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Developing Supplier Relationships in Emerging Markets

A Case Study of Volvo Truck Corporation in India

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Abstract

When a transnational corporation is setting up a supply chain in the manufacturing industry in an emerging market, it is often necessary to have well-established local sourcing connections. This is required in order to gain cost advantages, and to shorten the development phase of components being purchased. This thesis will examine the supply chain of Volvo Truck Corporation in India, focusing on the relationship towards its suppliers with international connections present in the Indian market. Volvo Truck Corporation established its operations outside Bangalore in south India in 1998. Presently, the company has a limited market share, although the company is benefiting from its global brand reputation.

In order to understand and examine various relationships in Volvo Truck Corporation's supply chain, the authors have studied the activities, by using the concept of technology transfers as a tool of measurement. This tool describes how information, knowledge, skills and technology have been transferred between different parties. In order to map these transfers occurring in Volvo Truck Corporations supply chain, the authors have used a model designed by UNCTAD.

The findings of this study can conclude that there is a two-way transfer of technology between Volvo Truck Corporations and its international suppliers. The majority of the transfers have included embodied technology from Volvo Truck Corporations to its suppliers during the development of products ordered by Volvo Truck Corporation. The transfers have mainly incorporated assistance in providing machinery and equipment, and assistance regarding the implementation of quality and environmental assurance systems. In addition to this, the authors have defined a number of indicators, which categorize different areas that are connected to the extent of technology transfers necessary within a relationship. The categorizations are created in order to simplify the efforts needed in order to strengthen the relationships. The analysis has led the authors to formulate a number of recommendations with the intention of developing Volvo Truck Corporation's relationship towards its suppliers. The overall recommendations encourage Volvo Truck Corporation to

evaluate the technical standards of each supplier individually, and therefore avoid misperceptions regarding a perceived higher technological standard of its international suppliers. Furthermore, the authors believe that further collaboration within the supply chain should be established. These collaborations should focus on joint research and development and establishing of co-operation clubs within the network of Volvo Truck Corporation.

Keywords: backward linkage, emerging markets, follow source supplier, India, Linkage Programme, technology transfer, truck industry, Volvo Truck Corporation

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Gothenburg, December 2002

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1 Introduction

The first chapter in the thesis will describe details in connection to the background of the problem being analyzed in this study. This will function as a framework for the overall structure and surface the central areas of interest upon which the thesis is written. The main research problem of the thesis is defined as well as two underlying research problems.

1.1 Setting the Scene

The globalization of markets, the merging of historically distant and separate national markets into one big global marketplace, was crucial for the rapid industrialization for some of the countries in Southeast Asia during the 1960s and 1970s. (Hill, 1998) One of the factors that made the industrialization a success was the ability to imitate, often by revising existing foreign technology. (Kim, Nelson, 2000) During the late 1980s analysts noticed a trend indicating further global widening and deepening of production processes. A spread of the globalization of production refers to the sourcing of goods and services from locations around the globe to take advantage of various national differences with the aim of minimizing the total cost the processes involved. (Howells, Wood, 1993, Hill, 1998, Lall, Streeten, 1980) These advantages can in many cases be gained in developing countries, where overall production costs often are lower than in developed countries. India is one of these developing countries, and perhaps one of the more promising future emerging markets for an international corporation to establish operations in. This is especially true if considering the recent movement towards liberalizations and adoptions to free market economy. This is one of the reasons for the increased amount of foreign direct investment (FDI) that is flowing into the country. Along with inflow of capital, a number of Transnational Corporations (TNC) of various industries has set up operations in the country over the last few years. (Hill, 1998)

The case company that has been studied in this thesis is Volvo Truck Corporation (VTC). VTC was chosen as both authors have prior experience of the company and its products from earlier research carried out during the spring of 2002. As VTC is one of the many international companies that has established a venture in India, the authors felt that the situation could be utilized in order to acquire data regarding the transfer of technology in an emerging market. VTC is a manufacturing and assembly firm producing trucks for the domestic market. One of the fundamental questions that a newly established company must face is whether to buy the necessary components for its production from the local market or to make the components in-house. (Hill, 1998) Initially, VTC's operation in India was supported through imports of

necessary components. However, as a result of VTC's global sourcing strategy, and India's high import-tariffs, the company increased its supplies from local manufacturers. In order to achieve efficient operations and establish high quality in the final product it has therefore been important to develop a strong relationship with these suppliers. As business relations grow stronger, many assembling firms prefer to work with the same supplier. Consequently, a new situation arises once an assembling firm, in this case VTC, decides to establish operations in a foreign market. In order to facilitate the internationalization of the production the sourcing companies can therefore follow the assembling firm to the new market. This is new type of strategy among suppliers, referred to as the *follow source* (FS) strategy. (Humphrey, Lecler, Sergio Salerno, 2000) To ensure that the production of goods and services functions in the foreign market, TNCs often offer help and assistance to their suppliers. Significant for FS suppliers is that they are a part of an international network which is often able to provide required technology and information to the suppliers. In this thesis, the term FS supplier will be used to indicate a wholly owned international supplier or a supplier with an international network. Hence, it is not required that the FS supplier has followed its original equipment manufacturer (OEM) from that manufacturer's home market, in order to be categorizes as a FS supplier in this thesis.

Close collaboration with the TNC's supplier is often required in order to make adjustments in production when changes in the market occur, as this has proven to be difficult at times (Dagens Industri, 2002-09-03). A relationship can be developed or strengthened by transferring knowledge, information, skills and technology between the actors in the supply chain in order to synchronise the operations between them. Transfers of this type are referred to as the concept of Technology Transfers (TT), which can only occur whenever there is an imperfectly functioning intermediate product market, where knowledge levels of the different actors needs to be upgraded. The situation often emerges in developing markets where technological standards are low compared to an international level. (Dunning, 1993) In order to identify various acts of TT between different companies, the authors have used a tool known as the Linkage Programme, developed by UNCTAD. The term relationship and linkage will be used interchangeable throughout the thesis.

This thesis will have its focal point on the assistance between an international assembly firm, VTC, and a certain type of that firm's suppliers. The authors have chosen to study VTC's international suppliers in order to understand whether being a part of an international network will affect the extent of TT. The international suppliers, as mentioned above, the international suppliers will be referred to as follow source suppliers. The FS suppliers which have been studied in this thesis were chosen due to their geographical location. The FS suppliers were located in Mumbai, Pune, Chennai, and Bangalore, making it possible to investigate several suppliers within the same geographical area. Notable is that these four cities are situated in three different industrial areas of India.

The concept of TT will be used as a tool in order to measure the amount of technology and assistance which has been transmitted between the different parties. The overall aim of the thesis is to establish what types of transfers have occurred backward in VTC's supply chain and to understand their impact.

1.1.1 Volvo Truck Corporation in India

VTC India is a wholly owned subsidiary of the Swedish parent company Volvo Group, which includes the operations of Volvo Buses, Volvo Aero, Volvo Construction Equipment, Volvo Penta and Volvo Trucks. Currently, Volvo has approximately 70 000 employees, production in 25 countries and operations on more than 185 markets. The Volvo Group's total sales amounted to approximately 1.6 billion US dollars in 2001. (http://www.volvo.com, 2002-11-17) VTC began to manufacture commercial vehicles in India in 1998 through a greenfield investment in a production plant in Hoskote, outside Bangalore. The company was the first major truck and bus manufacturer that set up a wholly owned firm in the country. Currently, the plant produces approximately 400 trucks per year but VTC aims to manufacture 4 000 units in 2006. The plant employs a work force of 350 persons, including both administrative and operative employees. VTC is currently estimating that the revenue for all activities in India during 2002 will amount to approximately 64 million US dollars. Approximately 40 percent of the total sales are expected to come from VTC's construction equipment unit, which has almost doubled its sales

compared to one year ago. (http://www.worldmarketsanalysis.com, 2002-11-16, David, 2002-11-31, Göteborgs-Posten, 2002-09-22, Asia Pulse News, 1999-12-14)

VTC decided to establish its operations in Bangalore because of the market potential, low labour costs, acceptable infrastructure and advantageous offers in tax policy set by Karnataka state. The Indian authorities provided VTC with the property upon which the factory was built and a 10-year tax exemption when starting the company's business. (Alvstam, Ivarsson, 2002) The usage of reduced corporate tax or similar benefits created to stimulate new foreign firms to enter the Indian market has been stirring up controversy within the Indian government lately as opinions vary. Critics are implying that this will decrease funds available for public spending. (The Hindu, 2002-11-04)

The only two manufacturers of heavy trucks in the market before VTC's entry were two domestic firms, Telco and Ashok Leyland. However, with the entry of VTC, the competition has intensified. (Business Line, 2000-05-11) The intention of VTC is to increase the share of total global purchases from low cost countries over the next three-year period (Göteborgs-Posten, 2002-09-04). VTC has already started to export components from its Indian operations to other factories around the world. A more export-oriented strategy will most likely increase VTC's number of activities in India over the next coming few years. (http://www.worldmarketsanalysis.com, 2002-11-16)

VTC's follow source suppliers in India are often joint ventures with local firms. The reason for this arrangement is the need for local adaptations and the demand from the Indian government regarding local production requirements. Hence, the local companies need to be included in the supply process in a majority of the cases. The different types of follow source suppliers used in India can be grouped as ordinary TNC, technology tie-up with foreign TNC (TNC-TT) and joint venture with foreign TNC. Out of the 19 follow source suppliers that VTC is currently conducting activities with in India eleven are either TNC-TT or JV. (Alvstam, Ivarsson, 2002) Please see Table 1 in the Appendix.

Despite a decrease in sales of commercial vehicles in India of approximately 5 percent during 2001, VTC's revenue grew by 25 percent to 520 million US dollars. The explanation is that the introduction of Volvo buses has balanced the downturn in the sales of trucks. (http://www.worldmarketsanalysis.com, 2002-11-16) VTC's buses have recently received good appraisals regarding safety and quality from authorities in Mumbai. The city of Mumbai has bought buses that are currently being used in public traffic. As the authorities are pleased with the result of the purchase, more buses may be bought when the city is replacing its bus fleet. (The Times of India, 2002-10-23) Publicity like this allows VTC to reach different customer segments and build brand recognition throughout India, hence offering more than a short-term increase in revenue.

1.2 Problem Definition

When conducting operations in an emerging market, where the technological capabilities (TC) may not be as developed as in industrialized countries, the need for TT are of importance for all involved parties.

This report will analyse the TTs between an assembly firm and their FS suppliers, as well as the TTs between the FS suppliers and their subcontractors, where the TTs are conducted with the purpose of establishing a long-term relationship. This thesis will have its centre of attention on the relationship between the TNC and its FS supplier. The main research problem for the thesis will therefore be formulated as:

Main Research Problem

How can relationships between TNC's and their suppliers be developed in emerging markets?

In order to gain better understanding of the issues surrounding the main problem, two underlying research questions have been created, which will facilitate a more in-depth analysis.

1.2.1 Research Problem 1

Research Problem 1 is designed with the intention of pinpointing and labelling technology that has been transferred between the assembling company, the FS suppliers and the FS suppliers' subcontractors. With the help of tools presented in the theoretical section of the report measures are discussed that will allow for classifications of different kinds of transfers. The research question will be written and analysed from both VTC's and the FS supplier's perspective. The objective is to define both parties' perception of the technology being transferred within the supply chain. Consequently, Research Problem 1 is therefore formulated as:

Research Problem 1

How are technological transfers currently performed in emerging markets?

1.2.2 Research Problem 2

In order to understand the extent of TT that is required within a relationship, it is important to identify the underlying factors affecting it. These indicators could prove useful for both parties when monitoring the transfer. The indicators could therefore be considered key factors for improvement of a firm's TC. Consequently, Research Problem 2 is therefore formulated as:

Research Problem 2

What factors are affecting the usage of technological transfers in a manufacturing supply chain?

1.3 Delimitations

The thesis will only focus on backward linkages established towards suppliers as opposed to linkages made with customers, which is defined as forward linkages.

The relationships analysed in this report will focus on transactions that go beyond arm's length or one-off relations. These operations are to be considered long term.

The thesis will not consider VTC's supplier evaluation manual (SEM) score system. The SEM score system is an internally developed tool used to upgrade VTC's suppliers on a long-term basis.

1.4 Limitation

Due to confidentiality, the authors were not provided the data from VTC's SEM score in connection to the investigation of the Indian market.

1.5 Purpose

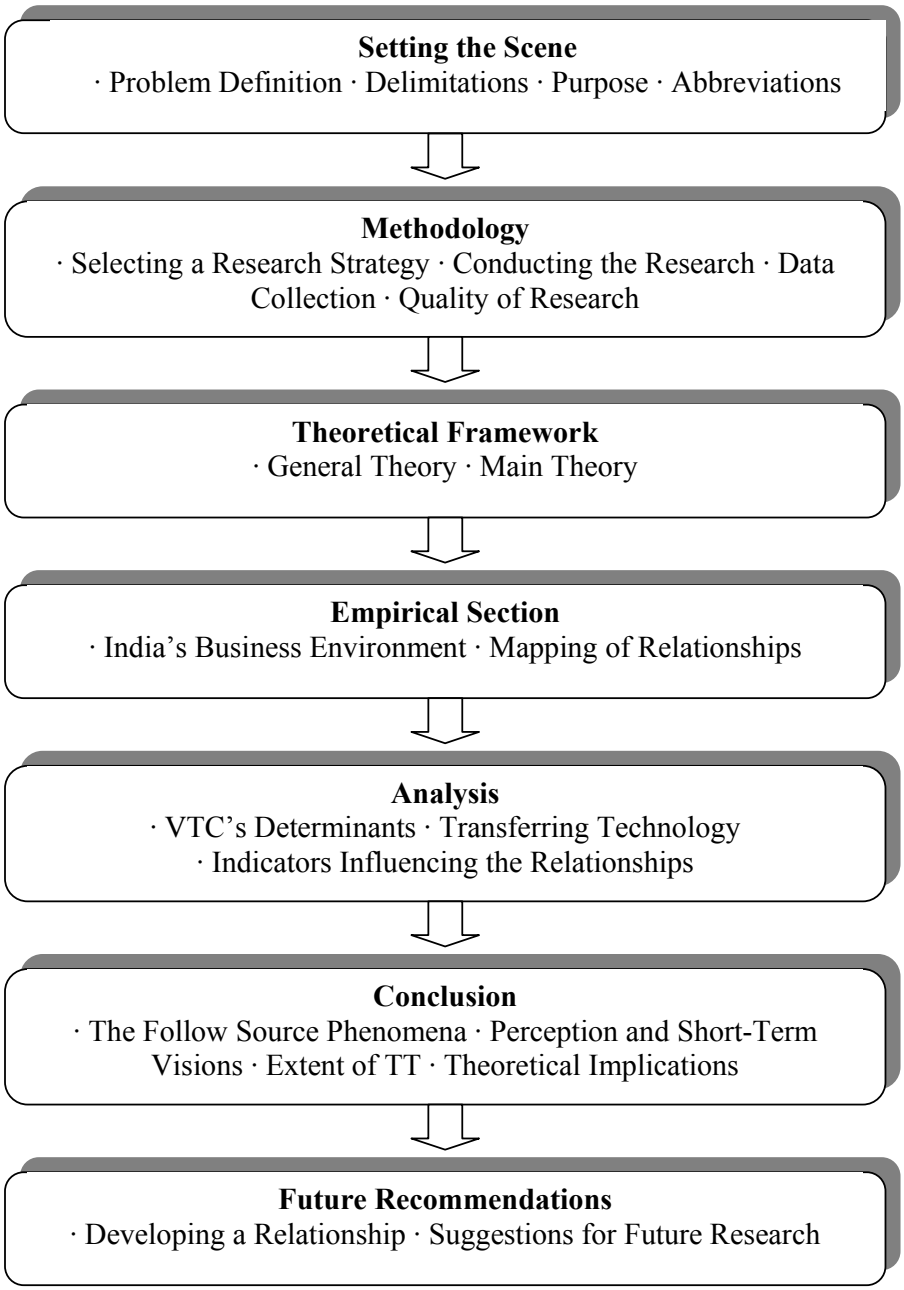
The purpose of this thesis is to identify the types of TT that occurs between a TNC, its FS suppliers and the FS supplier's subcontractors, in an emerging market. This is done with the intention of identifying key areas for improvement in the relation between a TNC and its follow source supplier.

1.6 Glossary

CKD	Completely Knocked Down Unit
FDI	Foreign Direct Investment
FS	Follow Source
JV	Joint Venture
OEM	Original Equipment Manufacturer
R&D	Research and Development
TC	Technical Capability
TD	Technical Development

TNC	Transnational Corporation
TNC-TT	Transnational Corporation Tie-Up
TQM	Total Quality Management
TT	Technology Transfer
VTC	Volvo Truck Corporation

1.7 Disposition



2 Methodology

The following chapter will describe and discuss various aspects associated with the gathering of data in connection with the research which has been conducted in this study. Basis for the validity and reliability of the study will be discussed as well as the authors' research method.

2.1 Selecting a Research Strategy

There are different methods of conducting research: case study, survey, experiment, archival analysis and history. The different types of strategies are performed when executing certain types of studies. Depending on the type of research questions, as well as the extent of control over behavioural events and balance between contemporary as opposed to historical events, a researcher may chose different types of strategies. (Yin, 1994)

This thesis will be based on both the principles of the case study as well as the survey. The *case study* is an empirical inquiry, which incorporates an in-depth investigation of contemporary phenomenon in a real life context. The case study may be used for a wide range of purposes in the areas of business, politics, social work and planning. The purpose of the strategy is to apply a theoretical discussion and test it on a specific practical environment. (Yin, 1994)

As mentioned, this thesis will investigate the issues of TTs between VTC and FS suppliers and its subcontractors in the Indian market. Previous studies in the area have been quite limited which is why the authors believe it may be useful to confront present practices with a theoretical study of the truck industry, using VTC as a case company. The case study gives the opportunity to perform an in-depth study of the company's current operations and study the occurrence of technological transfers in the actual market place. The real life examples provided when studying VTC's operations will make it possible for the authors to challenge and discuss the problems found in the theory and refer back to the situations found in the environment of VTC in India.

Criticism has been given to the case study method, incorporating mainly three different issues. Firstly, the method may result in biased views of the issue being studied. Secondly, there may be a risk that the strategy cannot provide enough material in order to perform scientific generalization. Lastly, the in-depth character of the study may result in a time-consuming process less efficient than other research strategies. (Yin, 1994)

Although there has been criticism towards the case study method chosen, the authors believe that the positive aspects of the method out-weight its flaws. The research method provides information in order to execute a detailed and specific analysis resulting in a deeper understanding of the problem. In addition, the case study displays a real-life example of the situation in which VTC and its suppliers find themselves.

In combination with the above-mentioned case study method, the authors will also use a *survey study*. As mentioned, the thesis will focus on the operations of VTC as a singular entity in India; however, the investigation will also include a survey of the suppliers, which VTC is utilizing in the market. These suppliers were interviewed with the help of a standardized questionnaire which provided an opportunity to compare the extent of technological transfers performed between VTC and its various suppliers.

2.2 Conducting the Research

When gathering data in connection with this master thesis, the authors have undertaken a qualitative research method in order to fully understand the actions taken by VTC and its suppliers. The information used cannot be quantified in order to simplify the investigation and as a result it will include both subjective and objective information making it complicated to generalize the findings. This type of problem is however normal when conducting a study based on qualitative research material and cannot be associated only with this specific study.

However, the authors believe that the objectivity of the study has been improved since the research has not been done under the supervision of VTC. As a result, the information gathered at the follow source companies have not been influenced to a greater extent by the presence of VTC in the study.

2.2.1 The Authors' Research Approach

When performing a research study, three different types of approaches can be defined: exploratory-, descriptive- and explanatory research. All three methods have been used during the development of this study. (Kinnear, Taylor, 1996) The *exploratory* research was used in the initial stages of the master thesis project when the subject was relatively unknown to the authors. The procedure included the process of defining the problem and the gathering of further information in order to prepare for a more specific investigation.

After the relevant information regarding the research questions had been gathered, the *descriptive* method was used in order to formulate an appropriate theoretical framework. A course of events is then described in order to create an opportunity to formulate the reasons behind these events (Kinnear, Taylor, 1996). The main theory of TT was complemented with theories regarding sourcing, investments and the environment of emerging markets. The same descriptive approach was also used when outlining the empirical foundation of the study.

