent to ensure that the customer receives the goods that he/she really ordered. It could also be argued that order monitoring is encompassed by ordering procedures. However, during the interview with the management at PlymoVent one manager stated that the poor order monitoring was one of the biggest issues concerning the low customer satisfaction. Hence, these issues are of interest to find out whether or not they are something that the customers put a great deal of value on.

To further clarify the meaning of the importance, the matrix shown below has been developed. The mean values of the performances are measured to the importance that will show how well these blocks are performed in the organization. As can be seen when looking in Figure 36, the Correlation Matrix, there is a difference between the importance and correlation for most blocks. However, this is not an indication that either one of the analysis is wrong. The importance measure state what the customers believe to be of importance, whereas the correlation is a measure that determines the impact the blocks have on the total impression of
Importance Grading of Logistics Service Elements

the company, derived from the customers’ views.

As mentioned earlier, customers may have difficulties of answering objectively and truthfully; unconsciously, of course. When a customer is asked if something, which in addition is to his profit, is of importance he will inevitably mark that something rather high. A customer can not state that the performance of an important aspect lacks, and at the same time maintain that their overall impression of PlymoVent is fairly good. Analysis of each and every single respondent would be too comprehensive and time demanding. Consequently a dilemma arises. However, the information is still of use. Even though the specific mean value of the logistics service elements are hard to translate, the ranking among themselves is of interest. For example, the survey indicates that the customer finds it very important that discrepancies and problems get solved, and quickly, just not how.

Figure 34. Performance versus Importance mean value matrix.
Competitor Triggers

In order to further investigate the importance of certain supply chain aspects, the customers’ were asked what would trigger them to use a competitor of PlymoVent.

![Figure 35](image.png)

*Figure 35.* The figure shows the customers’ opinions concerning the possible use of PlymoVent’s competitors.

This block will not be measured with any correlation to the company impression as the prior, since it is not adequate. Analysis of Figure 35 gives enough information together with the importance grading in order to be able to compare it to the result of a correlative analysis. The comparative analysis is necessary to evaluate the correlations factors. If the factor analysis, see Figure 22, is improper; if one or two important aspects are aggregated with other aspects which are of no importance to the customer, the correlation factor will be low and will not reveal deficiencies in the supply chain.

When asking if the customers choose another supplier if they believe that PlymoVent cannot support them in the way they want there has been some differences among the markets. Prior statements indicate that the treatment, item availability, and delivery times has in some ways been carried out moderately by PlymoVent. The Swedes are more negative to the treatment which is consistent to prior statements. The customers say that they are willing to choose another supplier if the items required are on backorder. This is standard procedure in America. If a required item is on backorder, and a suitable substitute product is available the item is usually purchased where available. The delivery times can be the trigger to choose another supplier, according to the American survey. Related to the time lines are the stock holding, which can enable faster shipment. As stated before the time lines must be improved towards the international markets and should be done so in accordance to service versus inventory levels. Looking at the domestic market there are no indications that trigger a change of supplier due to the delivery times and inventory levels. Finally, when examining how the price may trigger a change of supplier, the customers believe the price setting is adequate and suitable for the products. The survey indicates that PlymoVent provides superior product quality to its competitors, which seems to be one of the major reasons preventing customers from altering suppliers. If the service surrounding the product is better and more trustworthy, there might even be room for a slight increase in price.
This chapter concludes the analysis of the supply chain and its performance. Logistics activities that need improvement are presented. Furthermore, measures that are necessary to take in order to raise the performance of the supply chain will also be presented in this chapter.

It has already been stated in this study that customers themselves can have problems stating whether or not certain logistics service elements are of true importance to their respective activities. To further clarify the meaning of this statement; if a customer states that a certain element is of outmost importance to their activities and maintains that PlymoVent performance in this matter is poor, they can not assert that they overall are satisfied with PlymoVent as a supplier. That would be self-contradictory. Therefore, the correlative analysis will be put in context to the importance grading of the specific logistics service elements. This is also done to ascertain the result from the survey. Drawing conclusion based on the correlative analysis, or the importance grading alone may prove to be misleading.

In order to be able to conduct a correlative analysis, the customers overall opinion concerning PlymoVent’s supply chain performance needs to be determined. The customers were asked the following questions:

- The performance of PlymoVent as a supplier?
- Which words best describes your feeling towards PlymoVent?
- What would your statements be when discussing PlymoVent with someone else?
- What is your general impression of the service PlymoVent provides?

The customers were asked to mark the performance of PlymoVent using a 1-5 scale of marks. The grade 1 translates into poor performance and 5 into excellent performance. The questions aggregated answers how the customers perceive PlymoVent as a supplier; i.e. their overall opinion.

The Correlative Matrix

In order to visualize the results obtained from the correlative analysis, the different aspects of the supply chain performance is put in the correlative matrix. It displays the different aspects, and their respective rating in a way that is comprehensible. Furthermore, it also creates an understanding of which aspects the customers deem to be in need of improvement by giving priority to those aspects that ends up in the upper left corner, i.e. the red area. Aspects in the red area are of great importance to the customers, but they lack the performance the customers demand. The right upper area; green area, is also of importance to the customers. But in contrast to the red area, the performance is sufficient to create customer satisfaction. The base area; grey area, constitutes aspects of the supply chain performance that have little or no impact on customer satisfaction. Aspects of the supply chain performance ending up in the grey area are called peripheral factors. The borders of the areas have been based on the scale of marks used. The reason for choosing the border between the red and green area can be said to be that a neutral stand, which equals a numerical value of 3, do not create customer satisfaction. A mean value of 3.5 or more is where the majority of customers are, at least, satisfied to some degree.
Logistics Service Elements in Need of Improvement

Logistics service elements that have the biggest impact on the overall supply chain performance and who are not currently creating customer satisfaction will be presented in this section. The aspects and the respective measures to be taken in order to enhance the performance of the supply chain should be given priority when redesigning the supply chain, as they – correctly managed – make up for the lion’s share of customer satisfaction. A widespread statement among philosophers say that no chain is stronger than its weakest link. However, the definition of supply chain used in this study allows some leeway, since it has proven that it is important that some links actually are stronger than others. But, in order to obtain an ultimate performance of the supply chain, all of the integrated parts of the supply chain should be refined and optimized, to fully enjoy all the advantages of a sound supply chain management.

Shipment to Customer

Shipment to customer has been divided into two subheadings; Shipment Accuracy and Shipment Content. The first group of questions concerns delivery times, and the latter concerns the actual content of the shipment received by the customers. The correlative analysis gives that Shipment Accuracy ends up in the red area, while Shipment Content is one of the peripheral factors. The Importance Grading renders the same judgement to the Shipment Accuracy. When trying to explain the Shipment Content with importance grading the report contains no comparative value for this factor, unfortunately. Consequently, the analysis of the matters concerning accuracy will be presented in this section, while shipment content matters will be analyzed in the following section, Peripheral Factors.

The actual shipment/transportation is one of the most visible parts of the supply chain to the customer, and has a big impact on the overall impression of the performance of the supplier.
As can be seen in Figure 7, the Supply Chain, contains of many different subsets, every one of them can be set up in different ways to reach the customer. The performance is the measure of the total impression of all these subsets. PlymoVent has tried different ways of setting up the supply chain over the years. No thorough elaborated strategy has been formulated or implemented. By adopting a supply chain management strategy, documenting goals and further developing strategic plans, the staff of the different divisions will have a clear and profound view of the issues. The customer knowledge will move from being tacit, into a clear understanding of what needs to be done in order to raise the customer satisfaction and efficiency of the supply chain.