The *explanatory* research approach was used in order to trace a causal relationship between the events described in the empirical study. The objective is to indicate and provide an explanation for how the same set of events can reoccur in other situations. (Kinnear, Taylor, 1996) This research approach was used in the latter part of the thesis including the analysis and recommendations.

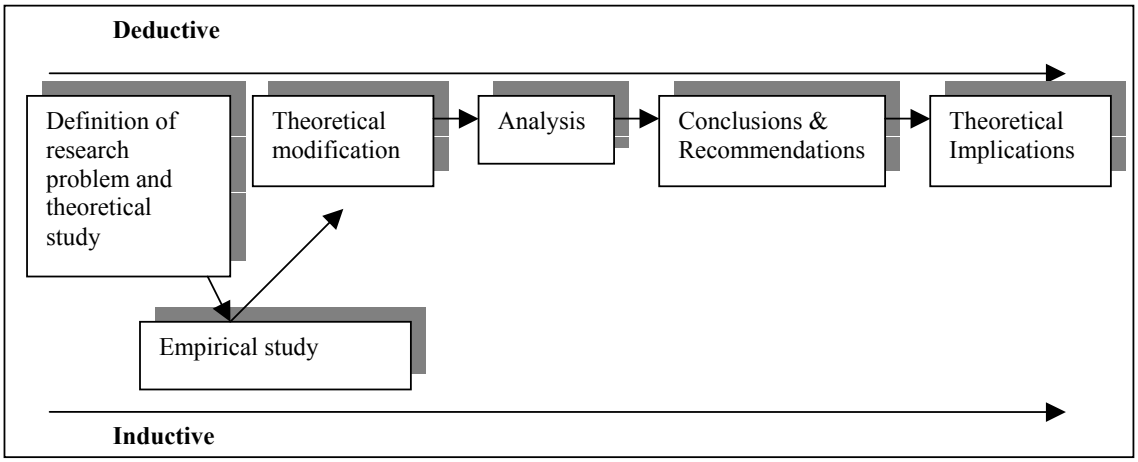
2.2.2 The Authors' Scientific Reasoning

When conducting a research study three different types of scientific reasoning is normally performed throughout the process of the project: inductive-, deductive and abductive reasoning. *Inductive reasoning* includes a number of different observations carried out with the help of empirical data in order to subsequently formulate theories that are generalized as a result of the observations. *Deductive reasoning,* on the other hand, starts with a number of general rules and theoretical foundations, which are later used in order to draw conclusions regarding a particular empirical observation. *Abductive reasoning*

could be described as a combination between the inductive and the deductive method. When conducting a study it is normally crucial to interchangeably observe both the empirical and the theoretical material in order to produce synchronized and accurate results. (Yin, 1994)

The scientific reasoning utilized when conducting the study of VTC incorporated the abductive research method. The authors believe that a constant alternation between an empirical and theoretical approach has occurred, as described in the previous section.

Figure 1 - Research Method



(Robye, Rosander, November, 2002)

In the initial stages of the research, the deductive approach was used in order to gather appropriate information regarding several issues connected to the phenomena of TT. After the research problems and the theoretical framework were outlined, the authors used the inductive method in order to test the theoretical approach on the real life situations of VTC in India. The authors decided to focus on VTC's relations to its FS suppliers in the backward linkages of the company. In addition, TT were also about to be mapped for the subcontractors of the FS companies. Interviews were conducted with both representatives at the vendor development department at VTC, as well as with contact personnel knowledgeable about VTC at ten different FS companies on location in India.

The field study was initiated with interviews of the FS suppliers in Mumbai, Pune, Chennai and Bangalore. Shortly after having started the interviews, the authors realized that the original theoretical framework was not sufficient in order to grasp the information provided by the FS companies. As a result, the theoretical framework was modified in order to better suit the purpose of the study. Once this change was followed through, the empirical studies continued. Lastly, representatives of VTC were interviewed in Bangalore, which is the location of VTC's production site in India. Once the empirical study was finished, the authors returned to the deductive approach and performed an analysis, conclusion and recommendations and finally produced theoretical implications.

2.3 Data Collection

2.3.1 Primary Data

The use of primary data in this masters thesis has been done both during the case study of VTC and during the in-depth interviews of its FS suppliers. In both of the above-mentioned cases, the primary data have been based on 15 personal interviews and in some cases experiences gathered while visiting a company. The questions were of an open ended character, ensuring that no relevant information was missing by leading the interviewees towards certain irrelevant areas. To reduce the risk of losing information, a tape recorder was used during the interviews. In order to confirm and objectify the knowledge acquired during the study, the authors have used multiple sources. The relationships between VTC and its FS companies have in all situations been perceived from both directions in order to create an objective opinion. In several cases the same information has also been confirmed by several representatives within the different companies.

2.3.2 Secondary Data

The use of secondary data will be found in sections discussing theory, methodology, and background material. Secondary data is mainly abstracted from printed material such as academic literature, journals, magazines, annual reports, newspapers and the Internet. The main reason for using secondary data is to provide a platform for the empirical study, and for such a purpose, this type of data is cheap and easily gathered, as compared to the primary data.

2.4 Quality of Research

When measuring the quality of the research being conducted, it is crucial that the right type of methods is used. There are mainly two types of concepts to acknowledge when assuring the quality of a study, namely validity and reliability.

2.4.1 Validity

A high validity is accomplished if the study measures the original intentions of the investigation, and when the errors in the same investigation can be considered to be insignificant. (Patel, Davidson, 1994) There are two different types of validity; the internal and the external. The *internal validity* measures the question of how the theoretical study corresponds to the reality in the case company. The internal validity may be improved significantly if one considers a number of different tools such as multiple investigators, sources or other information in order to confirm the data gathered. (Yin, 1994) The information gathered from the VTC and the FS companies in this case study can be considered to have reached a high internal validity since the authors have had the opportunity to validate the information received. The authors had the opportunity to confirm the information given regarding the relationship as both parties were interviewed. However, the conclusion drawn on the situation of the second tier suppliers of VTC has a slightly lower validity since this analysis is based on the indirect information received from the follow source companies. In addition, the authors believe that the interviews conducted with middle

managers at the FS suppliers may have lower validity. This is due to the limited authority of these managers to express operational details.

The *external validity* measures the opportunity to generalize the findings from one study to other cases. In general the case study normally presents a problem in the area of replicating the findings in other studies. (Patel, Davidson, 1994) As mentioned previously, the case study focuses on one specific case which may create a biased view towards the specific peculiarities occurring in the external and internal environment of the case company. This is also a problem which must be considered in this thesis. However, since the thesis is combined with data gathered through a survey, the majority of the results have reached a somewhat higher validity. The opinions of the ten different FS companies regarding the TTs have provided an opportunity to compare the results connected to many different types of components produced by the different FS companies.

2.4.2 Reliability

The concept of *reliability* deals with the question of whether the same result would occur if another investigation was undertaken under the exact same conditions. If the reliability is high, the same result should occur in the subsequent study. (Patel, Davidson, 1994) In general, if the reliability of the study is high, the validity is believed to be high as well.

The authors believe that the reliability of this study is high since the collected material has been verified by the companies involved in the study. Both authors have also attended all interviews which ensure that the information gathered has been perceived in the same way. As a result, the authors believe that a similar result would appear if the study would be repeated in the same fashion.

3 Theoretical Framework

In this chapter the authors will describe and discuss the theoretical framework of the thesis. The chapter is divided into two different parts. The first part is designed to serve as a general theory, providing various fundamental theories, while the second part describes the main theory upon which much of the main focus of the thesis is based on.

3.1 General Theory

In order to create a platform for the main theory presented later, three main theoretical areas will be presented. The areas are sourcing, technology and investment. These areas are considered to be of vital importance to discuss since they are the very essence of the TT. Sourcing and technology will be discussed in order to define the environment in which companies do transfers in the supply chain, and how the technology used is actually defined.

3.1.1 Sourcing

This section will describe the foundations of the term sourcing and a number of related issues. For a firm to provide a suitable purchasing strategy several factors are to be considered. The primary issue relates to the question whether to buy or produce internally. In addition to this, there are a number of other related issues. The section covering *Sourcing* will be finished with the FS concept, which will be described thoroughly in combination with a related concept called follow design.

3.1.1.1 Purchasing and Inbound Logistics

The initial decision a firm must consider with regards to production is if they are to use a supplier or produce internally. This is normally referred to as the *buy versus make decision* that a company faces. This decision often involves two issues, namely control and economic issues. Economic issues are here referred to as production cost and the transaction cost associated with producing the item. (Dunning, 1993, Howells, Wood, 1993) Many companies argue the need for their production operations to closely interact with other key corporate functions. Using such arguments, a vertical integration of the supply chain may offer several advantages in both control and economic aspects. Control related benefits could include an even flow of supply, access to managerial company information as well as the overall control of operations. From an economic perspective, vertical integration of production could offer a reduction of transactional and logistical costs, and a better spread of overheads.

It could also make the economic co-ordination easier if fewer systems are involved and it will also increase the speed of economic data. In addition to this, it will provide an increased possibility to have products customized as well as it will give the buying company direct influence over quality, delivery and cost. (Howells, Wood, 1993) A TNC can however achieve improved product quality, increased productivity, improvements of delivery times and reduction of manufacturing costs without necessarily making the product themselves. If improvements are made in the relationship with the company's suppliers and subcontractors, improvements comparable to the benefits attained from integration can be achieved. (Dunning, 1993)

The second decision deals with the *global versus local sourcing*. Sourcing involves scanning and searching actively for suppliers and subcontractors. Global sourcing relates to the ability of manufacturing companies to widen its choice of potential suppliers to a world-wide scale, so that the options become more global. Notable is however that on the opposite end of the scope is an apparent trend of selecting local suppliers if entering into a new market. The overall reason to why many contacts are maintained with existing suppliers and that little effort is put into searching for new suppliers is due to the vast amount of capital necessary to conduct searches of this character. (Howells, Wood, 1993)

Different benefits could be gained from applying the global sourcing concept, such as widening the number of qualified suppliers. This could allow access to suppliers based in countries which have a lead in certain technologies or manufacturing practises as well as increase the general level of competition within in industry. An increase in competition could for instance lead to better purchasing prices and better quality. If global sourcing strategy is adopted with a more centralized purchasing policy, additional functional benefits can be gained. Furthermore, a consolidation of all purchases could be achieved which will result in cost reducing efforts, allow for easier purchasing, co-ordination and control. In addition to this, more effective long-term planning and technical research on new materials and components will be achieved. (Howells, Wood, 1993)

Certain general aspects are to be considered with regards to establishing a relationship between a buying company and a supplier. It is important that both parties are informed of the length of the relationship. Whether the relationship is long-term or short-term may affect the overall nature of the relationship. The subject of control with regards to the products being produced by the supplier is one of the most important issues for the buying firm. The level of quality and to what degree the buyer has the ability to influence the supplier will change the structure of the relationship. This often goes further to incorporate the procurement and in-put materials being used to produce the final item. (Howells, Wood, 1993)

3.1.1.2 Follow Sourcing

The relationships between suppliers and assemblers in the global auto industry have changed in the past decade facilitating smoother co-operation which is beneficial for both parties. The three most important features which have lead to the shift in the relationship will be described in the next paragraph.

The three most fundamental changes between suppliers and assemblers in the industry are as follows. Firstly, the suppliers in the auto industry have become increasingly aware of the importance of design. This has resulted in the fact that more suppliers have taken more responsibility within that area. A move towards greater customisation is the clear result. Secondly, the suppliers have to a greater extent started to ship complete functions rather then individual components. This reflects how the assembler is putting increased pressure on the supplier to provide specific products according to specifications given by the assembler. This type of relationship forces the first-tier supplier to become more responsible for the quality of the complete package of various components into units. Furthermore, this structure also stresses the importance of the relationship between the first-tier and the second-tier supplier. Lastly, a trend within the industry shows that assemblers are standardising their platforms across their different parts and divisions within the company. (Humphery, Lecler, Sergio Salerno, 2000)

With regards to the above-mentioned changes in the global components industry it is noteworthy that the changes have been particularly significant in the emerging markets. The pattern of relationship between assemblers and suppliers has therefore changed. Assemblers that are now establishing operations in emerging markets start by founding a small base of systems suppliers. In general assemblers prefer to have their suppliers located at or close to the operational plant. This creates an industrial condominium. This has generated a new type of strategy among the suppliers, namely the follow source strategy. The suppliers are often nowadays expected to follow the assembler to new markets. Once established in the new market, the suppliers are not only to handle the supply of parts and systems but also to organise parts or the entire supply chain in order to meet the assembler's norms. (Humphery, Lecler, Sergio Salerno, 2000)

The overall result of this is that the design of components is no longer the concern for the assembling company. The problem of design and customization to local conditions are therefore rather transferred to the first-tier component supplier, who is likely to arrange the production at a wholly owned or joint venture (JV) subsidiary in the foreign market. This may appear to be increasingly difficult for the component supplier to qualify with assembler's demand; however it is increasingly difficult to maintain a position as a first-tier supplier without full global coverage. The requirements for the first-tier supplier therefore include not only the design capabilities and manufacturing excellence but also the ability to make and deliver products globally. (Humphery, Lecler, Sergio Salerno, 2000)

3.1.1.3 Follow Design and Follow Source

In most cases, design modifications are required when serving a local market, therefore making it increasingly hard to apply a standardised design. One can label these modifications into four different categories. Firstly, changes of minor character are required to meet to the preference of the local customers. Secondly, changes may be required to more external factors such as infrastructure conditions. Thirdly, design adaptations may also be made because the characteristics of local material are different, or because different

production processes are more efficient at a certain volume. Lastly, there may be more substantial changes needed in order to meet the local market, which will force a change in the design. Local adaptations therefore frequently aim at the reduction of costs for the supplier. However, assemblers have different views as to where modifications of the above-mentioned character should be worked out. Even if the changes that are to be made are connected to specifications to the local market, there is no guarantee that these modifications are done in the local market of question. Many firms still prefer to have the changes done on a central level away from the specific market. However, one can conclude that if a standard design is used, follow sourcing provides considerable advantages. The FS firms that have a design or several designs available will create a more cost efficient process and a faster introduction to the market. (Humphery, Lecler, Sergio Salerno, 2000)

This concludes the first part of the general theory, having dealt with the concept of sourcing. The next part will describe the terminology of technology and related issues including technological capability, technological development and technology markets.

3.1.2 Technology

The terminology related to technology is widely spread throughout a vast amount of academic literature, and there are many different definitions used. The basic definition of the term is normally referred to the application of scientific knowledge and skills needed in order to set up, operate, improve and expand a firm's productive facilities. (Lall, 1987)

A more confined description only embracing the technical aspects for example is; technical information contained in patents or technical knowledge. (Chen, Dunning, 1994) A slightly more expanded view, incorporating managerial and organizational issues could be added to this if so desired.

The definition regarding such a general term as technology is important to sort out depending on the character of technological transfer which is being discussed. The situation might be such that technological transfer only involves

the transfer of a product or technological instrument. However, in many situations technological transfer includes a total package of technological knowledge regarding a special technical issue or product. (Lall, 1987)

3.1.2.1 Technological Capability

The technology presently used in the developing countries are most often transferred from the developed world, and for an organisation in an emerging market to adjust to a new system and way of operating, a considerable amount of time and effort is needed. (Amsden, 1989, UNCTAD, 1995) There are always a number of different changes needed to suit the technology to local scales, materials, climate, skills and market needs. Once these initial changes have been made, the productivity can be raised over time leading to minor innovations within the framework of the original technology. The term technological capability is often referred to as the general ability to undertake a broad range of tasks. But TC may also be defined as the skills and information, including technical, managerial and institutional, that allow enterprises to utilise equipment manuals, design patents and blueprints efficiently. (UNCTAD, 1995)

Definitions of the term are quite varied and wide. In order to narrow it down, TC can be divided into different parts. By breaking down the setting of a manufacturing activity, the terminology can be further developed and analysed. The following framework evaluates the TC of an individual firm active in a developing market. The concept incorporates the three areas, plant operation, technological improvement and technological transfer, which are to be considered when discussing the capability of an individual firm. (UNCTAD, 1995)

Plant operation requires a number of TCs on the operative level, which can be mainly compiled into two groups. The first group incorporates the capabilities required to achieve efficient operation of the original technology such as different types of support, quality control, inventory controls and translations of product designs. The second group incorporates the capabilities connected to

adapting and improving the technology, still within the original technology set up. (UNCTAD, 1995)

The second phase discusses the capability to perform technological improvement. Depending on the nature of the technology used, the introduction of new processes or products have different degrees of difficulty. In the textiles industry for example, technical improvements are largely embodied in the type of machinery used and therefore research and technology are mostly carried out by equipment supplying firms. On the contrary, in the manufacturing industry, technical improvements are mostly focused on the product itself and therefore, the product manufacturer itself undertakes most of the research and development. (UNCTAD, 1995)

Lastly, the final set of capabilities of an enterprise involves the technology transfer. This is the ability of a firm to transfer relevant technology to co-operating firms. (The concept of TT will be discussed more thoroughly later in the theory chapter.) In some cases a producer may have to send personnel to a supplier in order to perform support activities and in other cases it may involve design of new technological processes which are adjusted to the capabilities of the supplying firm. (UNCTAD, 1995)

3.1.2.2 Technological Development

TC and the concept of the technical development (TD) are tightly interconnected as TD could be described as the growth of a company's TC. This is regardless of whether or not the firm is using the latest technology available. (Lall, 1987)

Hence, TD is strengthened TC. The development is also relative and should not be compared to industrialised country standards. That is, if a firm in a developed country only upgrades its original technology without investing in the latest high technology, this should also be considered TD, and not just when a firm is using the latest international technology mostly used in the industrialised world. (UNCTAD, 1995) The five most important features of the TD will be discussed below.

The first feature deals with learning as a real and significant process. There are no predictable learning curves which all firms can follow. Some firms may have to invest ample of resources in order to accomplish learning, while other firms achieve learning and TD with fewer investments. Firms using a given technology for a period do not need to be equally proficient in comparison to a firm that is using new technology which takes time to adapt to. Firms do not always have full information available on the technology that they are using, resulting in an even slower development of the learning process. Regardless of the phase of learning, firms must realise that improvements can be accomplished if the company invests in TCs and are conscious of their benefits. In many of the developing countries, the learning process itself has to be learnt. (UNCTAD, 1995, Kim, Nelson, 2000)

Secondly, TD should involve all levels of the company. Hence, it is wrong to associate TD only to formal research and development (R&D) procedures. It is crucial to understand that what is to be considered routine activities in developed countries, such as quality control, maintenance, process optimisation and inventory control, are the activities with most potential productivity gains in developing countries. R&D is equally important in developing countries in order to incorporate modern technology in already established processes. However, the most valuable improvements of TC are often done in day-to-day processes on an operative level and not in advanced R&D activities. (UNCTAD, 1995, Kim, Nelson, 2000)

The costs and risks of improving TC vary depending on the sophistication of the technology and the level of TD reached is incorporated in the third feature. To upgrade the level of TC in the automobile industry for instance, requires more resources than an equivalent upgrade in the textiles industry due to on the high technological sophistication in the auto industry. Optimal investments in TC in developing countries cannot be predicted partly because the initial level of technology varies greatly. (UNCTAD, 1995)

A very crucial component in the process of developing TC is described in the fourth feature. The importance of taking part in networks of formal and informal relationships with suppliers, customers, competitors and educational

institutions is not to be underestimated. Different technological aspects can have different degrees of dependence on interaction from outside sources of knowledge and information. Network associations of this kind assist individual firms to get access to expensive information, as well as generating new information that will help the network as a whole. Normally, the more complex the technology gets the more importance the network associations will have. In high technology industries the need for updated information and skills is high and therefore TC can be supported with the help of a network. Technological interactions can take place both within a country and outside a country. It is therefore important that a country establishes the ability to interact with the international market with regards to trade. By taking part in trade related activities a country can realize its existing comparative advantage. By facing external competition, a country or firm may be stimulated to build its TC. Nevertheless, imported technology provides the most important input into technological learning in developing countries. (UNCTAD, 1995, Kim, Nelson, 2000, Lall, 1987)

Lastly, firms follow an evolutionary and individual path of TD. Some technological features tend to be more incorporated within equipment while others lack this feature, making the process of learning technology highly different from each other. Notable is that the investments that a firm undertakes in knowledge and skills are cumulative, hence build on investments and decisions taken at an earlier stage. (UNCTAD, 1995, Kim, Nelson, 2000)

3.1.2.3 Technology Markets

A normal market for commodities does not hold as many knowledge requirements as the technological market. As the buyer of knowledge is purchasing a whole package of direct investment from the TNC, the buyer is often imperfectly informed of what it is buying. Hence, the normal assumptions of an informed buyer do not hold in the technological market. Developing countries purchasing technology often find themselves at grave disadvantage since they do not possess the capacity to be first movers in the industry. Therefore they do not have the knowledge or the skills to be able to bargain for alternative offers and to shop around for different sources of supply, and more

financially advantageous offers that would suit them better than the ones first presented to them. (Lall, Streeten, 1980, Kim, Nelson, 2000)

The following section will describe the five factors which define the characteristics of the technological markets. These are all factors that influence firms' activities in the technological market, leading to successful outcome if the companies involved have strong bargaining power, both towards governmental institutions, TNCs and local firms.