At the time for the introduction of this study, the Swedish market faces new methods of purchasing standard goods. The wholesale firm Ahlsell will act as a retailer for the component buying customers. To the many, but minor customers, this will enable product deliveries over night. For larger projects and high level purchases, this will not has a major effect. As a result the Swedish market and its customers will have a faster and more reliable distribution chain. The survey result in the previous chapter shows that PlymoVent customers have slight differing opinions across the Swedish and American markets.

The first area of shipment considers the time aspect from requisition to delivery and delivery on time. No profound differences between the markets are to be found, but the American customers are in general more negative and few are totally satisfied. Delivery dates that are provided by PlymoVent rarely match actual deliveries. A large share, more than 50 per cent of respondents state that the promised dates are not kept. When asking if the customer believes that the time between placing a requisition and receiving the product is short, the difference is more obvious. Sixty per cent of the Swedish customers are positive to the delivery time, whereas only thirty per cent of the Americans say that it is satisfactory, and none totally agree with the statements. The negative opinion hold by the American customers is also evident when surveyed about backordered requisitions. Not surprising, but unfortunate as the backorder in itself creates additional dissatisfaction. It is all more unfortunate when the handling of a backorder requisition also creates dissatisfaction.

The problems can be derived from two thing; distance to market and inadequate inventory. The greater the distance the harder it is to estimate actual delivery dates. If a transatlantic shipment misses delivery on one crucial day, i.e. shipping day, that can render a one week delay for next shipment overseas. However, this is a problem PlymoVent has to overcome. The customers will not settle for such stochastic promised delivery dates. Since PlymoVent has explained that moving the manufacturing facility to a more geographically strategic position is not a viable solution, the problem needs to be taken up one level. This creates an understanding of the characteristics, which respective governing minimizes the problem.

Putting the distance problem aside, the problems seem to be derived from the lack of control PlymoVent have over the actual transportation of the goods to the customers. It is recommended that PlymoVent engage in a closer relationship with its third party logistics provider. This would create a better understanding of the dynamics of both businesses; better estimation of delivery dates, possibilities of better order monitoring, and a better overall understanding of each others needs and wants. PlymoVent should also evaluate the American warehouse; classification of stock kept goods, frequency of stock taking, time elapsed between replenishment of stock are all factors that need consideration. A well managed warehouse brings benefits such as time to customer would decrease significant, and accuracy of estimated delivery dates would be more precise.
Chapter 8

When surveying the American customers if they would be willing to pay extra for expedited delivery as few as 20 per cent disagreed whilst the rest agreed or took a neutral stand. Evidently, the American customers find the inaccurate delivery dates a big problem when dealing with PlymoVent, to the extent where they would be willing to pay extra to resolve it. If this indication is correct, some of the cost derived from raising the ability to delivery could be covered by the customers, a different choice in transport mode is not viewed as a viable economical option. However, even if a higher inventory level may prove to be an acceptable option, it should be considered as a secondary—or a temporary—solution. According to Eloranta (1988) research findings suggest that increasing inventory levels or increasing the slack in dispatching does not improve the delivery performance of orders, see Customer Service. Consequently, efforts should be put in creating a viable, efficient transportation link between the manufacturing plant and the customers and an effective warehousing management. PlymoVent should strive to raise their ability to deliver without keeping too high inventory levels. Even though the Swedish customers seem to be satisfied with the way transportation issues are handled today does not mean that the American customers are. The transportation issues concerning the American customers are much more complex, which should be recognised and the resolution of the issues should be assigned the proper efforts. The American customers constitute the largest market and should at no time be neglected or overlooked.

In order to summarize the issues concerning the accuracy of the shipments; the survey indicates a clear customer discontent with the present governing of the issues, at least with the American customer. The measures presented below are recommended to be implemented to raise customer satisfaction:

- **Engage in a Closer Relationship with the Third Party Logistics Provider.** As each firm in the supply chain directly and indirectly affects the performance of all the other supply chain members, as well as ultimate, overall supply chain performance, close relationship with the actors involved are inevitable. The full benefits of a supply chain management can never be achieved without close relationship among supply chain entities.

- **Evaluate the American Warehousing Management.** The survey indicates that the governing of the warehouse is inadequate. PlymoVent should evaluate the managing of the American warehouse; classification of stock kept goods, frequency of stock taking, time elapsed between replenishment of stock are all factors that need consideration. PlymoVent has the last year raised the inventory levels with some 300000 US dollars, without coming to terms with the shipment accuracy.

**Discrepancy Reports**

Discrepancy reports concerns issues when the shipment to customers contains either quantity discrepancies or quality discrepancies. Buying goods gives rise to many opportunities where things can go wrong. A package may not show up on time or be damaged, some products may be on back order or you simply need a longer hose than ordered. As theses small errors occur there must be an easy and comprehensible way of filing a discrepancy report. It can be the small mistakes and errors that evolve into larger disaster. The backwards communication that enables problem resolving is therefore of outmost importance to the customer. By having comprehensive, but understandable procedures that facilitate the correction of a discrepancy is
in many ways a necessity for the companies striving for a working supply chain.

As can be seen in the matrix, Figure 36, the correlation of this area makes up for a big part of the overall impression of PlymoVent as a reliable supplier. In this study the response correlation is 0.66 making it the fifth most relevant area. According to the mean value which merely reaches 2.85, PlymoVent’s efforts in this area are rather unfruitful. A glance at the different markets indicates that there are no specific differences in opinions and that most of the respondents are neutral or dissatisfied with the procedures carried out by PlymoVent. The fact that the customers are neutral or do not agree to the report process is partly due to the fact that they are not familiar to such structured report writing. Most of the customers are used to placing a phone call to their contact person and trust them to take care of the problem. Often this person is a salesman and has nothing to do with the claiming errand itself.

When filing a discrepancy report most of the respondents argue that there are no action taken to correct the problem or the action taken does not end with the problem being solved. This could be seen in one project where PlymoVent sold an add-on solution using some existing material. The solution soon proved to malfunction and when filing a quality discrepancy report to PlymoVent, numerous actors got involved but nothing happened. The actions taken did not generate any result in solving the problem which was vital the customer’s production. After running on half speed for some days and the problem was still not solved, the issue got more strenuous.

To summarize discrepancy reports it can be said that PlymoVent have well defined procedures, but it is the carrying out of the procedures that fails. PlymoVent is recommended to look over the handling of discrepancy reports. Even though procedures may seem to work fine in theory does not mean that they actually do. Filing a report should be an easy and quick process for the customer, and should render in a first, immediate response. The survey indicates that the customers feel that there is too much bureaucracy involved when filing and correcting a discrepancy report. The procedures should be shaped in a manner that makes it possible to monitor, thus controlling the problem resolution process. Monitoring possibilities also allows for updating the customer on the progress of the problem resolution. Situations where filing a discrepancy report do not render a resolution to the problem must never arise. Customers expect a response when taking the time to file a discrepancy report; swift response- and problem resolution time show responsibility towards customers.

**Post Order Placement**

There are many aspects of ordering procedures. This study has chosen to divide this category into two subsets; which involves procedures before an actual order has been placed, and afterwards. After the customer has recognized PlymoVent, and received information on the products, one of three situations arises; a requisition or an inquiry is placed to the sales personnel, or the customer simply does not contact PlymoVent again. Consequently, the pre order placement aspects service aspects are; requisitioning quantities, inbound information on inventory levels, and requisitioning procedures. If the aspects are recognized and handled right, they will enhance the probability of an actual buy. When the order has actually been placed different needs arise. Order monitoring and the availability of required items are aspects that need to be recognized and managed in a way the customers prefer. The correlative analysis shows that post order placement have a bigger impact on the overall performance, and are managed worse than pre order placement. Consequently, post order placement will be
presented in this section, whilst pre order placement will be presented in the section Factors Creating Customer Satisfaction.

The questions concerning Post Order Placement, are mostly to the interest of the American customers. Again, due to differences in distance to market, different needs arise. Previous chapter showed that the answers varied a lot and that many stocked items were put on back order. The vast answer frequency saying that required items are not available is another fact adding negative effect to the company, but can to some extent be explained by the fact that many of the customers place their order prior to production. Thus, no items required are available at the time of the order placement. However, surveying the customers about whether or not stocked items usually are available, more than 60 per cent of the respondents state that they usually are not. Accordingly, the survey indicates that PlymoVent needs to update its inventory control and prediction of demand. At the writing point of this study PlymoVent is looking at ways to change their way of producing goods. The intention is to keep a modularized product assortment. This would enable a faster order fulfilment process, as the final assembly would be the only manufacturing stage after the order is placed. Furthermore, predicting the demand and controlling the inventory would probably be easier with a modularized product assortment. However, this is not a solution that solves all the issues concerning post order placement, merely a step in the right direction.

When surveying the customers about order monitoring, it is evident that the need originates from the stochastic delivery dates experienced by the American customers. The Swedish customer gave no expression for such a need. Since the American customers maintain that they never really know when a shipment actually arrives, they would at least like to have the possibility of monitoring the whereabouts of the order. Order monitoring gives the customer a sense of control; any discrepancy would be communicated immediately, which enables the customer to plan ahead. Furthermore, an order monitoring system should be shaped in a manner which alerts the customer of any discrepancy, at the time of the discrepancy. Another issue concerning the control the customer has over his/her order is whether or not PlymoVent cancels backordered items. The result of the survey indicates that this is a common phenomenon when dealing with PlymoVent. This is an issue that would be resolved if a well functioning order monitoring system was put in use; the unfulfilled backorders would be visible, both to the customer and to the issuer of the manufacturing work plan. Thus, an order monitoring system would prevent orders to disappear.

The analysis of the impact on the overall impression of the company, shows that post order placement is the fourth most important with a correlation of 0.72. According to the performance which is no more than 2.93, improvement of the aspects of post order placement is of importance. For fast and profound recovery PlymoVent needs to focus on updated order status that is working properly and that required items to a higher level are available to customers on a more direct basis. The impression of these problems did not arise when talking to the Swedish system buying customers. They have, as earlier mentioned the advantage of overnight transportation and they plan the purchase to a bigger extent in advance. The partnership with Ahlsell in the Swedish market will probably enhance the domestic component buying customers’ satisfaction. Measures to be taken in order to enhance the supply chain performance follows:

- **Evaluate the Inventory Control and the Forecasting of Demand.** Improvement of the aspects would resolve the issues concerning the availability of required items.
items. Is the accuracy of present models satisfactory, do they describe the reality of PlymoVent’s business as conducted today? The survey indicates that there is a need for more accurate procedures to ascertain inventory levels. If the models are obsolete, PlymoVent needs to implement new and more accurate ones. Furthermore, review the procedures and make sure that the actors involved understand and carries out them correctly.

- **Implement an Order Monitoring System.** The survey indicates a true need for an order monitoring system. The reasons being; failure to comply with prescribed delivery dates and arbitrarily cancellation of backordered items. Both PlymoVent and its customers would benefit from an order monitoring system.

**Problem Resolution Quality**

The fact that problem resolution is another crucial part of the overall reputation when examining the performance of a supplier is notified in the literature and actualized by the analysis. The correlation to the total impression is 0.798, which marks a very high level. Cases which have a correlation factor of 0.5, or more are deemed to have such an impact on the company repute that one should strive for a performance grade over 3.5. Problem resolution quality does not reach more than 3.22, which in no case is good enough. Looking at the separated markets the values reaches 3.36 for USA and 3.06 for Sweden. This is not as high as preferred and therefore, certain actions have to be taken. PlymoVent should in the near future put extra effort to the problem resolution as well as the Discrepancy Report handling which are strongly interrelated. A mental reservation is in order; if a company lacks in performing the aspects encompassed by problem resolution quality, there is a big risk of the customer getting a long lasting negative impression of the company. There is little or no chance of a customer becoming a reoccurring one, since the customer probably feels that he/she was mistreated during the last encounter with the company. In an even broader perspective; a discontented customer is more likely to speak about his/her experience than a satisfied customer. Thus, a negative impression of the company will be spread by word of mouth.

The survey indicates that the American customers have a greater understanding of the problem solving procedures than the Swedish customers. Further analysis of the issue indicates stringency between the understanding of procedures and who actually resolves problem. 90 per cent of the American respondents states that the problem is resolved by the designated contact person at PlymoVent, whereas only 55 per cent of the Swedish respondents states the same. The interviews conducted further indicate this fact. The difference is probably due to the fact that the contact man in the subsidiary in the USA finds it hard to redirect the errand to the manufacturing facility in Sweden. It is probably easier for a Swedish sales man to direct the errand to Lycksele since no language barrier exist. During the interviews it was apparent that customers often find the problem solving procedure more incomprehensible the more actors involved in resolving the issues. Not only becomes the procedures incomprehensible; the bigger the number of actors involved, but PlymoVent also seem to find it harder to accept responsibility of a discrepancy. Several interviewees have mentioned cases where none of the actors would accept responsibility. PlymoVent should accept responsibility towards its customers in all cases, thus ensuring the satisfaction of the customer. Blaming other supply chain entities is not a viable way of conducting business. The use of external participants of the supply chain is merely a way of achieving economies of scale, and PlymoVent should at no time place the responsibility of fulfilling a customer’s needs
and wants on them. PlymoVent should engage in relationships with external parties whom they can trust to fulfil certain functions. If they can not fulfil the functions as desired by the customer, look for other options! The supply chain should be viewed as a seamless pipeline, which transforms raw material and customer needs and wants into desired goods or services. The third party members should not be viewed as detached entities where there is a shift of responsibility. Consequently, the satisfaction of customers is always the responsibility of the company where the customer originally placed his/her order. The cost of leaving a customer discontented—probably always—exceeds the cost of solving the problem at hand. PlymoVent need to change their very set of values concerning the aspects of problem resolution. It is not an issue of responsibility, rather what can be done to ensure that the customer is left in a state of satisfaction, and that responsibility falls into the domains of PlymoVent. The company is in dire need of revising its policy regarding claims errand.

The survey also indicates that time aspects concerning problem resolution quality seems to be of importance. When looking at the different areas of the problem resolution, one finds that inquiry response time are too long and that problem resolution takes all too long. The customer always focuses on the time elapsed from placing an order or an inquiry to actual delivery or response. Customers could be argued to be very egocentric; they demand attention, quick response to inquiries, they need to feel important and appreciated. If these basic demands can not be satisfied, the immediate outcome will be discontent. If something takes too long, no matter what, it really undermines all the other efforts made to fulfil the customers’ basic needs. However, situations may very well arise where there are no possibilities of an immediate response or resolution. In those situations, the customer should be continuously be updated on the progress. Updating the customer sends a clear message that he/she has not been ignored or overlooked, and that the company to best of its efforts are doing what can be done to resolve the issue. PlymoVent needs to establish procedures which ensure swift inquiry response time and faster problem resolving.

In order to summarize product resolution quality it can be said that PlymoVent’s performance is really lacking. Throughout the interviews voices were raised concerning this matter, as the result of the questionnaire also showed. PlymoVent is urged to take the findings with the outmost seriousness; the measures presented below would improve the supply chain performance if implemented:

- **Revise the Claims Errand Policy.** PlymoVent should try to adopt another approach to its problem resolving procedure; where the customers’ satisfaction is given priority to cost and not the other way around. PlymoVent exists on the good will of its customers, not the opposite. A strategy which ensures customer satisfaction should be formulated and communicated throughout the organization.