Firstly, there are several sources of technology in the market; not just transactional companies, but also consultants, smaller firms that may license the technology or undertake direct investments, official and international agencies which can provide technical assistance without charge or for a small fee and state enterprises. The different sources of technology have different influence depending on how technology intensive an industry is and how much need there is for commercialisation and marketing. The larger the firm, and the more resources presented, the more bargaining power can be accumulated. (Lall, Streeten, 1980)

Secondly, there are several ways in which technology can be bought. The most common alternative is to purchase a design or a patent for the direct use. Acquisitions can also be made through intermediary arrangements requiring technical support or equity participation or direct investment in a wholly owned subsidiary. The type of purchase is strongly influenced by governmental policies, but also sophistication of the technology, monopoly power and corporate policy of the buyer. (Lall, Streeten, 1980)

Thirdly, the price of the goods will shift dramatically depending on the bargaining power and skills of the participants active in the making of the deal. An acceptable price may lie between the marginal cost of transferring the technology and a price that would make the buyer decline the offer and head for other sources of technology. Furthermore, the prices related to the transfer of technology are often a reflection of complex situations prevailing in the market. (Lall, Streeten, 1980)

The last factor deals with patent systems and national law. Many governments in developing countries have granted patent protection of TNCs' inventions for the developing markets. However, critics say these laws do not generate any significant benefits, resulting in markets being prevented from cheaper imports, and firms are also prevented from using the patented technology. (Lall, Streeten, 1980)

After having presented related issues to technology, the last section of the general theory will describe how this technology can be transferred into a country with the support of different modes of investments and joint ventures. The section will end with a discussion regarding the motives for TNCs' foreign production.

3.1.3 Investment

The measurement of foreign direct investment acts as an indicator of the increasing internationalization of economic activity, its scale and complexity of international investments. Direct investment is defined as the investment conducted by one firm in another firm with the intention of gaining a degree of control over that firm's operations. Foreign direct investment is therefore direct investment, which occurs across national boarders from the investing company's perspective. However, several different actions taken by a firm are often still considered as a FDI, for instance, when a firms sets up a branch or subsidiary operation in another country. (Dicken, 1998) Various restrictions and regulations regarding the usage of FDI may be issued by local government bodies. A variety of issues are therefore to be considered such as policy objectives, national regulations, technical standards, intellectual property rights and access to market. (Howells, Wood, 1993)

As the control of the resources transferred remains with the investor, as it is being transferred within the company, FDI can be other items than capital. FDI can consist of packages of intermediate products, such as technology, management skills, access to markets and entrepreneurship. It is important to separate the aspect of intermediate products being transferred in a FDI aspect

compared to when a transfer of similar character is conducted in a business transaction. (Dunning, 1993)

3.1.3.1 Joint Venture

A joint venture entails the establishment of a firm that is jointly owned by two or more otherwise independent firms. Any long-term alliance which falls short of a merger and which the parties in question own a sufficiently large proportion of the equity capital to give each of them some degree of control or influence over key areas of decision making is considered a JV. The most typical joint venture is a 50/50 venture, in which there are two parties, each of which holds a 50 percent ownership stake and contributes a team of managers to share operating control. Some firms, however, have sought JV in which they have a majority share and thus tighter control. (Dunning, 1993, Hill, 1998)

Companies have used the method of JV for several decades for various reasons such as entering new markets and sharing the risk of development of new products. JV is often considered the best and most efficient strategy when entering a foreign market and is therefore often integrated with a firm's global strategy. The form of collaboration is spread throughout both developed and developing countries as well as various industrial sectors. However, the intention of the JV is mainly to acquire complementary assets and capture economies of synergy, which explains why the JV form of collaboration is particularly popular by firms engaging in strategic assets seeking investments. (Dunning, 1993, Hill, 1998)

3.1.3.2 Motives for Foreign Production

Establishing a production unit in a foreign market is often embedded in the company's overall strategy and therefore a part of the growth strategy proclaimed by the firm. There are four different motives to why companies may want to internationalize their production. The four categories are resource, market, efficiency and strategic asset or capability reasons. In practice, firms do not often have a clear outspoken reason to why they choose to place production in a foreign country that may apply to the below described four categories.

Hence, a combination of the four categories or partial reasons is the most common explanation to the firm's behaviour. (Dunning, 1993)

The first category describes companies that are seeking various physical resources of a certain kind. This includes cheap and well-motivated unskilled or semi-skilled labour, as well as exchange rate, natural resources, production techniques, technical capabilities, cost of transportation, management, marketing and organisational skills. (Dunning, 1993, Lall, Streeten, 1980)

The category for the market-seeking company describes firms that are in pursuit of sustaining or protecting an existing market or trying to exploit or promote new markets. A common reason for why companies often pursue such tactics is the requirement of local customization when selling products to a certain market segment or when trying to establish a presence in a new market. Local manufacturing is often seen as a means to achieve better contact with the market, hence it will be easier for companies to respond to market fluctuations and do correct estimation of both quality and quantity aspects. Once a firm has established production in a foreign country, the transactional costs are often considerably less compared to having to transport finished or semi-finished products from the domestic country. The aspect of proximity is therefore considered important from several aspects, for example closeness to the end customers for increased understanding and proficient projections, closeness to the company's suppliers as well as reduction of adjustable costs. (Dunning, 1993, Lall, Streeten, 1980)

An efficiency seeking company is described in the third category as a company that is destined to take advantage of differences in the availability and cost of traditional factors in different countries. Internationally recognized firms often conduct efficiency seeking measures in countries with similar economic structure, not necessarily neighbouring countries, to gain economies of scale and scope. (Dunning, 1993, Howells, Wood, 1993) Economies of scale are achieved when cost advantages associated with large-scale production are obtained (Hill, 1998).

The fourth category for establishing foreign production concerns whether the company is in pursuit of a strategic asset or a specific capability. This is often the case for companies active in industries with heavy reliance on R&D. Governmental FDI policies are often a major consideration for a company when establishing operations in foreign countries. Tools used by foreign governments to steer activities of foreign firms can be tariffs, direct or indirect restrictions of imports, or actual threats of restrictions. High technological exports from one country may be generated from locally assembled imported components where few local inputs have been made, due to policies of this character. Underlying reasons for actions of this kind may not be official, but it is often an attempt to gain technological knowledge from investing companies or simply to protect domestic firms. Promotional efforts to diffuse technology and skills from foreign companies to local firms are another way that local government may intervene. In addition to the above-mentioned categories, other motives for establishing foreign production could be so called escape investments or supportive investments. Escape investments are performed in order to avoid various regulations or policies established by regulatory bodies, where as supportive investments refers to the investments made by companies when aiding or assisting other parts of the same enterprise. (Dunning, 1993, Lall, Streeten, 1980, Kim, Nelson, 2000, Howells, Wood, 1993)

The described sections incorporating sourcing, technology and investment have provided a basic knowledge for the understanding of the main theory which will be presented in the next section.

3.2 Main Theory

The second part of the theory chapter will focus on theories discussing transfer of technology and linkage theory. Linkage theory includes the Linkage Programme, which is our main theory for the analysis of our research questions.

A transfer of technology can be considered to be a movement of technology from one location to another, from one user to another or a combination of the

two. Alternatively, the concept can be defined as the transfer of capacity to understand and develop introduced technology. (Chen, Dunning, 1994) This terminology means that the TT has not been complete until the receiving company can understand and operate the technology in question, without support from an outside source. In this sense, a TT is not simply a purchase of technology by a receiving firm; rather it is a complete build up of a firm's technological capability. The capability includes the knowledge to develop, not just operate, given technology. The difficulties when defining TT lie in the fact that it deals with a transfer of knowledge, and not just physical goods, such as machines. Such subjective information as knowledge is difficult to express in a concrete fashion. For example, to transfer knowledge regarding organisational innovations is a much more complex task than transferring machines or processes, mainly because of the subjectivity of management styles and the problem of defining tacit knowledge, hence the type of knowledge that can not be expressed in words. (Chen, Dunning, 1994)

Studies referred to by John H. Dunning have suggested that the rate of diffusion, hence, the rate at which a firm absorbs TT and operates it without support, is normally better in an industry with high involvement of TNC activity. These firms tend to speed up the rate of diffusion in both foreign and local firms in the emerging market. However, there is not yet any valid proof for foreign affiliates diffusing technology faster then domestic firms in the same industry. (Chen, Dunning, 1994)

The main TTs are unpatentable and patented know-how, which are the most valuable to be integrated into host company operations. Unpatentable know-how is knowledge that cannot be expressed in words and is normally associated with practical experience. Patented know-how on the other hand, can be inventions or trademarks often transferred on license. The reason why these types of know-how are valuable is because receiving firms cannot acquire this type of knowledge without co-operation with another firm. Often, unpatenteble knowledge is of a greater value then the patented knowledge, simply because the latter can not function and be incorporated into a firm's operations without support from unpatentable knowledge. (Chen, Dunning, 1994)

Furthermore, TT could be categorised into both internal and external. Internal TT referrers to transfers made within the TNC while externalised TT are transactions such as licensing or other forms of arm's length transactions outside of the organisation. (Kim, Nelson, 2000)

The next section will discuss linkage theory using the concepts of sourcing, technology transfers and its relation to emerging markets presented previously.

3.2.1 Linkage Theory

When discussing the linkages constructed in order to transfer technology and skills from a foreign affiliate, distinctions are normally made between backward, forward and horizontal linkages. Backward linkages are formed when affiliates purchase goods and services from domestic firms, and forward when affiliates sell goods and services to domestic firms. Horizontal linkages on the other hand exist when firms have interactions with domestic firms engaged in competing activities. (UNCTAD, 2001) The Linkage Programme, which now will be discussed in depth, will focus on the backward linkages. In the upcoming sections, we will make use of the words linkage and relationship, interchangeably.

3.2.2 The Linkage Programme

In order to evaluate the standard of the TTs in VTC's supply chain we have decided to use a framework, developed by the UNCTAD organisation, called the Linkage Programme. This theory will be used both for the analysis of the two-way TT between VTC and the follow source company as well as between the follow source and its suppliers.

The Linkage Programme is used in order to identify, on a detailed level, different transfers of technology, knowledge, information, and skills between two actors in a supply chain active in an emerging market. The activities acknowledged in the Linkage Programme which are used as tools when transferring the technology, knowledge, information and skills are: finding new

local suppliers, technology transfers, providing training, sharing information and financial support. These activities are all used when strengthening linkages. The theory, as it was presented by UNCTAD, discusses exclusively linkages towards purely local firms. However, in order to use the theory for our purposes the framework has been slightly modified. This will be described in the next section where the research questions will be applied to the framework.

3.2.2.1 The Linkage Programme Applied to the Research

The authors intend to use the theory in a slightly modified version in order to analyse the TT between foreign affiliates and FS suppliers and their subcontractors. The first section will discuss how the model will be applied to the transfer between the foreign affiliate and the FS company, while the second part will discuss the relationship between the FS and its subcontractors.

In the relationship between the foreign affiliate and the FS company, the model will be modified because of a natural reason. The original version of the Linkage Programme describes how underdeveloped local firms in emerging markets can be technologically upgraded with the help of foreign affiliates transferring their technology and know-how to these local firms. However, the phenomena of FS, which has become increasingly important in emerging markets, may also be incorporated in the framework of the linkage programme. As mentioned previously, the FS firms clearly have international support and other ways to acquire knowledge than from the manufacturer. Therefore, the Linkage Programme needs to be adjusted in order to fit our purpose in the research. The original version of the linkage programme analyses only one-way transfers of technology from the foreign affiliate towards the supplier. However, since the FS firms in many cases have substantial experience and technical knowledge, we believe that the possibilities of TT from the FS towards the international manufacturer are just as common as transfers from the affiliate towards the FS. Hence, our slightly modified version of the linkage programme will, when possible, analyse the two-way transfers of technology between the two actors.

After having discussed our choice of model and how to apply the framework to the first research question, we will now provide a detailed description of the linkage program and its different components.

3.2.3 The Characteristics of the Linkage Programme

When establishing business operations in an emerging market, the TNC and the FS supplier often have to assist each other in raising the level of TC. The Linkage Programme incorporates two different types of technology, embodied and disembodied. The *embodied* TT is when production equipment is transferred to different business partners. This type of rather simple transfers does not necessarily lead to a long-term upgrade in the technological development of the supplier. Rather, technical support such as advice or training in quality management systems are used to a much greater extent on order to create viable long-term benefits. This is the type of TT called *disembodied* transfer where personnel in the supplying firm are involved in long-term activities such as education, training, and different types of technological co-operation. (Chen, Dunning, 1994) Both embodied and disembodied technologies are represented in the Linkage Programme in the form of five the different tools called finding new local suppliers, technology transfers, providing training, sharing information and financial support. All these tools can be defined as disembodied technologies, except technology transfers, which partly incorporate embodied technology. The five tools are used, for example, by a foreign affiliate when transferring machines, knowledge, skills and information through a supply chain to suppliers in an emerging market. The tools could also be used by a FS company when transferring knowledge regarding the local product market to the foreign affiliate. The tools are only used in an imperfectly functioning intermediate product market, where linkages are weak and relations in the supply chain do not operate efficiently. The tools in the Linkage Programme will now be described in depth. (UNCTAD, 2001, Dunning, 1993)

3.2.3.1 Finding New Local Suppliers

The process of identifying new local suppliers in a developing market may be time-consuming. However, there is a particular need to select potential suppliers carefully since the companies may in general not be as well-developed as a firm from an industrial market. This may be extra important for firms that cannot import or produce components in-house. There are two different ways of finding new local suppliers. Firstly, the firm can make public announcements for the need of suppliers. In the announcement the manufacturer can specify the requirements that firms must meet on costs quality, ability to undertake continuous improvement, technological capabilities and delivery (UNCTAD, 1995). Secondly, the manufacturer can perform supplier visits and quality audits, which are used to evaluate and develop new suppliers. In these visits delivery capabilities, inventory performance and quality ratings are evaluated. When the preferred supplier has been contacted, it is important to set up a plan for the TT. Depending on how well-developed the supplier in question is, it is important to chose the right type of tool for transfers of technology, skills, knowledge and information. (UNCTAD, 2001)

3.2.4 Transferring Technology

The types of TTs are divided into three different areas: firstly, product technology, which involves technologies related to product function, design and R&D. Secondly, process technology, which incorporates machinery, equipment and production planning and thirdly, organisational and managerial know-how, which involves for example inventory management and quality assurance systems. As mentioned, the types of technologies most often transferred are related to processes, especially quality-control techniques (Chen Dunning, 1994). The three different parts of the transferring technology tool will now be explained in detail.

3.2.4.1 Product Technology

The product technology focuses purely on the development of the product or component itself. For example, in order for a supplying firm to cope with the

demands set up by a purchasing firm, the company might have to learn how to improve design skills or how to make improvements in product function (UNCTAD, 1995). There are a number of different types of TTs regarding product technology.

The transfer of product technology incorporates *product design and technical specifications*. This is the main form of product technology and relates to transfers associated with detailed technical specifications and designs to enable the supplier to produce goods of high quality or to produce the right type of component, which is required. However, the product design and technical specifications might also be transferred from the supplier towards the international affiliate. For example, the supplier might have local market knowledge regarding the product, which can benefit the operations of the manufacturer. (UNCTAD, 2001)

Secondly, the foreign affiliate or the FS can provide each other with *feedback on product performance* to help each other to improve product quality. The foreign affiliate can for example produce feedback reports given to the supplier, which include diagnostic measures to increase quality. Hence, the supplier is given a plan, which supports and helps them to overcome mistakes in the future. Likewise, the FS can provide feedback towards the foreign affiliate regarding the performance of its component in the market, given to them for example from other customers using the same component as the foreign affiliate. (UNCTAD, 2001)

If the FS and the foreign affiliate want to develop product and processes faster, it is extremely important that the companies set up *collaborations in R&D*. However, in order for such a collaboration to function there must be a minimum level of research capability, such as well-educated staff, available in the host country. (UNCTAD, 2001)

The next section will continue with the process technology and the type of technology transfers associated with this concept.

3.2.4.2 Process Technology

Process technology transfers deal with the production process and related technology. For example, transfers of machinery or different product plans can be followed through in order to improve effectiveness in the production. Firstly, embodied technology such as *provision of machinery and equipment* can be transferred to suppliers. The machines may be related to production of the goods purchased or testing equipment for quality control. The manufacturer may for instance provide tooling to the supplier in order for the supplier to be able to speed up the development phase of the product. (UNCTAD, 2001)

Secondly, the foreign affiliate can provide *technical support regarding production planning, quality management, inspection and testing* in order to improve manufacturing processes and quality control methods of the FS. The manufacturer may also give advice regarding the selection and the use of process equipment and other related technologies. (UNCTAD, 2001)

Thirdly, the foreign affiliate can also perform *visits to suppliers' facilities* to advice on factory layout, instalment of machinery, production planning, production problems and quality controls. In certain cases an engineer from the manufacturing firm may be working for the supplier over a number of days to install machinery or in other ways support the operations. (UNCTAD, 2001)

Fourthly, *co-operation clubs* for interactions between affiliates and suppliers on technical issues can be formed. These clubs are meetings set up in order for suppliers and manufacturers to transfer knowledge regarding quality control, discuss case studies on quality improvement, value analysis and cost reduction activities. The co-operation clubs may also involve workshops on technical guidance and training. (UNCTAD, 2001)

Fifthly, *assistance to employees to set up their own firms* is sometimes given in the form of support in order for them to start their own supplying business. With the special knowledge that the previously employed holds, valuable understanding regarding the special requirements set up by the affiliate is achieved already at the start. In an arrangement like this the affiliate firm

provides not just procurement guarantees, but also know-how, equipment and technical assistance to such start-up firms. (UNCTAD, 2001)

In addition, the foreign affiliate could provide *procurement assistance* to the supplier at competitive prices in the free market in order for the local supplier to be able to produce the required parts. A situation of this character may arise for instance if a local supplier masters a specific production technique required but is lacking competitive measures in obtaining necessary procurements. In order to make the collaboration work between the TNC and the local supplier, procurement related linkages must be established. (Dunning, 1993)

3.2.4.3 Organisational and Managerial Know-How

This concept incorporates management theories that may be transferred between the supplier and the foreign affiliate. The transfer of organisational management is constantly becoming more important, and the number of theories discussing the phenomena is growing. One explanation for this is the internationalisation of service industries where concepts such as personnel development programs, task specialisation and structures for communication and adding information are pushing the development of organisational management (Chen, Dunning, 1994, UNCTAD, 2001).

When discussing organisational transfers, it is important to distinguish between complete transfers and transfers of elements of organisations. Complete transfers often include a greenfield investment in which a centralised management model is replicated from the headquarters in the home country. The transfers of elements of organisations often refer to, for example, a special production system developed at the home base of an international firm. The Japanese Just-In-Time (JIT) model or Kanban systems are good examples of these types of transfers. However, even if the original intention of a company was to transfer a small organisational model, plans most often extend and the company is required to implement more vast organisational models in order for a production system to work out. (Chen, Dunning, 1994, UNCTAD, 2001)

UNCTAD defines three different aspects of the concept. Firstly, the foreign affiliate or the FS might provide *assistance to each other regarding inventory management and the use of JIT* and other systems. This is an especially important support for a player in the automobile industry, since profitability is tightly connected to an assurance of uninterrupted flow of inputs to the supply chain. (UNCTAD, 2001)

Secondly, *assistance in implementing quality assurance systems* (including ISO certification) is given by some foreign affiliates in order to help with upgrades in quality standards and assurance of long-term quality supplies. (UNCTAD, 2001)

Lastly, the foreign affiliate might introduce to *new marketing techniques* to the FS since the company often has a wide experience of global markets and industrial marketing in international supply chains. Likewise, the FS might also have marketing experience in the local market, which can benefit the operations of the manufacturer. Hence there can be a two-way exchange of market related knowledge. (UNCTAD, 2001)

3.2.5 Providing Training

In order to sustain the linkages, which are formed through the TT, the TNC must provide training in order for the supplier to understand, use and improve a given piece of technology. A vital part in the success of setting up linkages is therefore to develop the human resource base. A study performed in Mexico, referred to by UNCTAD, revealed that all the foreign owned automobile TNCs present in the country provided support to their suppliers in the form of training, mainly in quality control. Training became more important for the linkage between a foreign affiliate and a supplier the longer the relationship lasted. Training also became more important the larger the affiliate was in comparison to the supplier. (UNCTAD, 2001)

There are a number of methods an affiliate can use in order to support suppliers in becoming aware of their current lack of skills and the ways to overcome them. Firstly, the manufacturer can arrange *training courses at the affiliates* for

the personnel of the supplier. These sessions could include organisational and managerial areas, and are often only offered when the affiliate is counting on a long-term relationship and is forecasting a high return in its investment, creating clearly better productivity gains and quality standards for the supplier. The courses could also be offered in co-operation with a number of institutions such as industry groups or public sector organisations at a local level. Secondly, the manufacturer could offer access to *internal training programmes in affiliates* or abroad. Lastly, the affiliate could send experts to the supplier in order to arrange *in-plant training sessions*. These could focus on the improvement of both technology and processes. (UNCTAD, 2001)

3.2.6 Sharing Information

The automobile industry is extremely dependent on a well-integrated supply chain since the number of actors is often substantial. Therefore players must be able to share information regarding, not just their own business plans, but also market and business information, such as price trends, raw material and domestic market potential. (UNCTAD, 1995) Firstly, both manufacturers and FS can use *exchanges of business information* and future requirements. For example, the manufacturer could send representatives to the supplier in order to inform the company about new market developments and future strategies. The aim of this is to help the supplier to take decisions about capital investments and the formation of business plans. (UNCTAD, 2001)

Secondly, the manufacturer may also ease the suppliers operations by *providing annual purchase orders*, which are confirmed periodically. By providing information in advance, JIT management routines are improved since they are strictly dependent on the accuracy of future demand. The purchase orders are extra important for automobile suppliers as the strict delivery requirements by manufacturers have forced many suppliers to build up huge inventories, hence locking in huge sums of capital that could be released. (UNCTAD, 2001)

Lastly, the manufacturer may encourage the supplier in joining business associations in order to provide a platform for the foreign affiliate to set up new

networks with other international suppliers, giving information on a wide variety of issues within the industry. (UNCTAD, 2001)

The sharing of information is a common activity that manufacturers conduct in order to build and strengthen linkage programmes with suppliers. It should be seen as an essential in order to match the requirements of manufacturers with the capabilities of the supplier. The last tool in the Linkage Programme that a foreign affiliate may consider using in order to upgrade their supplier is financial support.

3.2.7 Financial Support

Financial resources of companies in developing markets are often very limited and cause bothersome constraints for the operations of suppliers. Studies in the area referred to by UNCTAD, put forward evidence for a relatively low degree of financial support from international manufacturers to, especially local, suppliers in emerging markets. However, when financial support occurs it is a result of long-term commitments between international affiliates and suppliers. The TNC can help the supplier in a number of ways, for example, through repayable loans or contributions to the subcontractor's risk capital, pre-financing of machines, tools and specific price agreements (Dunning, 1993). Likewise, an FS company may also provide beneficial deals in order for manufacturers to get started with business operations in an emerging market. (UNCTAD, 2001)

The TNC could create *special or favourable pricing* for the components purchased from the suppliers. For instance, the TNC may offer increased payments to the supplier whenever the supplier achieves technical progress or set up favourable pricing in the beginning of operations to help suppliers get established. (UNCTAD, 2001)

TNCs may also help suppliers' cash flows by *purchasing in advance or providing foreign exchange*. These types of actions can help suppliers in a situation of financial difficulties or help in preventing exchange rate fluctuations, which might affect suppliers. The TNC could also support the

supplier on a more long-term basis, for instance, through guarantees for bank loans, financing of specific projects and leasing. (UNCTAD, 2001)

A FS company may also provide financial support towards a newly started international manufacturer when for instance the manufacturers initial order volumes are low. Even though the development cost for a small batch of products might be very high for the supplier, this contact can later become more profitable when the manufacturer has increased its order volumes.

This presentation summarises the description of the tools in the Linkage Programme. In the next section we will describe how the tools may be utilised to different degrees depending on the linkage determinants surrounding the co-operation with a certain supplier. These determinants incorporate the conditions under which the foreign affiliates are operating: the role assigned to the affiliate, technology and market position, investment motives and strategies, age of foreign affiliates, mode of establishment and size of affiliate.

3.2.8 Linkage Determinants Affecting the Linkage Programme

There are six different factors influencing the decision of which tools in the Linkage Program that will be most beneficial or suitable for a foreign affiliate when performing transfer of technology, knowledge, skills and information to a supplier in an emerging market (UNCTAD, 2001). These factors will now be described.

The first factor is the role assigned to affiliates. If the degree of autonomy given to the foreign affiliate by the home headquarters is high, the likelihood that the company will develop strong local linkages in the host economy are high. If the affiliate has a certain amount of decision-making power, outsourcing of production to local firms may be a more likely option than imports. (Howells, Woods, 1993, UNCTAD, 2001) On the contrary, less autonomy would make it more difficult for the affiliate to collaborate with the local supplier and, for instance, make it difficult to set up internal training

programmes, which is a part of the Linkage Programme. Hence, depending on the linkage determinants, certain tools in the Linkage Programme will not be applicable for certain foreign affiliates that do not have a suitable strategy or management system. (UNCTAD, 2001) The other determinants presented below can in a similar manner affect the linkage tools, changing the character of a specific linkage between a producer and a supplier in the host market.

Product technology and market position is the second factor that affects the creation and deepening of backward linkages. Depending on what type of product that the foreign affiliate is producing, the company will prefer different types of supply chain configurations. If the products are standardised, the manufacturer tends to prefer externalised arm's lengths procurement. (Howells, Woods, 1993) This because there are many suppliers to choose between which are cost efficient, and therefore it will not be necessary to transfer any special skills to the supplier. In this case the manufacturer may prefer to import standardised goods and may not get any use of the Linkage Programme. On the other hand, if the product is specialised it will be more efficient for the affiliate to produce in-house, or to set up close contacts with a limited number of suppliers in the domestic market. (UNCTAD, 2001) In this situation, where local contacts need to be strengthened, the company will find ample use of the tools in the Linkage Programme.

Investment motives and strategies is the third factor that influences the linkage programme. A firm with a domestic market oriented strategy is more interested in purchasing from the host market compared to export oriented firms. (Howells, Woods, 1993) A company with such a strategy will utilise the Linkage Programme to a greater extent than the export-oriented firm. In developing countries, fluctuating exchange rates may be a motive to purchase from the host market instead of importing. On the other hand, foreign affiliates that are a part of a vast international production system are likely to be more dependent on the global corporate sourcing policies. These companies are to be considered foreign market oriented firms and will in contrast to domestic oriented firms not choose suppliers primarily from a local market. (UNCTAD, 2001)

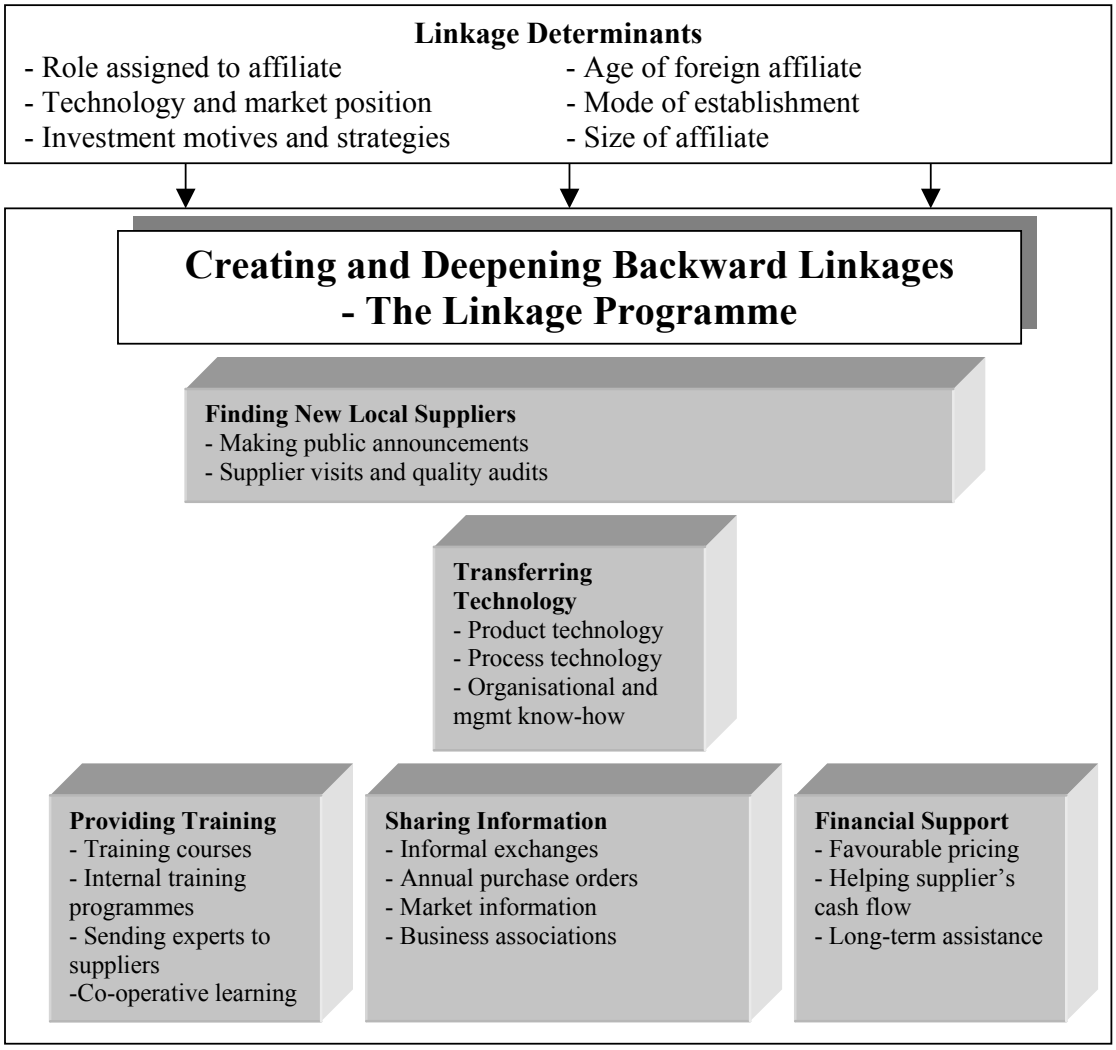
Age of foreign affiliates is the fourth linkage determinant. According to UNCTAD, studies have found that companies tend to be more interested in local purchasing the longer they stay active in the market. When a company has gathered knowledge and experience from the local market, the amount of foreign imports will be replaced with increased amount of local sourcing. As a result, firms will find a greater use of the linkage programme, the longer they stay active in the market and the more local linkages they establish. (UNCTAD, 2001)

Mode of establishment is the fifth factor influencing the tools used when creating and strengthening linkages. A firm established through a merger or acquisition is more likely to have strong local linkages than an affiliate set up through a greenfield investment. A company with the former mode of establishment has already established local linkages, which can be developed and strengthened, compared with a new organisation, which has to create a, from the company's perspective, new supply chain. (UNCTAD, 2001) In both cases the Linkage Programme can be applied.

The size of the foreign affiliate is the last factor influencing the tools in the Linkage Programme. The larger the affiliate is, the less incentive the company may have to develop local linkages in the host market. The reason for this behaviour is that the firm can internalise its operations better and take advantage of its entire international network. (Howells, Woods, 1993) If the local market is not utilised for the company's operations, the less the use of the Linkage Programme will be. However, the ambition of the company to create local linkages also depends on the type of industry the firm is active in. For example, the manufacturing industry has a broad range of linkage intensive activities, especially engineering activities, which can be divided into a number of divisible processes. These processes can be outsourced to suppliers in the local market, using the Linkage Programme as support. (UNCTAD, 2001)

After having described the linkage determinants, a model can be formed that describes the effect of the determinants on the tools in the linkage programme.

Figure 2 - Linkage Programme



(UNCTAD, 2001)

To conclude the presentation of the framework for the research, one can say that the linkage tools presented have a major importance for the integration of the supply chain in an emerging market. This has proved especially true for the automobile industry, where strong demands on accuracy and limited inventory levels further promote active usage of the Linkage Programme.

4 Empirical Background

The following chapter aims to create an overview of both the central issues of this thesis as well as the underlying factors affecting the very same. The chapter will function as an introduction of several of the aspects that are later to be described in the Empirical chapter and at the same time put some of the issues discussed in the Theoretical chapter into their right context.

This chapter will highlight aspects surrounding India and the country's economic environment, marking both historical and present events. Moreover, the country's truck industry will be discussed, its content and the factors that are influencing it. Lastly, VTC's operations and products in India will be presented.

4.1 India's Business Environment

The following section will give a description of the current business environment of India. This information will then be put in relation to the development of the truck industry in the country, hence outlining factors of relevance to the industry. Lastly, this section will include a description of VTC's operations including the company's products in India and its sourcing policy.

India has deep and diverse industrial sectors that suffer serious technological and organizational gaps, due to political policies that have hampered the development with their high costs and technical lags. Its biggest advantage is the large domestic market. Indian companies have the experience needed and research skills to move to a higher level of production and innovation in the area of new technology. But in order to achieve this on a wider scale, massive reforms are required and a reduction of the governmental role within the economy. For extensive long-term gains, large investments within technical and physical infrastructure are necessary. Maximizing the national benefit for new technologies requires considerable domestic capabilities. These capabilities have to go beyond those of an efficient low-end user of advanced technology to those needed for more complex production with these technologies and finally to having some autonomous innovation capabilities. (Kim, Nelson, 2000)

India's economic growth has been slightly stagnant over the last few years. The prime minister Atal Behari Vajpayee is to take action to ensure that the country will grow at a faster pace than the current 5 to 6 percent annually. (Financial Times, 2002-10-07) The country never achieved the targeted 8-10 percent in gross domestic product growth per annum, although compared to most other Asian countries India has performed well over average, outperforming all countries except China, Taiwan, Hong Kong and Singapore. Notable is that investment firms predict India's gross domestic product this year to be 6.2 percent, only allowing for a small increase compared to current growth rate. (Financial Times, 2002-10-08) In the aftermath of the Asian economic crisis in

1997, where the impact on India was limited, it became obvious how detached the country was from other Asian financial markets. Despite the fact that market liberalisation and official openness have been around since 1991, the country has never really been involved in the world trade and battle for FDI, if one would compare to other Asian countries. According to the latest news from United Nations Conference on Trade and Development, the amount of world FDI will decline in 2002 by approximately 27 percent to 534 billion US dollars. Notable is however that the amount of FDI inflow to India is predicted to be the largest for a decade, over 4 billion US dollars. (http://www.worldmarketsanalysis.com, 2002-11-16, Financial Times, 2002-11-13, The Times of India, 2002-10-25)

The fluctuation of the global oil price is something that has been noted in India. The fuel price has risen approximately 100 percent during the last 10 years. (Pimpale, 2002-10-25) The trend continued during 2000 and most of 2001, resulting in an industrial output decrease. In addition, the agricultural sector, which represents nearly 25 percent of gross domestic product, had a stagnant development. The Indian government has shown commitment to reform old bureaucratic systems. However, in reality there has not been any real progress in implementing the suggested actions, which has been followed by sharp criticism during the year. The government is disputing these accusations and is claiming that the privatization and reform is going ahead as planned, especially as successful deals have been made in both the automobile and telecommunications industry. Future plans include lowering of corporation and income taxes together with a halving of the dividend tax. In addition to this, the government has announced the need to control its expenditure, address the continuing bottlenecks in infrastructure and promote employment friendly labour policies. Additional liberalization regarding the country's FDI policies is to be expected as well. This, among other factors, has increased many countries' interest to strengthen its current relationship with India, including Sweden's. (http://www.worldmarketsanalysis.com, 2002-11-16, Financial Times, 2002-10-07, Financial Times, 2002-11-13, Svenska Dagbladet, 2002-10-08, Financial Times, 2002-09-10)

4.2 The Truck Industry in India

Sales and production of both passenger cars and commercial vehicles in India have seen a steady increase since 1993, although there was a small decrease in 1998 and 1999 as a result of a recession, and again in 2000 and 2001. There are about 400 large and medium-sized automotive component manufacturers in India. A few leading companies account for the major share of output, one of them being Telco who recently announced an increase in net profit. As a result, actors are more positive regarding the outlook on demand for the domestic commercial vehicle sectors in the medium-term. (The Hindu, 2002-10-31, Göteborgs-Posten, 2002-09-22) In total, almost half of the medium and large manufacturers have foreign partners, most often Japanese companies. The majority of the component supplier firms have limited capacity and old technology. Therefore these companies most often need substantial capital and technology support to meet the requirements of international vehicle manufacturers. (http://www.worldmarketsanalysis.com, 2002-11-16) It is important that a country upgrades it automobile industry in order for it to meet international standards. The reason for this is the spin-off effect it generates within an economy as many different industries are directly or indirectly involved in the automotive industry. (Howells, Wood, 1993)

A country's infrastructure is closely connected not only to the manufacturing side of the automobile industry but also to the consumer side. Consequently, the condition of the infrastructure is often considered to be one of several key factors which will affect the development of the industry. Many parts of India's infrastructure hold a good standard if compared to other parts of Asia, especially the railways. However, when evaluating the rural areas of the country, infrastructure in general is very poor and many areas are to be considered inaccessible. The weak infrastructure can be considered a serious threat to the country's future development. (http://www.worldmarketsanalysis.com, 2002-11-16)

India's roads are currently extremely underdeveloped. Approximately half of all roads are unsurfaced and over one-third of India's villages have no road access. The quality of Indian roads, even highways, which are now being built from

east to west and north to south, have very low standards compared to international levels. The roads are badly maintained, narrow, highly congested and dangerous, making India the country with the highest traffic accident casualty figures in the world. However, the government is aware of the problem and plans to spend 12.5 billion US dollars upgrading existing roads and constructing new ones. As a result, India's road sector is believed to be among the fastest growing infrastructure areas in the country, expanding by almost 50 percent in 1998-1999, and by nearly 70 percent in 1999-2000. In order to sustain the development of the roads, the government has formed a National Highways Development Project. (http://www.worldmarketsanalysis.com, 2002-11-16, The Hindu, 2002-11-04)

In regards to the commercial vehicle market, road transports has increased its share in the total goods traffic from 12 percent in 1951 to 62.5 percent in 1998. The transport industry in India is largely deregulated, encouraging a high demand for commercial vehicles. The medium and heavy commercial vehicle markets decreased in 2000 and 2001 as a result of slow industrial and agricultural growth. See Appendix, Table 10. (http://www.worldmarketsanalysis.com, 2002-11-16)

As result of extreme pollution in many parts of India, the government has taken a number of procedures in order to lower emissions. An important step in order to succeed with these plans is to replace the aging fleet of commercial vehicles on Indian roads. Society of Indian Automobile Manufacturers (SIAM) estimated that as much as 60 percent of India’s commercial vehicle fleet is older than 10 years, and by taking vehicles more than 15 years old off the road would reduce emissions by as much as 60 percent. (http://www.worldmarketsanalysis.com, 2002-11-16)