- **Implement Problem Resolution Procedures.** Procedures which ensure swift inquiry response time and a fast resolution of problem should be implemented. The procedures should also ensure that the customer is limited to one or two contacts in the company. The fewer actors involved the less confusion for the customer. Furthermore, if the designated contact person handles all the inquiries and problem solving it is less likely that the issue remains unresolved, since it is obviously his/her responsibility to see to it that the matter is resolved.
Peripheral Factors

Logistics service elements, which performance does not matter all too much on the total overall opinion on PlymoVent as a reliable supplier, will be presented in this section. The grey area in Figure 36, which constitutes the peripheral factors, has not been divided into fields of performance since it is hard to tell whether or not the factors create any significant customer satisfaction. Still, recommended measures and actions will be presented in order to raise the customer satisfaction, where it is deemed to be necessary. However, the recommended measures should not be given any priority. They should be considered when the supply chain already has reached an acceptable performance level, as putting a finishing touch the supply chain. One could argue that an adequate governing of the peripheral factors is what makes the supply chain performance exceed the customers’ expectations, if all the other factors rates high in performance.

Product Information

The group of questions called product information concerns the information provided by PlymoVent; if it is satisfactorily to the customers. The Product Information of PlymoVent is in many ways very good, at least the company has put a lot of effort in the catalogues on the products. The Internet site offers the product information in electronic format available for everyone.

From the analysis of the mean value of the respondents’ answers, it follows that PlymoVent’s performance in providing customers with the information they need to order is insufficient, as it falls under the acceptable limit of 3.5. Further analysis of the information group of questions sets the correlation value to 0.364, see Figure 36 This value indicates that the aspect of product information do not have a big impact on the total impression of PlymoVent as a supplier. It is also apparent that the Swedes are more likely mark neutral, compared to the Americans who more are willing to make a clear standpoint. Looking at the matrix, Figure 36, one observes the product information as one of the three aspects in the grey area that represents the peripheral factors. The aspects that end up in the grey area are the ones that should not be given the highest priority in the improvement process.

The survey results indicate that the American customers would like additional information to be found in the catalogues. Both the result of the questionnaire, and interviews conducted displays indication of discontent when it comes to the adequacy of information. The American customers hire architects and engineers themselves to design the systems. Hence, the American way of conducting business gives raise to a different need than the Swedish way do. While the Swedish customers rely on the expertise of PlymoVent’s personnel; with vast product knowledge, the American customers have to rely on a third party, whom in their turn has to rely on the product information provided by PlymoVent. According to Berggren (2003), who is the manager of the vehicle and exhaust products, the survey confirms the suspicion of PlymoVent’s lack in performance when it comes to providing adequate product information to the American customers. He states that designing a ventilations system requires some knowledge or experience in PlymoVent’s products. According to him it would be hard to design a system based solely on the catalogue information.

Thus, the survey indicates that the product information needs be more specific in order to enable overseas customers to design their own systems. The technical specifications and information provided by PlymoVent should be shaped in a way that does not require technical
consultation with PlymoVent personnel when considering PlymoVent products to be used in a customer in-house designed system. Even though the need for more specific product information is more evident in the American market, a system designing handbook could find its use in other markets as well. Furthermore, one could argue that a handbook in designing systems, using PlymoVent’s products creates a competitive advantage as it could be shaped in a manner that encourage the designer to use PlymoVent products throughout the whole system.

During interviews with Swedish customers it was apparent that some customers were unaware of the existence of product catalogues. Since it actually exist catalogues in different languages and media, the conclusion drawn have to be that PlymoVent fails to inform their customer of this fact. Making the customer aware of additional PlymoVent products can create a competitive edge. Even though the customer may not require a catalogue at the moment of purchasing PlymoVent products, the need may very well arise in the future.

In order to summarize the logistics service element of product information; the correlative analysis indicates that the supply chain performance -or the lack thereof in this matter have little impact on the customers’ overall opinion concerning PlymoVent’s supply chain performance. The total importance this factor has on the overall impression is somewhat as stated before, rather big. The information available make a great impact on the importance, but at the same time the opinion is separated among customers. This is more important for those that have to relay on the material itself, than those who put their trust in system designers who are familiar to the products. However, even though being a peripheral factor, the matter should be resolved but not be given immediate priority. Recommended measures to be taken in order to improve the product information follows:

- **Prepare a Systems Designer’s Handbook.** The handbook should contain adequate technical data, conformance of PlymoVent products, and comprehensive operating manuals. In order to keep the down cost of preparing such a handbook, appropriate appendices to existing catalogues and/or electronic information via the web could constitute such a handbook.

- **Make Greater Use of the Homepage.** The electronic media, which the homepage constitutes, is a cheap and effective way of reaching customers with adequate and updated product information. The result of the survey indicates that customers would like more updated information on product changes and new products. The homepage is a media which is excellent to convey such information.

- **Making the Customers Aware of the Information at Hand.** The customers need to be informed of and given the information that actually exist. Even though there may seem to be no such need, customers should have the product information communicated to them. It is always good to make customers aware of the whole product line due to possible future needs, word of mouth, and to the fact that it is always better to exceed customers’ expectations, rather than the opposite.

**Shipment Content**

Shipment accuracy concerns the actual content of the shipment. A logistic system must, as a part of customer service focus, fulfill the following seven R’s “...the right product in the right amount at the right place at the right time for the right customer in the right condition and at
the right price”. (Bloomberg, Murray & Hanna 1998). Shipment content concerns three R’s; namely the right product in the right amount and in the right condition.

The correlation analysis, that respond to the affect the different segments of the supply chain has on the overall customer opinion, indicates that there is a difference between the two shipment subjects. Looking at the matrix, see Figure 36, the first subject shipment accuracy correlates well to the overall importance (0.87). On the other hand the shipment content correlates much less (0.34). Factors encompassed by shipment accuracy concerns more critical issues, which performance the company repute and the customer satisfaction relies heavily on.

The performance rating of shipment content reaches fairly high, 3.75. The Swedish respondents answer more negative than the American respondents. If the survey result, which indicates that the American shipping procedures are more precise, is veracious it is recommended that the American procedures be adopted by the shipping personnel in Lycksele. However, the differing opinions across markets could prove to be purely haphazard. If a greater number of respondents were to participate in the survey it could be argued that the opinions would converge, either towards the Swedish opinion, or the American opinion. Consequently, no market segmented action is would be necessary. Although this may be true, PlymoVent is recommended to compare the shipping procedures of USA subsidiary and Lycksele. If they differ, PlymoVent is wise to adopt the American procedures to the manufacturing facility in Lycksele.

Product Quality

The actual performance of a product is very much important to the evaluation and the choosing of supplier. Before an actual buy the customer has all the different players on the market to choose from. When considering a first buy much rests upon the price – performance ratio. Good quality of the product renders the supplier repute among the players and customers on the market. PlymoVent product quality do not differ across markets, it is only a few technical differences such as input voltage.

As can be seen among the customers’ answers there are no direct difference between the two markets and the overall opinion is that PlymoVent provides good quality products to competitive prices. This is the first significant aspect that marks a good and reliable supplier. Further the Swedish customer is more negative about the technical specifications. The survey rendered in some customers stating that the products do not meet the specifications, which is very bad for those who tend to manage the buying on their own; i.e. component buying customer.