The auto policy of the Indian government has been aimed at self-sustained growth and to follow the regulation of the World Trade Organization. The policy allows wholly owned FDI in the auto manufacturing sector. New regulations also require a 100 million US dollars minimum investment by foreign companies wishing to set up a production facility for the four-wheeler market. Other measures to improve technological standards in the country

include a comprehensive policy to address the issue of vehicle taxes and import tariffs. For example, the auto policy offers a rebate in excise duty for every 1 percent of the gross turnover a company spends on R&D. (http://www.worldmarketsanalysis.com, 2002-11-16)

Historically, India has been one of the most economically protectionistic countries in the world. In an attempt to protect the industry from the lifting of quantitative restrictions, the Finance Ministry ruled in June 2001 that vehicles imported with the engine and gear box installed in them, requiring only body assembly, would be treated as a completely built-up unit, hence leading to a higher import tax. The clarification of the definition came as a notification made by Indian auto manufacturers that imported vehicles with gear assemblies and engines could be defined as semi-knocked downs vehicles, which would provide importers with lower customs duties, and threaten domestic production, which has been protected by high import tariffs on completely built-up units. (http://www.worldmarketsanalysis.com, 2002-11-16)

4.2.1 Volvo Truck Corporation's Products in the Indian Market

All VTC's trucks in the Indian market are supported by 24-hour Volvo Action Service stations, which are spread out at 40 different locations around the country. Reliability of the truck is guaranteed in the Volvo Preventative Maintenance program, which offers regular check-ups on the vehicles' continuous performance standard. (http://www.volvotrucks.volvo.co.in, 2002-11-17) All trucks sold in India have been adjusted to the local Indian conditions. For example, tropical engine-cooling kits, gearbox oil cooling and air conditioning are all standard applications. (http://www.worldmarketsanalysis.com, 2002-11-16)

The Volvo trucks are approximately four times as expensive as domestic brands, and in order to justify this price difference, VTC promotes the long-term benefits of the truck. These benefits include economical whole life costs and operational efficiency, which are being upheld by extensive after-sales

services. In addition, VTC offers driving courses for every vehicle sold, and training takes place on a driver training track and classroom located at the plant in Bangalore. The trucks currently available in the market are FM7 8x4, FM7 4x2 and FH12 6x4. The FM7 8x4 tipper truck is built both for off- road as well as on-road operations in construction and mining. The truck is both front axles steered and can be modified for different body capacities and various applications. The FM7 4x2 is a semi-trailer truck built for regional and long haul operations for the transportation of sea containers, bulk tank and refrigerated transport operations. The FH12 6x4 is a tractor primarily constructed for heavy long-haul operations. The truck can be used for transportation of steel, cement, containers and bulk material and has a high transport capacity if compared with 4 to 5 traditional 4x2 rigid trucks. (http://www.volvotrucks.volvo.co.in, 2002-11-17, Business Line, 2000-01-07)

Besides the assembly of trucks, the plant in Hoskote also manufactures components such as wheel rims and castings which are being exported to other VTC plants around the world. The long-term plans of VTC are to make the Indian affiliate a key hub for the global sourcing strategies of the company. Most of the exports are currently going to countries in South Asia. This activity is gradually replacing VTC's current export hub in Singapore. Apart from South Asia, VTC is also focusing on Sri Lanka, Bangladesh and Nepal. VTC is also becoming a production base for several new models, for example the FM9 next generation truck, which are to be exported. Therefore, recently the Swedish parent company decided that it will begin to charge a royalty fee of 8 percent on exports and 5 percent on domestic sales for the technology being transferred to India. (http://www.worldmarketsanalysis.com, 2002-11-16, Asia Africa Intelligence Wire, 2002-09-20)

In the future VTC expects a shift in India from the use of medium sized commercial vehicles to multi-axle vehicles and light commercial vehicles. This development follows the trend in most European countries and Brazil and VTC expects to double its sales of multi-axle trucks in 2003. (http://www.worldmarketsanalysis.com, 2002-11-16)

4.2.2 Volvo Truck Corporation's Sourcing Policy in India

In order to understand the overall sourcing policy of VTC in India, this section will trace the entire international production process of the final truck, as well as map the current range and structure of the suppliers providing components to VTC in the market.

The manufacturing operations of VTC in Bangalore incorporate assembly of completely knocked down units (CKD), which are imported from the main production site in Gothenburg in Sweden. The reason for the use of imports of CKDs is the high import tariffs of completely built up units. All trucks in India are being built on specific demand from customers. The production chain of the truck is divided into three different steps where the first step includes the compiling of a CKD kit at the plant in Gothenburg, including the engine, the cabin, and all parts that are not supplied from Indian manufacturers. The next step includes the shipping of the CKD kit to the plant in Bangalore, and the last step includes the assembly of the final product. The total lead time of the three steps is approximately 18 weeks. Currently, all trucks sold in the Indian market are designed at the global headquarters in Sweden, and as of now, there are no existing plans to introduce a model specifically designed for the local Indian market.

Presently, the local content value of the trucks being assembled in India adds up to around 35 percent, however, the policy of the corporate head office is to increase this share to around 60 percent. The reason for this strategy is to lower the total production costs of the truck, since raw materials and labour costs are significantly lower compared to industrialised countries. Especially labour intensive parts of the production, such as forgings and castings reap extensive cost lowering when produced in India, if compared to, for example Sweden.

By the end of 2001 the total amount of VTC's suppliers in the country added up to 64, of which eleven were only distributors with no actual production. The largest category of components being purchased locally from the market incorporates so called superstructures such as tippers, and other main parts of

the truck, which accounts for 27 percent of VTC's purchases. Furthermore, around 20 percent of the purchases consist of machined steel castings and forgings, eight percent accounts for machined aluminium castings, and another eight percent miscellaneous types of sheet metals. Furthermore, components such as cab interiors and exteriors suspension parts also represent a large share of the purchases.

Although the total number of suppliers is over 60, only a very few are responsible for the main share of supplies. For example, Hyva India, which produces superstructures, accounts for over a quarter of the total purchasing done in India. Out of the 15 largest suppliers in the market, seven are foreign TNCs formed through full ownership, JV between an Indian company and an international producer, or TNC-TT between a local Indian company and a TNC. Of the total amount of suppliers, 19 are companies with some form of foreign involvement, hence 30 percent of the supplier base. Four of these foreign companies are Japanese while three are from the USA, two are Swedish, three are German, two are from the UK and the rest from Netherlands, France and Belgium.

VTC's local sourcing policies reflects the trend of the international automotive industry to utilise the concept of follow sourcing where a limited number of suppliers are selected in order to deliver components within the global network of the OEM. In fact, all of the 19 suppliers with international character in VTC's Indian supply chain also deliver products to VTC's operations in other countries. All in all, 55 percent of VTC's local purchases are made from these follow source suppliers.

In order to more efficiently organise the supply chain, international manufacturers often aim to find suppliers that have a close geographical proximity to production or assembly facilities. The geographical location of VTC's suppliers in India, are mainly located at a number of industrial condominiums around the country. The main areas where suppliers are situated are Bangalore and Chennai, where 33 subcontractors have their operations. This accounts for 58 percent of the total amount of VTC's local purchases. 14 suppliers are located in Bangalore, however, only four of these suppliers where

chosen because of the importance of proximity and a need for face to face contacts in the daily operations of the production.

Another important region where a large extent of the components is purchased from is the Mumbai and Pune area where almost 40 percent of the supplies are bought. If one analyses the 20 largest suppliers to VTC it may be hard to motivate the geographical locations occurring in VTC's supply chain, since these suppliers reveal no clear locational pattern.

4.3 Summery

The core issues of the thesis have been presented in the Empirical Background. The phenomena of globalization have reached geographically distant places, creating the promise of new prosperous consumer markets and the possibility of cost efficiency. This has attracted many TNCs to establish operations in developing countries, India being no exception. When a establishing a new TNC, a whole new string of supplier for each TNC is to be created. Due to India being a historically economically closed country, many of the TNCs are forced to collaborate with local companies in order to be active in the market. This and other reasons have created the FS trend. India is still to a certain extent a closed country with extensive restrictions in various industrial sectors, due to various governmental policies. This has hampered the country's growth and still is in some cases. VTC has been in India since 1998. The company is currently producing a very limited amount of trucks for the domestic market. VTC is however still hoping that future demand will pick up as the country starts to benefit economically. VTC has furthermore announced the intention of making India into the company's hub for export to parts of Asia.

5 Empirical Study

This chapter contains the field data gathered during interviews with VTC and its FS suppliers. The presentation of the material is related to the structure of the Linkage Programme, and is presented in three different sections. The first section is describes the relationship from the FS supplier's point of view towards VTC, while the second section describes the opposite. The third and final section deals with the relationship between the FS supplier and its subcontractors. Information presented in this chapter is mainly based on personal interviews with managers from the various companies, unless otherwise stated.

In order to introduce the FS companies which have been investigated in connection to VTC, a matrix containing overall company information has been created. This is done in order give sufficient background information in order to understand the companies' operations. The matrix includes information regarding the history of the company and the structure of its international network. The products and manufacturing/assembly processes which are conducted by the companies will be described. Furthermore, the companies' market share and any additional information will be explained. The data upon which the matrix is based can be found in the Appendix under the section 10.1 Follow Source Supplier Information.

5.1 Follow Source Supplier Matrix

Company Name	History / Established in India	Structure of Network	Products	Manufacturing Process / Assembly	Market size / Clients	Additional Information
Autoliv Incorporated	Merger between Autoliv Sweden AB (founded in 1956) and Morton ASP in 1997. Autoliv Inc has been in India since 1994.	Autoliv Inc. has 80 subsidiaries and JV in 29 countries. Employing approx 30 000 people.	Seat belts, airbags and services for automobile safety.	Autoliv India has own test facilities. Close collaborations with Autoliv Germany regarding quality issues.	Approx 60% of the total market share in India. Clients such as Telco, GM, Daewoo, Volvo and Ashok Leyland.	Two main competitors: Habisec (JV with Japanese firm) and TRW (US firm). ISO 9000, QS 9000 and ISO14001 certified.
Brakes India Limited	Established in 1962 through a JV between TVS Group and Lucas Industries Plc.	TNC-TT with TWR, Meritor, Tokico, Akebono, Freudenberg and Hitachi.	Primary brakes systems but also product such as callipers, cylinders, vacuum boosters, valves and drum brakes.	Brakes India is manufacturing S Cam, simplex air drum, wedge and hydraulic brakes for the truck segment.	Brakes India is present in every segment of the brake market, with clients such as Ashok Leyland, Bajaj, Fiat, Maruti and Telco.	Brakes India is in the initial phase of implementing TPM and TQM systems, assisted by a Japanese consultancy firm.
Elf Lubricants India Limited	Elf has been active in the	Elf India is a part of Total	Petroleum activities,	Lubricants are primarily	Approx 8% market share of	90% of total sales are from

	Indian market since 1992.	Fina Elf (France).	exploration and refining. Oil-based lubricants.	blended in-house, although 15% is made by third party.	the Indian market. Various OEMs, such as Maurti, Telco, Punjab Tractors, Bajaj, VTC, and Watseka.	consumer/after-market for cars, busses, trucks and fleet owners. 10% to other industries. ISO 9000 certified.
Goodlass Nerolac Paints Limited	The company was formed in 1920, has since changed shape several times, due to int. exposure.	Goodlass is a wholly owned subsidiary of Kansai Paints Company Limited as of 1999.	Paint and coating material.	Blending.	19% of the Indian market, supplying to 90% of the OEMs in India.	ISO 9000 and QS 9000 certified.
Hyva India Limited	Hyva Group founded in 1979 in Holland. Exporting to 110 markets. Hyva India was prior to 2002 acting as a distributor in India.	In 2001, Hyva Group employed 600 people, with wholly owned subsidiaries in 12 different countries. Hyva India, 38 office staff and 150 employees in the factory.	Transport efficiency industry. Hydraulic cylinder and trailers for the truck industry. Full solutions on tippers and tipping trailers.	Hyva India started its production in 2002. Manufacturing sites in Mumbai, Bangalore and Jamshedpur.	65% of total sales to Telco, 25% of total sales to VTC and 10% to different clients.	Both manufacturing and trading tipper systems. Hyva India is an agent for JOST and Ringfeder (Germany) and HMS (Denmark). ISO 9000 certified.

Kalyani Lemmerz Limited	Hayes Lemmerz, founded in 1900s, is a majority owner of Kalyani Lemmerz, which is an underlying company to Bharat Forge since 1995.	Associated with Hayes Lemmerz and Bharat Forge Limited. Kalyani Lemmerz is represented in 27 countries.	Aluminium wheel and wheel rims.	Kalyani Lemmerz has manufacturing plants in India, Germany and Brazil.	Clients such as Telco, Tata, Ashok Leyland and VTC. Exporting to Korea, Spain and Sweden.	Kalyani Lemmerz enjoyed an overall company growth of 48% during 2001.
Krishna Fabrications	Member of the Suvir Group. Krishna Fabrications is a family managed company, established 1975.	JV with Friedrich Boysen (Germany) and TNC-TT with Isringhausen (Germany).	Seating systems, sheet metal structures and operator cabins for heavy earth moving equipment.	Plants in Bangalore, Chennai, Pune, Hyderabad and Delhi.	Clients such as Telco, Bharat, Maruti, VTC and Ashok Leyland.	ISO 9000 certified.
PL Haulwel Trailers	PL Haulwel is associated with Ashok Leyland since 1996. PL Haulwel has been in the Indian market	Collaborations with Hammer, Fischer, Hyva, Cometto, Callahan, Marathon Electronics,	Fifth wheel coupler, trailers and side loader, cement bulker, trailers with hydraulic suspension and	The trailer unit was added to the company 6 years ago. 2 production units in Pondicherry and 1 in	Trailers represent 80% of PL Haulwel's total sales. VTC's share is 50% of the 80%. Other clients are	ISO 9000 certified.

	since 1985.	C&B, and Swing Thru Int.	forced steering.	Chennai.	Ashok Leyland.	
Sundaram Clayton Limited	Began its operations in 1962 in together with Clayton Dewandre Holdings (UK).	Part of the TVS group employing 29000 people.	3 business areas, foundry, air-brakes and ABS. Focus on engine transmission components.	1 plant in Chennai and 1 plant in Hosur.	85% market share of OEMs. Focuses mainly domestic OEMs, although has small export.	ISO 9000 and ISO 14000 certified.
ZF Steering Gear India		Collaborations with ZF Friedrichshafen (Germany).	Power steering gear for light, medium and heavy vehicles.	Manufacturing two types, mechanical and power steering gear.	60% of the market share for heavy and medium steering gear.	VTC has stopped buying from ZF in India and now importing its steering gear from a different source.

5.2 Autoliv IFB India Limited

5.2.1 Autoliv's Relationship towards Volvo Truck Corporation

The relationship with VTC India was set up through the already established contact between Autoliv and Volvo Sweden. VTC's share in Autoliv's production is extremely small, with purchases of only 100-200 seatbelts per month compared to Autoliv's total production of 200 000 seatbelts per month. However, Mr. Subramanian believes that the sales to Volvo might however increase somewhat over the next coming few months since Volvo is introducing a new truck in India. (Subramanian, 2002-10-31)

The product that Autoliv delivers to VTC in India is of a special type not used for any other customer. The belt is designed to be less sensitive in order not to stretch over the driver when operating the vehicle in question. Autoliv Sweden gave Autoliv India the technology to produce the type of product that VTC required. Testing of the product was performed in Sweden. One could say that the only TT that has occurred since Autoliv started supplying to VTC has been the transfers from the Swedish branch of Autoliv towards the Indian branch. No transfer between VTC and Autoliv India can be defined. (Subramanian, 2002-10-31)

The testing procedures are normally done together with other branches in the international network of Autoliv. For example when developing a product for General Motors, Autoliv India transferred knowledge and technology from the Japanese branch of Autoliv. The development of products and technology for the 8 currently running projects is normally done to 90 percent by Autoliv India themselves with the help of their customers. The company also has their own R&D centre. Whenever help is needed from within the organization this is normally taken from Autoliv Germany, which has excellent R&D facilities. (Subramanian, 2002-10-31)

The relationship with VTC has worked fine. When developing the product, VTC sent instructions with vehicle configurations to Autoliv. Autoliv considered the information given to them and gave VTC a design proposal together with a sample. Minor changes were done to this design and thereafter visits were made whenever needed, in order to solve eventual problems. Furthermore, the relationship between VTC and Autoliv has not lead to any managerial changes. To sum up, one could say that Mr. Subramanian believed that communication has been good all the way through Autoliv's and VTC's relationship. (Subramanian, 2002-10-31)

Deliveries to VTC from Autoliv are done every month according to a tentative delivery schedule set up every two months. This is done in order for imports from Europe to reach India on time. Autoliv uses both FIFO, JIT systems and Kanban. However, VTC did not initiate the establishment of these systems. After the seatbelts are assembled in Autoliv's factory in Bangalore, the products are delivered to the Volvo factory in Bangalore. (Subramanian, 2002-10-31)

Business information regarding the truck industry is given regularly by VTC, and Autoliv believes this information flow has been relevant and beneficial to the operations of Autoliv India. VTC also invites Autoliv to annual gatherings together with other suppliers of VTC. These meetings have been very useful for the company. (Subramanian, 2002-10-31)

5.2.2 Volvo Truck Corporation's Relationship towards Autoliv Incorporated

Mr. Baht, who was the representative from VTC that started the contact with Autoliv, believes that the company meets all of VTC's requirements. The standard of the product has been high and no problem has occurred in regards to communication. (Rao, 2002-10-31)

In addition, there have been no price issues and no quality issues; hence there has not been much communication between the two parties. However, some

communication in regards to product design had occurred during the development phase, but no technical knowledge was transferred. (Rao, 2002-10-31)

5.2.3 Autoliv's Relationship towards the Company's Suppliers

Autoliv India procures components for the company's assembly from both domestic and international suppliers. The imports are mainly bought from Australia and Germany. Local suppliers used by Autoliv are all ISO 9001 certified and this has been accomplished with a lot of help from the company. (Subramanian, 2002-10-31)

Autoliv India has continuously increased their supply of local products and aims to continue this procedure over the next few years. Currently, the local content is 80 percent. The reason is the high import quotas for the products supplied from Australia and Germany. (Subramanian, 2002-10-31)

Finally, the relationship with VTC has not led to any changes in the relationship towards the suppliers, neither local nor international. (Subramanian, 2002-10-31)

5.3 Brakes India Limited

5.3.1 Brakes India's Relationship towards Volvo Truck Corporation

The requirements from VTC regarding the final product were fairly easy to meet as Brakes India manufactures similar products for other customers. The design is however unique to VTC, making the product into a, for Brakes India, new product. Currently, Brakes India is only supplying one sort of brake system to VTC. If service of the brakes is required, VTC performs this service as agreed upon between the two companies. (Sridharan, 2002-10-28)

VTC provides Brakes India with the specifics regarding ordering of products on a monthly basis. There is no fixed time period regarding the business relation between the companies in writing. Confirmation of the monthly order is later done in order to ship the finished product to VTC in Bangalore. VTC has assigned a logistics company to handle the shipping of the products. Costs in connection to the transportation are paid for by VTC. (Sridharan, 2002-10-28)

The development phase during which the product supplied by Brakes India to VTC was worked out will be described below. The project cycle is divided into four different stages, starting with stage 0. (Sridharan, 2002-10-28)

At stage 0, Brakes India was importing a complete brake system from Meritor, which was the same system that Meritor was providing VTC Sweden. Notable was that the system was fully functional and that Brakes India acted only as a distributor. (Sridharan, 2002-10-28)

The next step in the development phase forced Brakes India to put up an assembly production line in order to do semi-assembly procedures. This is the start of stage 1 in the development. Once the assembly line was approved and quality checked, Brakes India started to import a few loose components from Meritor. This allowed Brakes India to do the final assembly in the company's own facility and later deliver the finished product to VTC. (Sridharan, 2002-10-28)

The purpose of stage 2 is to localize the high value items in India. These items are at present: top plates, brake shoe, shaft and shield. These are the four parts that are localized in India. The rest of the parts are still imported from Meritor in UK. In addition to this, there are a few integrated parts that are not considered to be imported. The items that are especially technical and are crucial with regards to quality are still kept on the import list. A dedicated production line was created for VTC. Meritor as well as Brakes India did tests at Brakes India's test facilities. These tests were aimed both at the test facility itself but also towards the products that were assembled at the facilities. Two production engineers from Meritor visited Brakes India where the entire

manufacturing line was validated. This was considered especially important as the design of the production line is originally from Meritor. VTC also confirmed the quality of the production line. (Sridharan, 2002-10-28)