The fact that the correlation of this area is not more than 0.29 shows that the overall impression of PlymoVent as a supplier does not vary much to these kind of characteristics. One can argue that this analysis is wrong and not reliable, but when looking into the specific arguments of this area one can see why. The product quality and the pricing are the two arguments that make up much for the correlation. The other arguments are of minor matter to the overall impression. Looking into the importance grading of the product quality it is found that the actual product quality is very important to the customer. In that case the correlation analysis is totally wrong, due to the fact that most of the statements that make up product quality are rather irrelevant to the customer. Therefore, it is of great importance
to maintain the product quality. However as the mean value only reaches 3.58 there are some improvements that can be carried out for this segment in order to raise the customer satisfaction. PlymoVent is recommended the following measures:

- **Ensure that the Technical Requirements are met.** The survey indicates that PlymoVent needs to put more effort in ensuring that the goods delivered meet the technical requirements. Interviews conducted on both markets indicate that PlymoVent original products are very competitive. It seems to be the performance of the substituted items that are inadequate. The interviews conducted further supports the result of the questionnaire.

### Factors Creating Customer Satisfaction

In this section logistics aspects which performance are sufficient to create customer satisfaction will be presented. Even though the performance of the aspects may exceed the lowest acceptable performance, there may still be room for improvement. PlymoVent should strive to position its performance as far to right as possible in the correlative matrix. The measures presented should not be given any priority of implementation. However, if implemented they would raise the customer satisfaction.

**Contact Quality**

In order to see how well the people at PlymoVent communicate and interact with its customers, this section is critically analyzed. It is crucial to the customer to know the supplier on a profound basis, which enables the customer to engage in fruitful communication with the company. This is of course much a two way interaction where both parties have to understand each other. This analysis will help the PlymoVent personnel to realize to what grade their customers understand them.

Analyzing the result of questionnaire, showing the level of satisfaction of the different markets, there is no indication of market differentiated answers. What can bee seen is that the satisfaction level of the Swedish market is much lower. The Americans rank the contact quality higher (3.90) than the Swedish market (3.64). Since the sales organizations are the ones mostly communicating with the customers and these organizations differ among the markets, there may be differences among the personnel and in the way of working and interacting with its customers. Sales people have different personalities, which are usually of great importance when selling the product. Therefore the opinions may differ a lot. When interviewing Swedish customers, there have been representatives from both parties. Integrating the sales personnel and documented approach will help towards a customer driven value chain explained earlier in chapter 4.3.1, *Customer Oriented Value Chain*.

Stated in the report is the value of supported interaction and the overall competence and integrity of the sales and customer service personnel. The goal is to reach and deliver a value added service for the customers. This is done through enhancing the link between the customer and the supplier.

- **Establish Sales Personnel Symposium.** PlymoVent is recommended to arrange a yearly symposium for the sales personnel. A symposium would enable the sales personnel to exchange expertise and experiences. This would also constitute an
opportunity to further educate the personnel on the subject of salesman skills.

**Pre Order Placement**

The procedures used by PlymoVent are well received by the customers on both markets. Though, none of the Americans totally agree with the statements, there is an overall opinion that everything works just fine. The inventory level is not available to the customers, which is normal for the business in which PlymoVent ventures.

When analyzing the overall impact on the total impression these arguments have on the company, one find that the correlation is 0.55 and the mean value is 3.57. This will render a very good grade and place the block in the upper right corner. This corner is marked green as it shows the blocks that have a good performance which needs to be maintained, and if possible refined. The survey resulted in that there seem to be no problem with the dynamics in the relationship PlymoVent has with its customers. However, the discontent with PlymoVent’s problem resolution has a negative effect on the rating. There is no need for any specific measures to be taken in order to raise the personal contact quality besides the ones prescribed in the section of problem resolution quality.

**The CSCIC Applied to PlymoVent’s Business**

The continuous supply chain improvement cycle set in context of PlymoVent’s business could be argued to be generalized in to somewhat representative of small to medium sized multinational companies, active in the line of business of supplying fresh air to human working environment. To generalise even further, it could argued to be representative for small to medium sized manufacturing companies competing in a global market. However, the generalisation is not based on any specific research or surveys and should be considered as such. Rather, the discussion of generalisation is based on previous experiences and notions of the authors.
Many of the inadequacies, or lack in performance experienced by PlymoVent’s customers are not very rare in small to medium sized companies, operating trans-national. Not seldom lacks the companies understanding of the dynamic relationship a company has with its customer. All too often focus is put on the immediate cost rather than to focus on pleasing the customer. The choice of the word immediate cost serves a purpose here; in a broader perspective: implicit costs arise when a company leaves a customer dissatisfied. The implicit cost is hard to quantify, and all too often forgotten about. A once spoken quality statement will conclude this analysis:

"Quality is free. It is the lack of quality that arise costs."
Recomendations

This chapter summarizes the report and presents a suggestion of an action plan. The action plan will help PlymoVent of raising their supply chain performance.

In the prior analysis several new insights and observations have been realized about the supply chain of PlymoVent. During the progress of this study the customers of PlymoVent have been able to give their view on different aspects concerning the supply chain performance. The performance has been divided into different areas which aggregated makes up for the total supply chain performance. The final goal is to make all involving elements work together as a seamless chain; the creation of the ultimate market infrastructure. The supply chain approach can be seen as an environment which is ever evolving. Consequently, it is never time to stop developing processes which is embraced by the supply chain. Supply chain management may seem to be an intricate struggle with relationships and procedures, service levels and costs. However, a poorly managed supply chain requires a lot of attention and supervision. Furthermore, some logistics service elements, that lacks in performance may very well create additional demands on the supply chain. Order monitoring can be argued to be a need which originates from poor performance in delivery date accuracy, which in its turn could originate from poor warehousing management, the need for more effective discrepancy reports originates from poor performance in problem resolution, etc.

In order to make an easy and understandable action plan for PlymoVent, the following improvements, which stem from the previous analysis, have been issued. The presented issues concern vital measures to take in order for the company to deliver enhanced product- and service value. The main issues to focus on are seen in the red field of the performance matrix in previous chapter. Immediate and thorough actions need to be carried out by the senior management of PlymoVent. In order to reach the desired goals, the management has to communicate, maybe even provide the personnel with documented course of actions that support the directions regarding the changes presented –in a prioritized order– below:

- **Revise the Claims Errand Policy.** PlymoVent should try to adopt another approach to its problem resolving procedure; where the customers’ satisfaction is given priority to cost and not the other way around. PlymoVent exists on the good will of its customers, not the opposite. A strategy which ensures customer satisfaction should be formulated and communicated throughout the organization.

- **Implement Problem Resolution Procedures.** Procedures which ensure swift inquiry response time and a fast resolution of problem should be implemented. The procedures should also ensure that the customer is limited to one or two contacts in the company. The fewer actors involved the less confusion for the customer. Furthermore, if the designated contact person handles all the inquiries and problem solving it is less likely that the issue remains unresolved, since it is obviously his/her responsibility to see to it that the matter is resolved.

- **Evaluate the Handling of Discrepancy Reports.** Filing a report should be an easy and quick process for the customer, and should render in a first, immediate response. The survey indicates that the customers feel that there is too much bureaucracy involved when filing and correcting a discrepancy report. The procedures should be shaped in a manner that makes it possible to monitor, thus controlling the problem resolution process. Monitoring possibilities also allows for updating the customer on the progress of the problem resolution. Situations where filing a discrepancy report do
not render a resolution to the problem must never arise. Customers expect a response when taking the time to file a discrepancy report; swift response- and problem resolution time show responsibility towards customers.

- **Evaluate the American Warehousing Management.** The survey indicates that the governing of the warehouse is inadequate. PlymoVent should evaluate the managing of the American warehouse; classification of stock kept goods, frequency of stock taking, time elapsed between replenishment of stock are all factors that need consideration. PlymoVent has the last year raised the inventory levels with some 300000 US dollars, without coming to terms with the shipment accuracy.