The last phase of the development of the VTC project is referred to as stage 3. This stage is an attempt to further reduce the cost of production for Brakes India. The company is aiming to localize 8-10 items instead of the current 4 items. This will save Brakes India funds as less will be spent on import duties. At present, this has still not been materialized, but once it is, all products will be quality tested by Meritor to ensure customer satisfaction. (Sridharan, 2002-10-28)

What makes the VTC project special is that it starts at stage 0. Normally, customers at Brakes India start at stage 1. One of the reasons to why VTC started at stage 0 was that the brake system that VTC is buying is unique to VTC and consequently specially designed for VTC. (Sridharan, 2002-10-28)

VTC represents about 1 percent of Brakes India's sales. This however is not of concern for Brakes India at present, as they consider the co-operation with VTC as long-term, hence Brakes India hopes that the volumes will increase as VTC gets better established in the Indian market. In order to speed up this process, Brakes India has initiated discussions with VTC regarding an increase of the order volumes; this does not only incorporate the domestic market, but also the export market. (Sridharan, 2002-10-28)

Brakes India considers VTC to indirectly have provided knowledge to the company. As discussions between Brakes India and VTC began, VTC has cleared VTC Sweden to introduce procedures and other necessary details vital for the manufacturing and assembly of the product to Brakes India. The actual transfer of knowledge has gone through Meritor to Brakes India, all originating from VTC Sweden. In order words, neither VTC nor VTC Sweden is actually providing Brakes India with any TT. But when VTC entered the Indian market, knowledge was indirectly transferred to Brakes India. (Sridharan, 2002-10-28)

It is however not possible to use the manufacturing processes and technique that Brakes India has gained through the above described TT from Meritor in production of other products. Small features that are common for all products could be transferred from the VTC project to other projects, but as the design of the VTC product is unique it is not possible to transfer technology on a large scale. (Sridharan, 2002-10-28)

During the development phase of the product, which is partly still taking place, there was a constant exchange of information regarding numerous issues of the project. These issues covered many different subjects such as product- and process technology as well as quality and environmental matters. During the initial period in the development phase, there were several visits conducted by Brakes India to VTC and vice versa. (Sridharan, 2002-10-28)

VTC did compensate Brakes India financially with regards to the tools necessary for the manufacturing of the product. The actual procurement and purchase of the tools was done by Brakes India, but the financial aspect was cleared by VTC. Notable is that these tools can only be used when manufacturing the product required by VTC. (Sridharan, 2002-10-28)

Brakes India has obtained ISO 9002 certificate for its foundry division and ISO 9001 certificate for its brake division (http://www.brakesindia.com 2002-11-08). Furthermore, QS 9000 is implemented as well as IS 14001. Brakes India has realized the need to follow international standards regarding quality and environmental issues if they want to be suppliers to TNCs. VTC did not directly affect Brakes India's decision in acquiring these certificates, as VTC is one of many TNCs that Brakes India is currently supplying products to. (Sridharan, 2002-10-28)

As the initial development phase is complete, there has been less communication between the companies. However, when corrections, for instance regarding quality issues, have been necessary, or when there is a difference in opinion between Brakes India and VTC, a discussion has normally taken place. Brakes India considers this to be a genuine two-way

communication process. Hence VTC is not telling Brakes India what to do, nor is it the other way around. (Sridharan, 2002-10-28)

There are no real structured social meetings between the Brakes India and VTC apart from the vendor conference that VTC conducts. (Sridharan, 2002-10-28)

5.3.2 Brakes India's Relationship towards Its Suppliers

Brakes India is experiencing a one month lead time on products ordered at its domestic suppliers and a four month lead time on imports. Considering this, it does not allow Brakes India any opportunity to use systems such as JIT. To compensate for this, Brakes India does hold significant inventory of spare parts and various articles. (Sridharan, 2002-10-28)

Brakes India has not considered the possibility of vertical integration of its suppliers. The company have however the intention to gain better control of their suppliers with the help of IT systems that are currently being developed. (Sridharan, 2002-10-28)

As previously mentioned, Brakes India has the intention to increase the amount of high value products being localized in India in order to reap better margins. In order to do so, discussions will take place between Brakes India and its suppliers to ensure that the suppliers have the capacity to deliver the inputs necessary for Breaks India to keep the quality level required from VTC. This could force Brakes India to upgrade their suppliers. If an upgrade is required, knowledge necessary to perform the upgrade will be transferred to Brakes India from Meritor. (Sridharan, 2002-10-28)

The TT that has occurred indirectly from VTC, as described above, has to a certain extent improved various manufacturing processes at Brakes India. This has forced Brakes India in some cases to have their suppliers to upgrade their routines and products. Assistance has been given from Brakes India to its suppliers in order to complete the upgrade if necessary. In cases where

assistance has been necessary, technicians from Brakes India have provided hands-on knowledge in order to complete the upgrade. (Sridharan, 2002-10-28) There is no other information being shared between Brakes India and its suppliers apart from volumes and quality. (Sridharan, 2002-10-28)

5.4 Elf Lubricants India Limited

5.4.1 Elf Lubricants India Limited's Relationship towards Volvo Truck Corporation

VTC India selected Elf Lubricants India to supply 100 percent of its requirement regarding service and oil fills in India when starting its operations in 1997. (Business Line, 2002-04-07) The partnership is strategically very important for Elf India since VTC produces highly sophisticated products and has an acknowledged good reputation within the truck industry. Since VTC entered the Indian market, the company has quickly transformed the truck industry with its more technologically advanced products. As a result, Elf is eager to be associated with the Volvo brand since this will provide a good image for Elf. VTC's share of Elf's sales in India are very small, a mere 1 to 1, 5 percent. However, Elf believes that current small orders are not a problem since VTC is on a route to expand and is considered a firm with long-term ambitions. The contract with VTC runs for three years and expires in 2004. (Mittal, 2002-10-21)

Most of the technology utilized in Elf has been transferred from the parent company in Europe. The lubricants are centrally developed products and when Elf started delivering to VTC in India, the parent company in Europe performed the tests together with VTC in Europe. These products were later transferred to the Indian market. When local adjustments need to be done in the Indian market, tests are done in Europe and the results are transferred to India. For example, compared to a European level there is a lot of dust on Indian roads and the lubricants need to be adjusted to compensate for this. When such an issue evolves, Elf India contacts its European branch and tests are performed in order to deal with the issue. As a result, VTC has not transferred any product

design or technical specifications, since the knowledge was already contained in the global organization of Elf. In addition, the transfers of process technology have also been rather limited since the test procedures and production planning were already of a good standard before VTC became a customer. (Mittal, 2002-10-21)

The current two way communication between ELF in India and VTC works efficiently even though the contacts are not that intensive. The reason for this is that the lubricant is a fairly standardized product, which does not require much follow-up testing. Initially, during the development phase, the communication was reasonably intense; however this phase is now over and as a result contacts have gotten fewer. On an international level, there has also been a certain amount of contact between the European branch of Elf and VTC in Europe, but this contact has now been less frequent as well. (Mittal, 2002-10-21)

VTC visits Elf once every year in order to evaluate the products and quality control systems in the plants. VTC does not provide any specific advice for the operations of Elf, rather only certain comments are made when necessary. The environmental issues are often discussed as a result of VTC's ambition to increase standards of its suppliers in general. The decisions regarding these standards are taken both by Elf India and Elf Europe, and all tests regarding the environmental standards are performed in Elf's laboratories, hence not involving any provision of facilities from VTC. To conclude, in regards to the organizational and managerial know-how, feedback given by VTC has primarily led to an upgrade in environmental standards. (Mittal, 2002-10-21)

Elf has not been able to gain market recognition as a result of the partnership with VTC primarily because VTC has not allowed Elf to promote themselves as the sole lubricant supplier to VTC. However, even though marketing has not been used, Mr. Mittal was of the opinion that it is well known in the industry that Elf is the supplier of VTC in India. Hence there is no formal marketing needed. Mr. Mittal believes that VTC does not like Elf to market themselves as the only supplier of lubricants because this might display a monopolistic behaviour, having only one brand within the field of lubricants. According to Mr. Mittal, VTC is always open to new entrants in the market and any company

that wishes to become a supplier to VTC should have the opportunity. (Mittal, 2002-10-21)
Regular visits are made by Elf at VTC's premises in order to discuss for example delivery procedures. However, nowadays not very many issues are brought up since the purchases are very set and formally organized. Contacts over e-mail or phone are conducted approximately once a week. (Mittal, 2002-10-21)

Transportation services are used externally in order to bring the products to the 50 VTC service centres around the country. Thereafter, VTC delivers the products from these centres onwards to the plant in Bangalore. Mr. Mittal believes that even though there have been some major improvements in lead-time over the last few years, further lowering is definitely needed. (Mittal, 2002-10-21)

5.4.2 Volvo Truck Corporation's Relationship towards Elf

Elf was chosen as a supplier to VTC because of the superiority of their products and the company's dominate position in the lubricant sector. One important reason for the supremacy was its vast network of service stations and affiliates all over the country. This allows for fast service with oil, fuel and lubricants. (Prasanna, 2002-10-31)

When testing the quality of the product the initial sample was sent to VTC Sweden, which performed regular check ups. These tests showed good performance and high quality standards. (Prasanna, 2002-10-31)

Mr. Prasanna believes that the communication from VTC to Elf works efficiently. Elf has clearly been well-educated about the mission and vision of VTC, and there can be no doubts about where VTC is heading in the market and what segments the company is about to focus on. (Prasanna, 2002-10-31)

Mr. Prasanna does not see any reason for Elf to be informed about the long term strategy of VTC in the market. The overall strategy is not of importance for the supplier. (Prasanna, 2002-10-31)

Mr. Prasanna believes that communication with the supplier should only be done if necessary, and then, preferably by telephone or e-mail, since personal visits are costly and do not provide many benefits. (Prasanna, 2002-10-31)

During a vendor meeting two years ago, Elf expressed their expectations regarding the relationship with VTC. At this point, Elf believed that the relationship between the firms should be upgraded to a business partnership where Elf took a more active part in the development of the product. Mr. Prasanna believed that the business partner status was achieved since Elf was extremely committed to developing the relationship with VTC. For example, Elf has been able to provide added value by testing various oils giving the test results to VTC, free of charge. According to Mr. Prasanna, this works as actual evidence of a business partnership. (Prasanna, 2002-10-31)

Regarding TT, VTC has assisted Elf during one occasion with regards to the packaging of the product. The method used previously was affecting the quality of the product and hence destroying some of its features. The knowledge provided by VTC was later used by Elf in their relationship with other customers. (Prasanna, 2002-10-31)

5.4.3 Elf's Relationship towards Its Suppliers

As mentioned, the suppliers of Elf are mostly large international firms, which were already supplying to Elf on an international level. The contacts are well settled and the firms are normally well-educated and not in need of upgrades in skills. If, in any case, problems might occur, Elf provides the suppliers with suggestions for how to solve these problems and if required, Elf gives complete technological support. (Mittal, 2002-10-21)

Elf does not believe that the relationship with VTC has affected the contacts with its suppliers in any specific way. However, Mr. Mittal believes that the

entrance of OEMs in the Indian market has forced the company to upgrade its requirements on existing suppliers. (Mittal, 2002-10-21)

5.5 Goodlass Nerolac Paints Limited

5.5.1 Goodlass Nerolac Paints Limited's Relationship towards Volvo Truck Corporation

Goodlass has been VTC's supplier since the beginning of the operations in India. The company fulfilled the requirements after VTC had visited at their laboratories and checked the quality of the products. (Khanolkar, 2002-10-22)

The painting of VTC's trucks is made in Bangalore, and Goodlass supplies the products themselves to the factory. The share of VTC's purchases in Goodlass' business is less then 5 percent and thus considered very small. (Khanolkar, 2002-10-22)

Mr. Kahnolkar considers the relationship towards VTC to be excellent with good communication and quality standards set up by VTC which have been met by Goodlass.
VTC provides Goodlass with goodwill and is considered a very serious company. Even if VTC is a small company and carries small quantities in the Indian market, Goodlass is sure to receive more orders with the company later on. Mr. Kahnolkar believes VTC will upgrade the standard of the truck industry in India, which will surely create ample of business opportunities in the future. (Khanolkar, 2002-10-22)

During the development phase contacts were frequent between the companies. In order to produce the right type of colour shade that VTC required, Goodlass needed to upgrade its quality standards. After the product had been fully tested in Goodlass' labs, the product was, on demand by VTC, sent to VTC Sweden for further testing. The tests resulted in some minor changes in the final product and subsequently, the product was acknowledged by VTC. After the

development phase was over the level of communication between the firms was lowered. (Khanolkar, 2002-10-22)

Initially, Goodlass had some problems in keeping the time schedule when delivering but after help from VTC in planning the production and testing, Goodlass managed to speed up the process. Whenever Goodlass experienced problems in production, VTC helped in finding the right type of information and knowledge. For example, during the development phase, VTC required a solidity test of the colour which Goodlass could not facilitate. The test was supposed to be done in a 40 bar water testing system, but this kind of system could not be set up by Goodlass. In order to deal with the problem VTC took the product for testing and arranged it themselves. With the help of VTC, Goodlass later bought the same equipment, which could be used for doing the same kinds of test for other OEMs. (Khanolkar, 2002-10-22)

VTC had high environmental demands on Goodlass which as a matter of fact already had the ISO 14000 when approached by VTC. In addition, VTC gave a list of all components that the company has forbidden to be used in the paint. (Khanolkar, 2002-10-22)

To summarize, Mr. Khanolkar believes that VTC has taken very good care of Goodlass and has been very open to the suggestions made. Mr. Khanolkar believes that VTC is in general a very open company that believes in competition and has therefore welcomed any supplier to step forward in the battle of signing a contract with VTC. Finally, even though Goodlass has not marketed themselves officially as a supplier of VTC it is well known within the industry that Goodlass is the company's supplier. (Khanolkar, 2002-10-22)

5.5.2 Volvo Truck Corporation's Relationship towards Goodlass

Before VTC decided to settle with Goodlass as a supplier, the company shopped around for various suppliers in India. The reason why Goodlass was better compared to other paint manufacturers was the company's commitment

to its buyer and the patience during the development phase. However, the product quality between the suppliers that VTC evaluated was actually marginal. (Prasanna, 2002-10-31)

Mr. Prasanna believes that Goodlass has been very receptive regarding ideas that have come from VTC, especially during the development phase. Furthermore, the development phase was quite extensive; however Mr. Prasanna believed that Goodlass had shown good patience during the test period, even though the development took a very long time, about 1.5 years. However, Goodlass and VTC have enjoyed very deep communication regarding several technical issues. (Prasanna, 2002-10-31)

However, Goodlass' ability to perform tests was not sufficient in VTC's point of view. Therefore, assistance in this area was needed, which was why the prototype was sent to VTC Sweden for extensive testing. TT was carried out in a one-way direction, as VTC provided necessary documents to Goodlass. VTC's strength is its knowledge in surface treatment and as a result VTC suggested a number of process improvements to Goodlass after the evaluation. (Prasanna, 2002-10-31)

The communication between the companies has in general held a high standard. However, the forecasting from VTC to Goodlass needs to be improved. There is however difficulties to keep the on-time-deliveries, mainly because of order fluctuations from VTC's side. (Prasanna, 2002-10-31)

5.5.3 Goodlass' Relationship towards Its Suppliers

The raw materials (pigments) which are needed to produce the paint are imported from Europe, Japan and USA. CIBA is one international manufacturer of pigments used as a supplier. Solvents are purchased domestically and the pigments and solvents are blended to paint in the five factories owned by Goodlass in India. (Khanolkar, 2002-10-22)

VTC assisted in procurement issues and locating the right type of inputs in order to get the quality needed for the products. More or less all of the

assistance given by VTC was related to the start-up of the new product line for VTC. However, VTC made Goodlass aware of the high quality standards that international manufacturers normally hold. (Khanolkar, 2002-10-22)

Goodlass did not get any help in finding the right type of companies in order to do import since these companies were already long established since long in the network of Goodlass. (Khanolkar, 2002-10-22)

5.6 Hyva India Limited

5.6.1 Hyva India Limited's Relationship towards Volvo Truck Corporation

In 1998, VTC India approached Hyva in India since the company had been a supplier on a global basis to VTC, for example VTC in Gothenburg and VTC in Korea. VTC actually became the first customer of Hyva at the time, and a certain type of hydraulic system that first had been developed for Ashok Leyland could be used for VTC's truck. Reasons to why VTC selected Hyva were their international production capacity and the product quality. Mr. Prabhu believes that Hyva manages to cooperate with VTC in terms of design and providing know-how incomparable to other Indian firms which have no design skills. Being associated with VTC was a good showcase in order to generate further sales, however the relationship did not quite generate the publicity that Hyva had hoped for, mainly because VTC's production volumes did not increase as much as was believed from the beginning. VTC's share of total sales is 200 000 US dollars per month, which is approximately 25 percent of total sales. Rest of the sales are made to Telco which has about 65 percent of the business and the rest is sold to some minor miscellaneous buyers. (Prabhu, 2002-10-21)

The partnership with Volvo has in general been very successful and according to Mr. Prabhu both parts have learned a lot about the truck industry in India. Initially, Hyva was providing technical assistance to VTC with regards to tipper building as Hyva were stronger in that field than VTC. However, nowadays

there is more staff with the proper engineering background and skills employed at VTC, and as result the company is more competent. Mr. Prabhu believes that the interaction between the companies has changed over time. Initially, there was a one way communication towards VTC, focusing on support which has later turned into a more rewarding dialog developing two way communications and deepening the relationship. (Prabhu, 2002-10-21)

Visits between the two companies are facilitated whenever a need arises and are most often performed by Hyva visiting VTC. Recently, Hyva experienced some problems in receiving the payments from VTC on time and therefore a meeting was set up in order to discuss the matter. VTC did not clear their payments according to the contract, which stated a payment of 30 percent in advance and the rest within 30 days. VTC suggested to Hyva that since the two companies had had a partnership for such a long time, VTC should be offered a more beneficial payment deal. As a result, representatives from Hyva visited VTC in order to sort out the problem. At the meeting it was decided that VTC was allowed to pay within 30 days instead. However, VTC did not follow through their payments in accordance to the agreement and this troubled the relationship. As a result, Hyva managed to convince VTC to return to the former system of 30 percent in advance and the rest within 30 days. As of yet, there has not been any contract formed between the two companies and purchases are settled on an annual basis and complemented with quarterly forecasts. (Prabhu, 2002-10-21)

Initially, Mr. Prabhu believed that VTC really had the intention of adjusting its present product range to various local market demands. However, the dialog regarding VTC's products, Hyva's components and the local market needs of India, have not been as rewarding over the last few months since information given to VTC by Hyva has not been acknowledged. According to Mr. Prabhu, an important explanation for this is the staff turnover in the top management at VTC's office in Bangalore. As a result, suggestions given from Hyva have not been transferred to the replacing manager. Since Hyva started doing business with VTC, many of the staff members from management to shop floor people have been replaced. The only department that has been kept somewhat intact is the materials department where the same manager is still running the

operations. The high employee turnover has worried Mr. Prabhu since he believes that there is internal turbulence in the company. (Prabhu, 2002-10-21)

There was no technical know-how transfer or design transfer involved in the initial process. Hyva was able to provide VTC with a product that VTC later confirmed the quality on. Hyva managed to prove for VTC that their product and their materials were of correct specifications and requirements. Field tests indicated that the combination of VTC's bodies and chassis and Hyva's tippers were working. (Prabhu, 2002-10-21)

The turnover in the top-management level of VTC has been so frequent that it is hard to do business with VTC according to Mr. Prabhu and he is now worried that VTC is changing their plans and might reduce its interest in the Indian market. Since there have been changes in VTC's future plans, Hyva does not want to rely too much on VTC in case the company would abandon the market. As a result, Hyva has developed a close relationship with other customers such as Tata and Ashok Leyland. (Prabhu, 2002-10-21)

Hyva and VTC are communicating on a daily basis, often between the materials departments. Hyva's office in Bangalore was set up in order to have proximity to the VTC factory and therefore contacts are often made through that office. Hyva also set up a plant in Bangalore because Volvo insisted on this. The reason was that VTC needed stability in delivery and the proximity of Hyva as a supplier. In this plant Hyva is producing the tippers and not the hydraulic systems. During the meetings in Bangalore, all kinds of different issues are discussed: after sales, customer reactions, invoices and administrative issues. Sales staff from the two companies often interact as well, not just the vendor department at VTC with Hyva's sales department. (Prabhu, 2002-10-21)

The companies do not have any joint R&D facilities or efforts. However, VTC is demanding very high quality products, which is appreciated at Hyva, since it helps the company upgrade its standards. Total Quality Management (TQM) is a concept applied with the help of VTC. VTC provided the Hyva with a checklist with the requirements needed in order to upgrade the quality to

sufficient levels. Inspections by VTC staff, such as technicians and engineers, were carried out at Hyva in order for Hyva to ensure that they are applying the concepts correctly and that the capacity was up to the standards of VTC. (Prabhu, 2002-10-21)

VTC also assisted in production planning and in order for Hyva to cope with the demands set up by VTC, daily checking and confirming is in place to ensure the production planning with VTC. Routines for Hyva regarding overall production planning were originally received from Hyva International, but these were revised with the help of VTC. Lastly, Hyva got its ISO 9000 certification a couple of years ago. (Prabhu, 2002-10-21)

Regarding financial issues, price discussions between Hyva and VTC have been going on every now and then. The rotation of staff at VTC might have affected the price discussion with Hyva as new staff sometimes tries to squeeze the vendors. Hyva has a strict policy regarding pricing and they are even willing to stop relationships with companies if they feel that the margin is not sufficient. Mr. Prabhu thinks it has gotten harder to communicate with VTC regarding prices during the last 6 months. The reason for this is a lack of understanding from the new staff at VTC, or people from various departments within VTC. The interaction between various departments of VTC and Hyva has been affected negatively by the changes of personnel. As a result, Hyva is questioning VTC's future strategy and perhaps even the future relationship between Hyva and VTC. (Prabhu, 2002-10-21)

Hyva believes that VTC should arrange social gatherings with all the suppliers in VTC's supply chain in order to build relationships. These gatherings could be arranged when, for example, there are new product launches by VTC. Telco, which is Hyva's other large customer has performed these kinds of meetings several times and Hyva believes VTC should do the same. Mr. Prabhu informed the company about these issues a while ago, however, VTC did not respond. Hyva has also communicated a lot of other complaints over the last few months; however there has been no reaction to this criticism. As a result, Mr. Prabhu believes that VTC is not taking their relationship seriously. (Prabhu, 2002-10-21)

5.6.2 Volvo Truck Corporation's Relationship towards Hyva

In 1999, in the initial stage of the relationship, a tipper model was built for the FM7 truck, which was the only truck supplied by VTC in the Indian market. A body was also developed for the local market, with the help of Hyva. Already during the development phase VTC received a large number of orders for the FM7 truck, forcing VTC to quickly order a considerable number of components from Hyva. Even though there was pressure in the orders from VTC, Hyva managed to support VTC with the components. (Prasanna, 2002-10-31)

Six months ago, VTC replaced Hyva's contact person at vendor development. The former contact person, Mr. Prasanna, was replaced by Mr. Muthukumarasamy. Mr. Prasanna considered the relationship during the initial time of the relationship to be more of a joint team effort than a relationship. Suggestions came from both directions and the team effort was excellent. VTC provided engineers and floor shop personnel. The two companies did procurement together, and equipment necessary was sometimes sent from VTC to Hyva. The two companies also performed R&D together. All in all, according to Mr. Prasanna, it was an extremely good relationship. Later on, discussions took place regarding the 6x4 which Mr. Prabhu believed would be more suitable to the local Indian market. During this period, the relationship changed due to price related issues. (Muthukumarasamy, Prasanna, 2002-10-31, Prabhu, 2002-10-21)

5.6.3 Hyva's Relationship Towards the Company's Suppliers

Hyva processes 1200 tons of steel per month supplied by Indian local steel firms. 60 percent is produced domestically and 40 percent from Hyva in Brazil or Holland. However, steel prices have increased by about 35 percent this year, and the value of the Rupee has changed from about 35 Rupees per Euro to 45 Rupees per Euro pushing the needs for exports further. (Prabhu, 2002-10-21)

Finally, according to Mr. Prabhu, the relationship towards Hyva's supplier has not really been affected since VTC became a customer of the company. (Prabhu, 2002-10-21)

5.7 Kalyani Lemmerz Limited

5.7.1 Kalyani Lemmerz Limited's Relationship towards Volvo Truck Corporation

The initial contact between Kalyani Lemmerz and VTC was taken by VTC shortly after VTC had entered the Indian market. VTC Sweden is currently using Kalyani Lemmerz as their supplier of aluminium wheel rims and it was therefore natural for VTC to establish a connection to Kalyani Lemmerz in India. Notable is also that wheel rims are being manufactured at Kalyani Lemmerz in India that are being exported to Germany with the final destination of VTC Sweden. (Pimpale, 2002-10-25)

Kalyani Lemmerz is manufacturing a product called tube type. The tube type can be divided into various categories. The most common category is called 7.5-20. Current production allows an output of 45 000 – 50 000 items per month. VTC is currently purchasing some 750 units per month. This is however a very small quantity as for instance Telco purchases approximately 20 000 items per month. In addition to the 7.5-20, VTC has started to order a new product as of September 2002. This product is called 8.5-24, and is dedicated to the tipper vehicle manufactured by VTC. Estimated purchase quantity is 210 units per month. Notable is that VTC is the first domestic company to purchase the 8.5-24 in India, as Kalyani Lemmerz previously only manufactured the product for the export market. (Pimpale, 2002-10-25)

VTC has nominated a third-party logistics company to deal with the transportation of the finished goods from Kalyani Lemmerz to VTC in Bangalore. Costs associated with the transportation are dealt directly between VTC and the third-part company. Currently, products are transported 36 times per year from Kalyani Lemmerz to VTC. (Pimpale, 2002-10-25)

Kalyani Lemmerz considers the relationship with VTC to be of a good nature. The requirements of the product were met at short notice and the development phase was considered to be short. The development time for the initial product was approximately three months. Kalyani Lemmerz was a supplier to Telco before VTC entered the Indian market; hence the production technology already existed within the company when VTC placed its initial order and provided the design of the product. (Pimpale, 2002-10-25)

The quantities purchased by VTC are as previously mentioned very low. The orders are placed by VTC on an annual forecast and later confirmed on a weekly basis. Kalyani Lemmerz is not using any JIT system, and they do not feel that it is necessary in the case of VTC. The low volumes and the fact that VTC is advising Kalyani Lemmerz well in advance, some two months, leaves Kalyani Lemmerz the opportunity to keep the company's stock level low. Kalyani Lemmerz considers VTC to be an important customer in a long-term perspective regardless of the low volumes. (Pimpale, 2002-10-25)

Kalyani Lemmerz considers it to be a clear advantage for an Indian company to be associated with western firms, VTC is no exception. Kalyani Lemmerz believes that VTC has raised the standard within the light and heavy vehicle industry as VTC's products overall are of better quality. (Pimpale, 2002-10-25)

On operational level, Kalyani Lemmerz has noticed a change in forecasting and order handling as a result of the VTC relationship. VTC is far better and faster regarding communication with Kalyani Lemmerz compared to the company's other customers. This has made an impact regarding communications and forecasting within the whole industry that all the parties have noticed. (Pimpale, 2002-10-25)

Kalyani Lemmerz considers the communication between the two companies as good. VTC visits Kalyani Lemmerz regularly, approximately 5-6 times a year. 1-2 of those visits are for audit purposes, while the other visits are to inform Kalyani Lemmerz of new models, products or events that may be of interest. Kalyani Lemmerz does not however clearly know VTC's overall strategy and future plans, something that currently is not considered harmful for the

relationship. However, VTC is failing to transmit the overall picture of the company to Kalyani Lemmerz, making it hard for the supplier to assess the future of the relationship. (Pimpale, 2002-10-25)

VTC and several other customers have insisted that Kalyani Lemmerz should obtain various certificates, such as QS and ISO certificates. VTC has advised Kalyani Lemmerz of the requirements for ISO14000 certificate in order for the company to comply with it. (Pimpale, 2002-10-25)

5.7.2 Kalyani Lemmerz' Relationship towards Its Suppliers

Tata Iron & Steel Company Ltd is Kalyani Lemmerz's main supplier of input material. Kalyani Lemmerz is mainly purchasing hot roll sheets of aluminium, which are later used in the manufacturing process. In Tata's latest report, the company announced a sharp increase in earnings for the company's first six months of the fiscal year of 2002 (The Hindu, 2002-10-31). The raw material is delivered to Kalyani Lemmerz on a monthly basis. (Pimpale, 2002-10-25)

Kalyani Lemmerz has provided assistance to its suppliers on various issues within the field of technology. There is close contact between Kalyani Lemmerz and its suppliers. This contact includes quantity as well as quality confirmations. Kalyani Lemmerz has not been involved in any procurement related assistance towards its suppliers, except for the purchase of material necessary for tooling, as this has to be of a specific character. (Pimpale, 2002-10-25)

Kalyani Lemmerz is not able to indicate that its suppliers have been affected by VTC entering the Indian market. (Pimpale, 2002-10-25)

5.8 Krishna Fabrications Limited

5.8.1 Krishna Fabrications Limited's Relationship towards Volvo Truck Corporation

The relationship between Krishna Fabrications and VTC is originates from a third company called Isringhausen. This is a German company that VTC Sweden is familiar with. When VTC entered the Indian market, it was decided that the company wanted to use Isringhausen's seat model for the truck in India. VTC insisted however on having the seat manufactured in India in order to reduce manufacturing costs. Isringhausen therefore began to consider a few companies in India that they could arrange an agreement with. In 1998 Isringhausen decided on a close collaboration with Krishna Fabrications. A technical collaboration was agreed upon on between the two companies with VTC as an observer. The TNC-TT includes various fees, such as technical fees and license fees, as well as restrictions prohibiting Krishna Fabrications from manufacturing the product for any other customer than VTC. (Balan, 2002-11-02)

Isringhausen provides the documentation and design necessary for Krishna Fabrications to manufacture the driver- and co-passenger seat purchased by VTC. The manufacturing and assembly process of the product is all made at Krishna Fabrications' plant, excluding a few items that are imported from Isringhausen. The reason for these items being imported is due to expensive tooling required in its manufacturing process. (Balan, 2002-11-02)

The finished product is later packed and transported to VTC. Krishna Fabrications is using a technique referred to as box packing in which the seats are being shipped. This is a technique that VTC has approved. VTC currently accounts for less then 10 percent of Krishna Fabrications' total business in the seating segment. Since the initial phase of the business relation, Krishna Fabrications have been transporting the final product to VTC. However, lately, there have been discussions about having VTC arrange for the transportation, meaning that VTC would come to Krishna Fabrications' plant to collect the products. (Balan, 2002-11-02)

In 2000 Krishna Fabrications was also involved in a project incorporating tippers. The project was however of a short-term nature and is currently not running. The project also included Hyva. (Balan, 2002-11-02)

Lately there has been discussion between VTC and Krishna Fabrications to increase the amount of articles transferred between the two companies. VTC has shown an interest in purchasing floor mats from Krishna Fabrications. The project is however temporarily suspended because of the lack of finding a good supplier of rubber in India. Krishna Fabrications is not responsible for this as it is VTC's responsibility to find a good vendor for the rubber. (Balan, 2002-11-02)

Krishna Fabrications normally designs the seats for their customers, making VTC a special customer as they requested a specific seat. Normally, customers provide Krishna Fabrications with details regarding the space of the cabin where the seat should be mounted. Krishna Fabrications then designs the seat within that boundary and presents the suggestion to the customers. In the normal case, Krishna Fabrications does the entire design job and the testing, leaving Krishna Fabrications with the ownership of the seat with regards to patents and licenses. (Balan, 2002-11-02)

There was a constant exchange of information between Krishna Fabrications and VTC during the development phase. Much of the information exchanged was of technical nature in relation to the truck and the seating system. The communication worked two ways. (Balan, 2002-11-02)

There is a purchase agreement established between Krishna Fabrications and VTC on a monthly basis. Krishna Fabrications considers VTC to be a reliable but demanding customer, due to the agreement signed between the companies. The agreement makes Krishna Fabrications liable for various fees if they do not comply with the agreement. Krishna Fabrications has plans to implement ISO 14000 and QS 9000. (Balan, 2002-11-02)

VTC is Krishna Fabrications' first exposure to international companies. As described above, the relationship with VTC also incorporates a relationship

with Isringhausen from Krishna Fabrications' perspective. Again, notable is that Isringhausen contacted Krishna Fabrications as a result of VTC's intention. One can claim that VTC is responsible for the creation of the TNC-TT between Isringhausen and Krishna Fabrications, as without VTC, it would not be likely that Isringhausen and Krishna Fabrications would be working together. (Balan, 2002-11-02)

VTC has been able to provide Krishna Fabrications with several areas of TT. The monthly schedules provided by VTC to Krishna Fabrications has increased Krishna Fabrications' awareness of how to create more advanced schedules as well as creating better forecasts. Krishna Fabrications has been able to learn to improve its plant operations after visits to the VTC plant. During one of these visits, Krishna Fabrications was introduced to the effectiveness under which VTC operates. Parts of that knowledge have later been implemented at Krishna Fabrications' plant in Bangalore. (Balan, 2002-11-02)

With regards to financial issues, the two companies have been able to work together without any problems. In the initial phase, VTC supported Krishna Fabrications with the investments of the tooling required to manufacture the products. It is however customary of Krishna Fabrications' customers to pay for necessary tooling. (Balan, 2002-11-02)

There has been a great deal of risk management thinking transferred from VTC to Krishna Fabrications. As previously mentioned, VTC is Krishna Fabrications' first exposure to international companies and therefore also its first exposure to international pressure on its operations. The use of a grading system for suppliers helped Krishna Fabrications to understand what TNCs in general are looking for in foreign business partners. This in turn has made Krishna Fabrications more aware of the risk the company is exposing itself towards its own suppliers, forcing the creation of various back up plants etcetera in order to have consistent production in case of an emergency. (Balan, 2002-11-02)

Krishna Fabrications, being a family based company with good experience in its field of business, has furthermore been indirectly given assistance from VTC

with regards to knowledge about project planning. As previously mentioned, Krishna Fabrications were involved in a project with VTC and Hyva, giving Krishna Fabrications the opportunities to better learn about how to manage and execute projects. (Balan, 2002-11-02)

On the other hand, Krishna Fabrications thinks that VTC has been able to learn the processes that Krishna Fabrications is performing during sheet metal processes. Otherwise, Krishna Fabrications considers VTC to be much more advanced then Krishna Fabrications, making the learning process mostly one way. (Balan, 2002-11-02)

There was a constant flow of communication between the companies during the development phase as previously mentioned. Nowadays the frequency of communication is considered low. Most of the communications is done through e-mail. Even the monthly schedules are sent by e-mail. Krishna Fabrications thinks that VTC performs average regarding forecasting. This helps Krishna Fabrications to use a JIT system, even though there is a 10 week lead time for Krishna Fabrications regarding the imported items from Germany. (Balan, 2002-11-02)

Krishna Fabrications participated in the last vender conference held by VTC. Krishna Fabrications would however like to see more conferences of this nature as they are not held very frequently. Krishna Fabrications thinks there is a lack of market information and company information sent out from VTC. Hence Krishna Fabrications would like to learn more about the future plans of VTC from the CEO instead of from a junior buyer or through corporate related VTC news from the media. Other clients of Krishna Fabrications are often better than VTC when it comes to communicating these issues with the help of personal interaction on various levels. As a result of this, Krishna Fabrications is uncertain regarding other operations VTC is performing in the Indian market. Krishna Fabrications understood that Volvo is launching operations involving Volvo Construction Equipment in the future. Krishna Fabrications is hoping that they can take part of that forthcoming business and they can be a useful partner to Volvo Construction Equipment as well as with VTC. As the information is not available, Krishna Fabrications is consequently unsure of

Volvo's future plans. The same situation applies for Volvo's bus project. As the complete project has been handed to a dedicated supplier, Krishna Fabrications is now questioning whether they have the ability to supply for Volvo's buses or not. (Balan, 2002-11-02)

Krishna Fabrications still holds long term trust in VTC even though Krishna Fabrications is not sure in what direction VTC is heading. Krishna Fabrications' contact at VTC is in regular contact with the company, increasing the stability of the relationship. (Balan, 2002-11-02)

Krishna Fabrications was hoping to export its products to various markets, such as Pakistan, China and other nearby markets, through the help of VTC. This has however not materialized. The matter has been discussed with VTC and is according to Krishna Fabrications been well received, but still not materialized. VTC has even sent samples to other markets etcetera. The seat that Krishna Fabrications is currently producing for VTC is however customized for the Indian market and could therefore not be marketed in other countries than India at present. Furthermore, the technical agreement with Isringhausen prohibits the export of the product, as previously mentioned. (Balan, 2002-11-02)

When Krishna Fabrications agreed to the TNC-TT with Isringhausen and accepted to manufacture the seat and co-passenger seat for VTC, Krishna Fabrications was considering VTC's international reputation and the possibility to conduct more business with the company in the future. Consequently, Krishna Fabrications wants to supply more of the driver seat and the co-passenger seat to VTC. Krishna Fabrications was hoping that VTC would purchase the tippers from the company, but instead Krishna Fabrications has become more of a second-tier supplier to Hyva, which is VTC's primary tipper provider, an outcome that Krishna Fabrications does not appreciate. The distress has been transmitted to VTC, and all thought the reaction was positive; nothing has come out of it. (Balan, 2002-11-02)

5.8.2 Volvo Truck Corporation's Relationship towards Krishna Fabrications Limited

The development of the product was of no concern to VTC as necessary documentation including the design was transferred from Isringhausen in Germany to Krishna Fabrications in India. The TNC-TT allowed for a swift introduction of the product in the Indian market. (Rao, 2002-10-31)

There was a solid transfer and discussions of technical issues during the development phase and the initial stage of the TNC-TT between Isringhausen and Krishna Fabrications. VTC has approved all methods and quality issues involved. VTC considers Krishna Fabrications to be an important part of the process of the final product, and as Krishna Fabrications is the only company capable of producing the driver and co-passenger seat in India at the quality level required, this makes VTC somewhat dependent on the relationship. (Rao, 2002-10-31)

5.8.3 Krishna Fabrications Limited's Relationship towards Its Suppliers

There has not been any upgrade at Krishna Fabrications' suppliers with regards to the input materials. When VTC introduced the list of environmentally hazardous substances, this list was later distributed from Krishna Fabrications to its suppliers. Krishna Fabrications is now applying the environment list. Notable is that no changes were required to meet the conditions on the environment list. (Balan, 2002-11-02)

5.9 PL Haulwel Trailers

5.9.1 PL Haulwel Trailers' Relationship towards Volvo Truck Corporation

PL Haulwel Trailers is currently supplying VTC with 3½' couplers directly on its vehicles. PL Haulwel Trailers has in addition to this, developed a 60 ton

trailer that is being used by VTC. PL Haulwel Trailers occasionally also sells other kinds of trailers to VTC, for instance car carrying trailers. (Ramasubramanian, 2002-10-29)

Initially PL Haulwel Trailers was delivering other kinds of couplers to VTC. This was when PL Haulwel Trailers traded and sold couplings manufactured by Georg Fischer. This relationship has however come to an end. Nowadays, PL Haulwel Trailers believes that VTC is getting the George Fischer couplings directly from Sweden. (Ramasubramanian, 2002-10-29)

One of the reasons as to why PL Haulwel Trailers thinks that VTC's concept is successful is because VTC is selling both trailers and trucks together. There are firms in the same industry as VTC that do not believe in that concept, hence selling the items separately. PL Haulwel Trailers considers selling the items separately as potentially bad for the industry as there is no consistency in the design of the trailers. (Ramasubramanian, 2002-10-29)

VTC's share is 52 percent of PL Haulwel Trailers' total trailer sales. Trailers represent 80 percent of PL Haulwel Trailers' total sales. (Ramasubramanian, 2002-10-29)