- **Evaluate the Inventory Control and the Forecasting of Demand.** Improvement of the aspects would resolve the issues concerning the availability of required items. Is the accuracy of present models satisfactory, do they describe the reality of PlymoVent’s business as conducted today? The survey indicates that there is a need for more accurate procedures to ascertain inventory levels. If the models are obsolete, PlymoVent needs to implement new and more accurate ones. Furthermore, review the procedures and make sure that the actors involved understand and carries out them correctly.

- **Engage in a Closer Relationship with the Third Party Logistics Provider.** As each firm in the supply chain directly and indirectly affects the performance of all the other supply chain members, as well as ultimate, overall supply chain performance, close relationship with the actors involved are inevitable. The full benefits of a supply chain management can never be achieved without close relationship among supply chain entities.

- **Implement an Order Monitoring System.** The survey indicates a true need for an order monitoring system. The reasons being; failure to comply with prescribed delivery dates and arbitrarily cancellation of backordered items. Both PlymoVent and its customers would benefit from an order monitoring system.

- **Ensuring Technical Requirements.** The survey indicates that PlymoVent needs to put more effort in ensuring that the goods delivered meet the technical requirements. Interviews conducted on both markets indicate that PlymoVent original products are very competitive. It seems to be the performance of the substituted items that are inadequate. The interviews conducted further supports the result of the questionnaire.

- **Prepare a Systems Designer’s Handbook.** The handbook should contain adequate technical data, conformance of PlymoVent products, and comprehensive operating manuals. In order to keep the down cost of preparing such a handbook, appropriate appendices to existing catalogues and/or electronic information via the web could constitute such a handbook.

- **Make Greater Use of the Homepage.** The electronic media, which the homepage constitutes, is a cheap and effective way of reaching customers with adequate and updated product information. The result of the survey indicates that customers would like more updated information on product changes and new products. The homepage is a media which is excellent to convey such information.

- **Making the Customers Aware of the Information at Hand.** The customers need to be informed of and given the information that actually exist. Even though there may seem to be no such need, customers should have the product information communicated to them. It is always good to make customers aware of the whole product line due to possible future needs, word of mouth, and to the fact that it is always better to exceed customers’ expectations, rather than the opposite.

- **Compare Shipping Procedures.** The survey indicates that the American shipping
procedures are more accurate than the Swedish. PlymoVent is recommended to compare the shipping procedures of USA subsidiary and Lycksele. If they differ, PlymoVent is wise to adopt the American procedures in the manufacturing facility in Lycksele.

- **Establish Sales Personnel Symposium.** PlymoVent is recommended to arrange a yearly symposium for the sales personnel. A symposium would enable the sales personnel to exchange expertise and experiences. This would also constitute an opportunity to further educate the personnel on the subject of salesman skills.

Supply chain management encompasses not only the flow of goods or services, it relies heavily on the flow of information; both intra-company and inter-company. The different channels of communication is like the bloodstream for the supply chain; i.e. vital to its progress, see *Linking Logistics and Marketing*. When conducting the thesis numerous situations arose when the internal communications were all but effective. The communication proved all too often to be one way, both on domestic and international basis. This arouses suspicions of communication’s customs unfit for a modern organization. PlymoVent is wise to recognize the weight of effective communication. Information is conveyed for a reason; usually to get a response or a reaction. A frequently recurring situation was when placing certain inquiries, promised an answer and then, later on, ignored. This leavened all through the organization. If this behaviour finds the least resemblance to the ordinary way business are conducted, then PlymoVent is in need of improving its communication channels. Steps towards improving the level of communication within the company does not need to involve complicated processes. It could involve the following steps; the senior management formulates a communication statute, communicates it through the entire organization, and last but not least –lives by its credo.

The changes presented will help PlymoVent in raising their supply chain performance and the customer service level. The measures are all derived from the customers’ own needs and wants. Hence, the customers will perceive them as enhancing the value of the product. A becoming mental reservation concludes this study: *the implementation of measures have greater chance of success if they are deeply rooted in the agenda of the top management.*
Figure 38. The figure shows a proposed action plan, to raise the supply chain performance. The red marked tasks are those who should be given priority, whilst the green ones should not be treated as equally important.
The action plan, as presented in Figure 38, is merely a suggestion on how to proceed with redesigning the supply chain, thus raising the performance and customer satisfaction levels. The first task, *Improve Company Communications Channels*, refers to evaluate the level of communication in the organization. PlymoVent should try to map the communicating behaviour and, if necessary, try to establish more efficient communications procedures. The task should be undertaken immediately, since inappropriate communication causes businesses to be inefficient; its negative effects leave no member of the organization untouched. According to the action plan it should be a resolved issue by the end of the summer vacation.

The beginning of the third quarter should mark the point of departure for the work on redesigning the supply chain, and stretches through the fourth quarter. By then a new, sound culture of communication should have been established within the organization. The action plan, Figure 38, is only a suggestion; the duration of the tasks has been chosen rather arbitrarily. However, it provides a picture of how to proceed with refining the supply chain; the rest is merely a tampering with task bars and time lines. A few comments are in order to further clarify the action plan. The red marked tasks are not to be taken lightly. PlymoVent is recommended to complete the tasks as soon as possible, issue resolution at least by the end of the fourth quarter. The tasks linked to each other are to be resolved in consecutive order, as described. The top management should be the ones who *formulates and communicates a new claims errand policy*. The chance of fast company adoption increases if it stems from top level, preferably from the CEO. The tasks that run all through quarter three and four should be considered continuous.

**Future Studies**

Appropriate actions/studies closely connected to this report and who would serve as complements to this study are:

- **Evaluation of the level of communication within PlymoVent.** In order for the supply chain to reach its full potential, PlymoVent needs to have effective channels of communication.
- **Conduct a follow-up survey.** PlymoVent is urged to follow the customer centric continuous supply chain improvement cycle, Figure 11.
- **Study the warehousing possibilities on a strategic basis.** Warehouses in the USA and central Europe could constitute distribution centre for the American and European markets.
<table>
<thead>
<tr>
<th>Term</th>
<th>Explanation</th>
<th>Swedish Translation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adopt</td>
<td>Accept, take on, approve</td>
<td>Lägga sig till med, uppta</td>
</tr>
<tr>
<td>Afflict</td>
<td>Bother, trouble</td>
<td>Flägga, ansätta</td>
</tr>
<tr>
<td>Aggregate</td>
<td>Combined, collective, cumulative</td>
<td>Lägga ihop, kombinera</td>
</tr>
<tr>
<td>Ascertain</td>
<td>Determine, establish</td>
<td>Förvissa, ta reda upp, bilda en uppfattning om</td>
</tr>
<tr>
<td>Assert</td>
<td>State, say, maintain</td>
<td>Vidmakthalla, hava</td>
</tr>
<tr>
<td>Backorder</td>
<td>Supposedly produced goods or service, which for some reason are not</td>
<td>Restnoterad</td>
</tr>
<tr>
<td>Carrier</td>
<td>See Transport mode</td>
<td>Se eng. Transport mode</td>
</tr>
<tr>
<td>Collaborative</td>
<td>Combined, mutual, work together</td>
<td>Samarbetande</td>
</tr>
<tr>
<td>Comprehensive</td>
<td>Extensive, complete, all inclusive</td>
<td>Uttoomande, fullständig</td>
</tr>
<tr>
<td>Comprehensible</td>
<td>Understandable, intelligible</td>
<td>Förståelig, begriplig</td>
</tr>
<tr>
<td>Conformance</td>
<td>Match, fit, i.e. conformance of pieces of a jigsaw puzzle.</td>
<td>Att passa/lampa ihop.</td>
</tr>
<tr>
<td>Constitute</td>
<td>Make up for</td>
<td>Utgor</td>
</tr>
<tr>
<td>Constraint</td>
<td>Restriction, limitation</td>
<td>Restriktion</td>
</tr>
<tr>
<td>Deduction</td>
<td>See Induction &amp; Deduction</td>
<td>Se Induction &amp; Deduction</td>
</tr>
<tr>
<td>Deficiency</td>
<td>Lack, insufficiency, deficit</td>
<td>Otillräcklighet, bristfällighet</td>
</tr>
<tr>
<td>Depot</td>
<td>Depository, warehouse, storage area</td>
<td>Lager, förvald</td>
</tr>
<tr>
<td>Discrepancy</td>
<td>Inconsistency, difference, something out of the ordinary</td>
<td>Avvikelse</td>
</tr>
<tr>
<td>Disparate</td>
<td>Contrasting, incongruent</td>
<td>Motsatt, kontrasterande, olikartade</td>
</tr>
<tr>
<td>Domestic</td>
<td>Within national borders, house, home, family</td>
<td>Inhemsk</td>
</tr>
<tr>
<td>Economies of scale</td>
<td>Economic advantage</td>
<td>Ekonomiska skalfordelar</td>
</tr>
<tr>
<td>Encompass</td>
<td>Include, comprise</td>
<td>Omlotta</td>
</tr>
<tr>
<td>Entity</td>
<td>Unit, being. Here, an actor in the supply chain</td>
<td>Enhet, väsen. Har, medlem av supply chain</td>
</tr>
<tr>
<td>Fallacy</td>
<td>Erroneous belief, misleading notion</td>
<td>Misstag, felbedömning, bedräglighet</td>
</tr>
<tr>
<td>Fire House</td>
<td>A PlymoVent product line</td>
<td>Produktupp</td>
</tr>
<tr>
<td>Generic</td>
<td>General, common, non-specific</td>
<td>Generisk, allmän, generisk</td>
</tr>
<tr>
<td>Governing</td>
<td>Managing, controlling</td>
<td>Styrande, ledande</td>
</tr>
<tr>
<td>Haphazard</td>
<td>Random, by chance</td>
<td>Slumpmassig</td>
</tr>
<tr>
<td>Hermeneutics</td>
<td>See Science - the approach</td>
<td>Se Science - the approach</td>
</tr>
<tr>
<td>Incur</td>
<td>Happen, take place</td>
<td>Utspela, handa</td>
</tr>
<tr>
<td>Induction</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inquiry</td>
<td>Question, query</td>
<td>Förfra, frågning</td>
</tr>
<tr>
<td>Inter-company</td>
<td>Among companies</td>
<td>Företag emellan</td>
</tr>
<tr>
<td>Intra-company</td>
<td>Company internal</td>
<td>Foretaginom</td>
</tr>
<tr>
<td>In-transit</td>
<td>During transportation</td>
<td>Under transportering</td>
</tr>
<tr>
<td>Locus</td>
<td>Place, point of</td>
<td>Plats, ställe</td>
</tr>
<tr>
<td>Logistics</td>
<td>See Logistics</td>
<td>Se Logistics</td>
</tr>
<tr>
<td>Logistics service element</td>
<td>Supply chain properties and activities which create additional product value, see Logistics Service Elements.</td>
<td>Egenskaper hos, och aktiveter, i supply chain, se Logistics Service Elements.</td>
</tr>
<tr>
<td>Machining</td>
<td>Cutting production processes</td>
<td>Skärande bearbetning</td>
</tr>
<tr>
<td>Measure</td>
<td>Action, step</td>
<td>Åtgärds</td>
</tr>
<tr>
<td>Obsolete</td>
<td>Outdated, superseded</td>
<td>Föräldrad, ej längre bruklig</td>
</tr>
<tr>
<td>Term</td>
<td>Translation</td>
<td>Glossary</td>
</tr>
<tr>
<td>----------------------</td>
<td>----------------------</td>
<td>----------------------------</td>
</tr>
<tr>
<td>Pertain</td>
<td>Concern, regard</td>
<td>Angå, gälla, tillhöra</td>
</tr>
<tr>
<td>Positivism</td>
<td>See Science - the approach</td>
<td>Se Science - the approach</td>
</tr>
<tr>
<td>Procurement</td>
<td>Acquisition</td>
<td>Anskaffande, göra sig tillgodo</td>
</tr>
<tr>
<td>Replenishment</td>
<td>Rehill, renewal of stock</td>
<td>Återfyllnad av lager</td>
</tr>
<tr>
<td>Requisition</td>
<td>Demand, application, put in for</td>
<td>Rekvisition, beställning for</td>
</tr>
<tr>
<td>Retailer</td>
<td>See Vendor</td>
<td>Se eng. Vendor</td>
</tr>
<tr>
<td>Subsidiary</td>
<td>A company owned by another company, and is a part of larger organization.</td>
<td>Dotterbolag, dotterforetag</td>
</tr>
<tr>
<td>Supply chain</td>
<td>See Supply Chain Management</td>
<td>Se Supply Chain Management</td>
</tr>
<tr>
<td>Supply chain management</td>
<td>See Supply Chain Management</td>
<td>Se Supply Chain Management</td>
</tr>
<tr>
<td>Tacit</td>
<td>Intangible, no hands-on experience, unspoken</td>
<td>Tro, men inte veta</td>
</tr>
<tr>
<td>Tier</td>
<td>Level, row, layer</td>
<td>Nivå</td>
</tr>
<tr>
<td>Top Grade Collection</td>
<td>A PlymoVent product line</td>
<td>Produktgrupp</td>
</tr>
<tr>
<td>Top management</td>
<td>Executives and managers of a company</td>
<td>Foretagsledning</td>
</tr>
<tr>
<td>Toss-up</td>
<td>Random, by chance</td>
<td>Slump</td>
</tr>
<tr>
<td>Transport mode</td>
<td>The entity physical carrying the order to customer; airplane, ship, truck</td>
<td>Transportmedel</td>
</tr>
<tr>
<td>Turnover</td>
<td>Income, earnings, revenue Omsättning</td>
<td></td>
</tr>
<tr>
<td>Value chain</td>
<td>See Linking the Value Chain to SCM</td>
<td>Se Supply Chain Management</td>
</tr>
<tr>
<td>Vehicle Exhaust</td>
<td>A PlymoVent product line</td>
<td>Produktgrupp</td>
</tr>
<tr>
<td>Vendor</td>
<td>Retailer, wholesaler, merchant</td>
<td>återförsäljare</td>
</tr>
<tr>
<td>Wholesaler</td>
<td>See vendor</td>
<td>Se eng. Vendor</td>
</tr>
</tbody>
</table>
References


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Clasén Tommy, Scania, interviewed 2003-02-19


Norén, Lovisa, CMA Centrum för Marknadsundersökning, interviewed 2003-03-03


och rapportera en undersökning. Studentlitteratur, Lund


Pettersson, Anders, CEO Intercut, interviewed 2003-02-06


Rossman Jack, ACS Rossman, interviewed 2003-02-10


Appendix A - Questionnaire

PlymoVent AB
Customer Service Questionnaire

I. Instructions

Click in the box beside the answer which is closest to your response for each question.
Erase changes clearly.
We want your impressions of PlymoVent. There is nothing you need to “look up”.
Please respond in order to your experience.

For each question below you will find a statement about some aspect of PlymoVent’s performance. For the items, please indicate whether or not you agree with the statement on the following scale.
Upon finishing the Questionnaire, carefully save the document and return it attached in an e-mail to pv_survey@plymovent.se

Just click in the box that most closely matches your opinion of PlymoVent’s performance for that question. Mark only one!

II. Questions

The first group of questions concerns your impression of PlymoVent’s performance in providing you information on the products you need to order:

<table>
<thead>
<tr>
<th>Statement</th>
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<tbody>
<tr>
<td>Catalogue information is available</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Catalogue information is adequate</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Price change information is available</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Information on product changes is available</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Information is made available for new product(s)</td>
<td></td>
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</tbody>
</table>
This group of questions deals with your experiences ordering material from PlymoVent:

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</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>Requisitioning procedures are effective</td>
<td></td>
<td></td>
<td></td>
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<td></td>
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<td></td>
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<td>7</td>
<td>Requisitioning procedures are easy to use</td>
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<td>8</td>
<td>Inventory information is available</td>
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<td>9</td>
<td>Estimated delivery dates provided by PlymoVent are accurate</td>
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<td>10</td>
<td>Requisitioning quantities are not challenged</td>
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<td>Difficulties never occur due to maximum release quantities</td>
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<td>12</td>
<td>Difficulties never occur due to minimum order quantity constrains</td>
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<td>13</td>
<td>Information on minimum order quantities are available</td>
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<td>14</td>
<td>Few stocked items are not backordered</td>
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<td>Backordered items are not arbitrarily cancelled by PlymoVent</td>
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<td>16</td>
<td>Required items are usually available</td>
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<td>17</td>
<td>PlymoVent availability problems cause your activity to maintain additional stock locally</td>
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<td>18</td>
<td>Order status information is available</td>
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<td>19</td>
<td>Order status information is working satisfactorily</td>
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<td>20</td>
<td>The time between placing requisition and receiving a delivery is short</td>
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<td>21</td>
<td>The time between placing requisition and receiving a delivery is the same every time</td>
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<td>22</td>
<td>Deliveries arrived on the date promised</td>
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<td>23</td>
<td>The amount of time a requisition is on backorder is short</td>
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<td>24</td>
<td>The amount of time a requisition is on backorder is the same every time</td>
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This group of questions asks about shipments from PlymoVent depots and PlymoVent vendors to your activity:

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<tr>
<td>25</td>
<td>Order documentation arrives with deliveries</td>
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<td>26</td>
<td>Materials received from PlymoVent depots is undamaged</td>
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<td>27</td>
<td>Materials received direct from vendors is undamaged</td>
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<td>28</td>
<td>Shipments rarely contain the wrong item(s)</td>
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<td>29</td>
<td>Shipments rarely contain an incorrect quantity</td>
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<td>30</td>
<td>Shipments rarely contain substituted items</td>
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<td>31</td>
<td>Shipments are rarely filled with obsolete items</td>
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<td>32</td>
<td>We would be willing to pay extra for expedited delivery</td>
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This group of questions concerns the possible use of PlymoVent’s competitors:
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<tbody>
<tr>
<td>33</td>
<td>Competitor is used because an item is not stocked by PlymoVent</td>
</tr>
<tr>
<td>34</td>
<td>Competitor is used because the price is lower</td>
</tr>
<tr>
<td>35</td>
<td>Competitor is used because PlymoVent’s delivery time is unacceptable</td>
</tr>
<tr>
<td>36</td>
<td>Competitor is used because item is on backorder</td>
</tr>
<tr>
<td>37</td>
<td>Competitor is used because better treatment</td>
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</table>

This group of questions asks about your impression of the quality of PlymoVent products and services:

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<tbody>
<tr>
<td>38</td>
<td>Substituted items sent by PlymoVent work fine</td>
</tr>
<tr>
<td>39</td>
<td>Products ordered from PlymoVent meet technical requirements</td>
</tr>
<tr>
<td>40</td>
<td>Equipment and/or parts are rarely non-conforming</td>
</tr>
<tr>
<td>41</td>
<td>Damage rarely occurs as a result of the transport mode or carrier</td>
</tr>
<tr>
<td>42</td>
<td>Packing procedures/materiel protect against damage</td>
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<tr>
<td>43</td>
<td>Package markings are accurate</td>
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<tr>
<td>44</td>
<td>Correction of delivered quantity discrepancies (Reports of Discrepancy) is satisfactory</td>
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<tr>
<td>45</td>
<td>The Report of Discrepancy process is adequate</td>
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<tr>
<td>46</td>
<td>Filing a Quality Discrepancy Report corrects problems</td>
</tr>
<tr>
<td>47</td>
<td>The Quality Discrepancy Reports process is adequate</td>
</tr>
<tr>
<td>48</td>
<td>PlymoVent prices are competitive</td>
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<tr>
<td>49</td>
<td>PlymoVent product performance is competitive</td>
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</table>

This group of questions asks about your impression of the contacts you have with PlymoVent:

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<tr>
<td>50</td>
<td>The name of the specific PlymoVent contact person is available</td>
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<tr>
<td>51</td>
<td>The designated PlymoVent contact person is easy to contact for consultation</td>
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<td>52</td>
<td>The designated PlymoVent contact person makes an effort to understand my situation</td>
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<td>53</td>
<td>Problems are resolved by the designated PlymoVent contact person</td>
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<tr>
<td>54</td>
<td>The product knowledge/experience of PlymoVent personnel is adequate</td>
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<td>55</td>
<td>Problems are resolved</td>
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<tr>
<td>56</td>
<td>Problems are resolved by the designated contact person</td>
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<tr>
<td>57</td>
<td>Problems are resolved quickly</td>
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<tr>
<td>58</td>
<td>Response time in inquiries to PlymoVent is short</td>
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<tr>
<td>59</td>
<td>The procedures of PlymoVent are comprehensible</td>
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<tr>
<td>60</td>
<td>PlymoVent is an reliable supplier</td>
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</table>
The following questions are intended for you to mark the importance of various logistics processes, using the 1-5 scale of marks. The grade 1 translates into not of importance and 5 into outmost importance.

61 Accurate and updated product and price information
1 2 3 4 5

62 Ordering procedures
1 2 3 4 5

63 Order monitoring
1 2 3 4 5

64 Accurate shipments
1 2 3 4 5

65 Good product quality
1 2 3 4 5

66 Empathic and reliable contact persons
1 2 3 4 5

67 Quality discrepancy reports
1 2 3 4 5

68 Packing procedures/materiel
1 2 3 4 5

69 Problem resolution
1 2 3 4 5

70 Response time in inquiries
1 2 3 4 5

71 How satisfied are you with PlymoVent service?
1 2 3 4 5

The following questions are intended for you to mark the performance of PlymoVent, using the 1-5 scale of marks. The grade 1 translates into poor performance and 5 into excellent performance.

72 What is your general impression of the service PlymoVent provides?
1 2 3 4 5

73 Which word(s) best describes your feeling toward PlymoVent?
1 2 3 4 5

74 In discussing PlymoVent with someone in your organization, will your statements be:
1 2 3 4 5
This group of questions asks about your role in the organization and will help us to understand the people who we are trying to support:

75 Which category best describes your duties and functions?
   Supervisor   Non Supervisor

76 Which of the following most closely describes your primary role in your organization?
   Stock/inventory management End user Orderer Maintenance Other

77 How many years have you been in your current position?
   Answer: ________________

78 How many years have you been interacting with PlymoVent?
   Answer: ________________

79 Other issues concerning the customer service that you feel demands the attention of PlymoVent, please feel free to express your opinions.
   Fill in:

________________________________________________________

Now carefully save the document before returning it attached in an e-mail to pv_survey@plymovent.se

Thank you for helping us to understand your needs!!!
Appendix B - Graphs