PL Haulwel Trailers and VTC have worked closely together on occasions in order resolve problems and issues in relations to the development process as well problems encountered along the way. One of these issues was a brake adoption production related problem with a trailer that PL Haulwel Trailers is manufacturing. The brake capacity could not be established, this was vital in order to measure the functionality of the brake adoption. When PL Haulwel Trailers received several complaints from different customers, the company decided to act swiftly. Equipment required to measure the response time used in this matter is very expensive, hence PL Haulwel Trailers contacted VTC in order perform the necessary tests. Once the necessary tests were complete, VTC provided PL Haulwel Trailers with additional information on how to solve the issue. This information included details on how similar issues had been dealt with at VTC Sweden. Furthermore, VTC mentioned a list of instruments that could be used for measuring and evaluating the product to

ensure better quality. PL Haulwel Trailers performed several more of the recommended tests at Sundaram Clayton, which held several of necessary instruments. This also allowed PL Haulwel Trailers to resolve the issue. (Ramasubramanian, 2002-10-29)

Hands on advice was given by VTC during quality inspections. This has sometimes led to improved manufacturing techniques at PL Haulwel Trailers. An example of this was the setting of the kingpin on the couplers. VTC suggested a technique that improved the manufacturing process at PL Haulwel Trailers by using a laser-gun. This allowed for better quality of the end product. Painting and welding quality has also been raised as VTC has been able to prove assistance. This has led to a chain reaction noted by PL Haulwel Trailers, as other vehicle manufacturers have now realised the need to upgrade. Notable changes according to PL Haulwel Trailers are that total solutions have now been started to be sold by competitors, annual maintenance contracts are now being offered by other companies and that technical standards have also been improved, in order to carry bigger loads faster. Notable is that PL Haulwel Trailers is using the knowledge obtained from the relationship with VTC to manufacture products sold to other customers. PL Haulwel Trailers considers this to be a cost saving effort as the quality is higher and it will therefore reduce the cost in the long run. VTC's high standard and quality demand has made an impact, both directly and indirectly within the industry. (Ramasubramanian, 2002-10-29)

With regards to financially related TT, the two companies agreed to share costs in connection to the testing of the products conducted during the development phase. (Ramasubramanian, 2002-10-29)

VTC is pushing PL Haulwel Trailers to reach higher standards by making them upgrade products and routines in their manufacturing processes. PL Haulwel Trailers is now an ISO 9000 certified company. This is something that VTC definitely has been insisting on, and stressing the importance of. PL Haulwel Trailers started the application process in order to get an ISO 14000 certificate. (Ramasubramanian, 2002-10-29)

The turnover of personnel at VTC has created a small but notable disturbance at PL Haulwel Trailers as they have found it much harder to communicate with VTC. PL Haulwel Trailers has doubts regarding VTC's trust and hence the potential to build a strategic partnership with VTC. Much of this distress is due to VTC's lack of communication regarding the company's future plans and objectives. PL Haulwel Trailers are not positive regarding VTC's forecast and claims not to know vital details necessary for the relationship to work smoothly. (Ramasubramanian, 2002-10-29)

PL Haulwel Trailers believes that more effort should be placed on social issues such as gatherings and meetings between VTC and its suppliers. This could also involve company visits. These company visits should furthermore not only include customers and dealers, but all companies that have a relationship with VTC. (Ramasubramanian, 2002-10-29)

5.9.2 Volvo Truck Corporation's Relationship towards PL Haulwel Trailers

VTC considers the design of the trailers to be of importance during the development phase. Much emphasis was placed on this issue as it was crucial that the finished product matched the front part of the truck as well as gave it an appropriate and complete impression. (Muthukumarasamy, 2002-10-31)

The couplings purchased by VTC from PL Haulwel Trailers are customized to the Indian market in order to deal with the problems that occur due to overloading of the trucks. Furthermore, the relationship with PL Haulwel Trailers offers considerable savings in comparison to importing the couplings. VTC is therefore somewhat dependent on PL Haulwel Trailers to manufacture the couplings for VTC. The same situation does however not apply for the trailers. VTC does however get the feeling that PL Haulwel Trailers is aware of the current situation as VTC feels that there is no room for negotiation between the two firms. (Muthukumarasamy, 2002-10-31)

The problem related to communication between VTC and PL Haulwel Trailers has been noted at VTC. The routines regarding multiple contacts at VTC have been looked over and improvements are on their way. The vendor development department is trying to make sure that vendor development is the only contact point for the customer. (Muthukumarasamy, 2002-10-31)

Finally, VTC did not indicate that any direct TT had occurred between the companies. (Muthukumarasamy, 2002-10-31)

5.9.3 PL Haulwel Trailers' Relationship towards Its Suppliers

Plates and raw material used in the production at PL Haulwel Trailers are bought from the market. All products are manufactured in India apart from axles, which have their last assembly stage in India. The running parts of the axis are manufactured in India and brakes are bought together with bearings and hubs. (Ramasubramanian, 2002-10-29)

PL Haulwel Trailers' supplier has not been affected by the company's relationship with VTC; hence no TT has been commenced. (Ramasubramanian, 2002-10-29)

5.10 Sundaram Clayton Limited

5.10.1 Sundaram Clayton Limited's Relationship towards Volvo Truck Corporation

The relationship with VTC started in 1999 when VTC contacted SCL. VTC had evaluated a number of different suppliers for aluminium castings in India since the company wanted to move the production from Sweden. VTC searched for a company with high quality, transparency and proximity to VTC's factory in Bangalore. These criteria were found in SCL. However, VTC also demanded ISO 9000 and ISO 14000 quality and environmental standards, which SCL did not have at the time. In order to start the co-operation with VTC, the company

had to upgrade its standards, and acquire the skills necessary. This process took about one year and as a result of VTC's persistence in the area the company got the certifications in 2000 and was thereafter ready to supply the components. (Gopal, 2002-10-30)

As of today, SCL is supplying two products to VTC in India; an engine bracket and a clutch hosing. There have also been discussions about whether SCL should deliver other components in regards to transmission foundry equipment. At the moment VTC's share of the total turnover is only 2 percent, but Mr. Gopal expects this figure to increase in the future. (Gopal, 2002-10-30)

The development phase started with a discussion regarding provision of tooling in order to produce the aluminium parts that VTC required. SCL needed specific tooling, which the company got partly from VTC's former aluminium components supplier in Sweden, in order to reduce the lead time for development, and partly from tools that they developed themselves. This tool cannot be used for producing items for any other customers. In fact, the majority of the tooling used at SCL cannot be utilized for more than one specific buyer. (Gopal, 2002-10-30)

The company visits are nowadays, after the product has been developed, only done in emergency cases. When visits do occur, it is mostly by SCL visiting the VTC office. A recent problem that occurred was a quality issue with the bracket because of bad packaging. This problem was solved over night after visits made by SCL. To VTC, SCL has been able to solve most of the problem's themselves, however, when VTC had the possibility to provide knowledge and skills the company does so. (Gopal, 2002-10-30)

The relationship works fine with VTC and both sides are very open to each other, however there are some bottlenecks in terms of information exchange; however, this is unavoidable according to Mr. Gopal. SCL wants to have an open dialog and therefore SCL informs VTC about company-related issues such as what SCL's long-term strategic plans are and how they want the association to grow. However, there are also regular and continuous meetings performed at VTC every second month performed by Mr. Gopal in order to

discuss areas for improvements. These meetings leads to specific action plans which SCL uses in order to upgrade the communication and delivery of products. (Gopal, 2002-10-30)

SCL are very well informed of the future business plans of VTC, and the information has been given to them at a few occasions. For example, SCL was thoroughly briefed regarding the long-term plans of VTC in the Indian market during a conference in Gothenburg, in Sweden. The contract with VTC is based on a five-year period and orders are forecasted on a yearly basis. (Gopal, 2002-10-30)

There were a number of different areas in which the relationship with VTC has had a major impact in regards to TTs on SCL. However, these areas where not solely improved by the emergence of VTC, but also other multinational firms which became customers of SCL at the time. Firstly, VTC helped to develop SCL's foundry division and to refine the techniques used by the company. Actions included infrastructural upgrades, skills and organizational refinements, which improved business results. VTC may not always have provided the exact information but the company made it clear to SCL what was missing in the organization. SCL then gathered the knowledge from for example Japanese consultants and where possible, from the internal resources, by hiring new staff. Secondly, VTC upgraded the company's customer relationship skills and turned the company into a more customer-oriented firm. One could say that prior to this, the firm had only organized themselves in departments, not in divisions as of now. The difference is that nowadays, the company is not just delivering a product on order, rather is adding value by providing consultancy advice and design skills. In other words, SCL has grown from being a supplier to become a business partner. (Gopal, 2002-10-30)

Mr. Gopal believes that VTC could provide more information in regards to the supplier business in the truck industry since the company has worldwide knowledge. In addition, he is also of the opinion that there could be more training on SCL's premises done by personnel from VTC. But for SCL to visit VTC would be impossible since it is a process driven production. (Gopal, 2002-10-30)

There are two areas in which VTC has concretely helped SCL. Firstly, VTC supported the organization with subcontracting issues. VTC checked quality standards and helped sub suppliers to develop in their relations with SCL. VTC is the only client in SCL's portfolio that has done this. Secondly, VTC helped develop SCL's skills and technology in packaging of components and recycling issues. With this support, SCL has clearly upgraded its standards compared to other Indian companies. (Gopal, 2002-10-30)

5.10.2 Volvo Truck Corporation's Relationship Towards Sundaram Clayton Limited

In 2001, VTC started by purchasing brakes from SCL. These were imported from SCL's German TNC-TT. Some localization of the supply was accomplished. But as the German D-mark rose in value, it turned out more profitable for VTC India to purchase the brakes from VTC Sweden. During the development phase, there have been frequent visits between VTC and SCL. The companies meet every month; each company goes to see the other every two months. In addition to this, there is good phone and e-mail communication between the companies. The reason to why there still is a lot of co-operation between companies is that they are still in the development phase. (Bhat, 2002-10-31)

Nowadays, VTC is currently buying brackets for clutches from SCL's foundry division. VTC also exports some of these brackets to Brazil. The product was tested in Sweden and VTC India is still waiting for the go-ahead regarding quality and quantity issues. Once this has been approved, VTC will delete these items from the import list. VTC is proud to be a partner with SCL, as the company has received several awards and remarks. (Bhat, 2002-10-31)

In regards to TTs, VTC provided drawings and designs of the aluminium castings to SCL. Clarifications of these drawings were given to SCL if needed, however the company is very knowledgeable, so it has been unnecessary to provide extensive product help. In fact, SCL most of the time solves various problems themselves, either by the use of external consultants or by the

Japanese consultant firm, which SCL often is in contact with. (Bhat, 2002-10-31)

VTC has learnt a lot from SCL, for example the how to deal with the shrinkage of clutch houses. Originally, VTC believed that the problem lay in the high temperature generated in the component; however, it turned out to be the composition of the elements and the compound itself which was the problem. The knowledge in this area originally came from the Japanese consultancy firm. (Bhat, 2002-10-31)

VTC has also been able to help SCL with a number of issues, for example in the area of logistics and packing, where VTC has been able to provide SCL with new methods for planning. (Bhat, 2002-10-31)

Finally, VTC believes that SCL could be more proactive, for example the implementation of a detailed time plan which is used as an action plan for dealing with operative decisions is clearly an area with room for improvements. (Bhat, 2002-10-31)

5.10.3 Sundaram Clayton Limited's Relationship towards Its Suppliers

SCL buys pure aluminium from external parties and processes the pure aluminium into aluminium alloy in fully owned alloying plants. These products are evaluated in-house at SCL and then transported to the casting factory. (Gopal, 2002-10-30)

Mr. Gopal believes that SCL's suppliers have been upgraded since the relationship between SCL and VTC was established. VTC made both SCL and SCL's suppliers aware of the high international standards. The quality upgrades that SCL has been forced to make have also been reflected in the aluminium-supplying firms. Notable is that it is mainly the financial aspects between SCL and its suppliers that have been improved. The reason for this is that SCL was taught how to lower the input costs, which made them aware of the high prices

of the current supplier. As a result, SCL switched to an international supplier and can today enjoy large discounts as compared to the unfavourable payments in advance that were made with the previous supplier. SCL has also learned how to put pressure on the supplier in order to lower prices. However, quality has not been changed in the delivery of the pure aluminium in any way. The reason for this is that aluminium is a standardized product which makes it difficult to improve the quality. (Gopal, 2002-10-30)

5.11 ZF Steering Gear India

5.11.1 ZF Steering Gear India's Relationship towards Volvo Truck Corporation

The initial contact between ZF Steering Gear India and VTC was established once VTC entered the Indian market. Notable is that VTC Sweden has enjoyed a long relationship with ZF Steering Gear India's German counterpart, ZF Friedrichshafen. VTC's choice of having ZF Steering Gear India as its supplier was natural due to prior experience combined with local regulations and conditions. (Dange, 2002-10-23)

VTC was purchasing a specially manufactured steering gear, under the category of power steering gear. The quantity purchased by VTC is approximately 700 to 1 000 annually, making VTC a small client of ZF Steering Gear India. (Dange, 2002-10-23)

ZF Steering Gear India was forced to upgrade certain manufacturing processes and machines in order to supply VTC with the product that they had requested. ZF Friedrichshafen provided ZF Steering Gear India with the necessary techniques and knowledge to complete the steering gear. The steering gear purchased by VTC was manufactured in Germany and shipped to ZF Steering Gear India for final assembly. (Dange, 2002-10-23)

In the initial phase of the relationship, while still in the development phase, a team of engineers came to ZF Steering Gear India from VTC with the intention

of assuring the quality of the products being manufactured. During this phase, VTC provided training for staff in ZF Steering Gear India with regards to a specific painting process. The process that was in use at ZF Steering Gear India was required to be upgraded in order to comply with agreed quality. The technique taught by VTC is now applied to all products being manufactured by ZF Steering Gear India which require such treatment. ZF Steering Gear India claims that the improved quality has in some cases improved the company's relationship with some of its customers. (Dange, 2002-10-23)

Recently there has been a change in the relationship between ZF Steering Gear India and VTC. Steering gears are no longer being purchased from ZF Steering Gear India as VTC claims this is to costly. The issue has been discussed, but VTC is not convinced. This has resulted in VTC currently purchasing steering gears from VTC Sweden, who gets the steering gears from ZF Friedrichshafen. For ZF Steering Gear India, this has left the company with a stock pile of the special steering gear produced for VTC. ZF Steering Gear India expressed its wish to again obtain the business of VTC, as ZF Steering Gear India has made several investments, having representatives trained in Germany and special tools procured from ZF Friedrichshafen, in order to fulfil the product specifications agreed upon with VTC. (Dange, 2002-10-23)

6 Analysis

This chapter is divided into three different parts and features the complete analysis. The first part is an analysis of the linkage determinants affecting VTC's operations in India. The application of the linkage determinants will indicate the circumstances under which VTC's TT is undertaken in the company's supply chain. The second part thereafter defines the actual TTs undertaken in the various relationships between VTC and its FS suppliers. The discussion is presented using the structure of the Linkage Programme, hence finding new suppliers, technological transfers, providing training, sharing information and financial support. Both the relationship between VTC and the FS companies will be discussed, as well as the relationship between the FS companies and their subcontractors. The third and final part of the analysis highlights indicators, found by the authors, which are believed to affect the extent of TT necessary within a relationship.

6.1 Volvo Truck Corporation's Determinants in India

As described in the chapter featuring the theoretical framework, the linkage determinants are divided into six different parts. The first part address the role assigned to the foreign affiliate. The second part discusses the product, technology and market position of the company. The third part describes the investment motives and strategies, while the fourth part discusses the impact of the duration under which the company has been active in the foreign market. The fifth defines the mode of establishment while the last factor describes the size of the foreign affiliate.

All the six different linkage determinates are somewhat connected to each other, creating an internal hierarchical structure. The outcome of one factor may therefore outplay the importance of one or several other determinants. All of the factors involving VTC's determinates in India will consequently be discussed without the proper boundaries of the six different parts, allowing for a more transparent discussion.

VTC's operation in India is considered to be dependent on the directives set from the parent company's corporate strategy. VTC is somewhat obliged to apply to the corporate global sourcing strategy. The appliance of this strategy is forcing VTC in India to emphasize the use of already established international contact within the corporation's network. This controls VTC usage of local suppliers, as well as decreasing the decision making power. The parent company provides clear guidelines to VTC as well as creating a structured course of action. This gives rise to a trade-off between the use of local adaptation and the use of global effectiveness. This trade-off is reoccurring throughout the linkage determinant factors surrounding VTC.

As VTC entered the Indian market by using a greenfield investment strategy, the company has been required to create a new local line of the supply chain. This has proven to be a time consuming effort, as the process is still ongoing. As relationships develop, VTC is gradually replacing components and products

that are imported, with components and products bought from the local market. Notable is that the longer VTC has been active in the Indian market, the number of relationships established with local suppliers has increased. Co-operating with local suppliers is considered to be part of the overall corporate strategy of VTC International. This may prove especially true in the Indian market where the cost benefits are substantial compared to using an import based strategy or producing the components in some other parts of the world. This can also be argued further as VTC has announced that the company is considering using India as an export base for its product to the markets in Southeast Asia.

When discussing the size of VTC's operations in India, it is notable that the theory described regarding this matter is not completely applicable. The theory describes that a small affiliate is more dependent on local suppliers than on the company's international network. The opposite applies for a large affiliate where a substantial number of components are to be sourced from the global network of the enterprise, hence leaving only a small number to the local suppliers. A number of factors influence the theory, making it hard to apply in reality. In the case of VTC in India, the first factor deals with various governmental policies such as import quotas, which to a certain degree are forcing VTC to localize parts of its production. Secondly, local production may also be used in order to reap the benefits of cheap inputs and low labour costs. In other cases, when local production falls short of the high quality standards set by VTC, the company is pressured to rely on its international network. The last factor influencing the usage of the international network, in comparison to using local sourcing, is VTC's application of its global sourcing strategy. As VTC may be considered a small player in the Indian truck industry it is clear that the company is not only focusing on sourcing from the local market as the theory would imply. Instead the company is combining its local production with the inputs from its international network.

Table 1 - Summary of the Determinants and the Impact on Volvo Truck Corporation

	Role assigned to the affiliate	Technology and market position	Investment motives and strategies	Age of the foreign affiliate	Mode of establishment	Size of affiliate
Impact on VTC	Dependence on global sourcing strategies and decreased decision - making power	High technological standard, slightly customized. Top end market position	Local sourcing under the supervision of the global sourcing strategy	Increased local sourcing over time	Greenfield implies the need for long establishment period	Not dependent on local sourcing. Backup through international network

(Robye, Rosander, December 2002)

Finally, the authors believe that the product that VTC is manufacturing and selling is slightly locally customized, without making it into a product specially made for the Indian market. This local customization can be exemplified with such product modifications as tropical air conditional systems, special lubricant blends and increased durability of the tippers. Again, emphasizing the importance of combining such factors as local sourcing and global effectiveness.

6.2 Transferring Technology

This section will define the key areas in regards to TTs in VTC's supply chain. The findings will be presented using the structure of the Linkage Programme. This section will be divided into two parts. The first part will address the TTs occurring between VTC and the FS companies, while the second part will focus on the TT towards the FS companies' suppliers. A complete matrix featuring both above-mentioned parts with all TTs can be found in the Appendix, Table 13.

6.2.1 Technology Transfer between Volvo Truck Corporation and Follow Source Companies

6.2.1.1 Product Technology

The TT that was related to product design and technical specification has been extensive and has reoccurred within all relationships. The underlying reason for this was that all components involved in various manufacturing activities at the FS suppliers' had been altered to correspond with VTC's product demand. All suppliers were therefore provided with product design and technical specifications from VTC in order to process the demand. Notable is that the specific design transferred to the FS companies could not be applied by the FS firms to products sold to other customers. As previously mentioned, the relationship between VTC and its FS suppliers is based on two-way communication. In the case of technical specification, Sundaram Clayton Ltd. did perform TT towards VTC. TT of such character can be characterized as a short-term benefit for the involved parties.

The occasions during which feedback on product performance have occurred are categorized separately from the above-mentioned transfers of product design and technological specifications. In the relationship between VTC and PL Haulwel Trailers, specific advice with regards to the mounting of the kingpin, welding- and painting techniques were transferred from VTC. According to PL Haulwel Trailers there has been an increase of their product quality as a result of the TTs. In the relationship between VTC and ZF Steering Gear India, know-how regarding painting techniques that ZF Steering Gear India now applies to all products requiring this treatment were transferred. The increased product standard provides PL Haulwel Trailers and ZF Steering Gear India with a long-term benefit as the companies are able to apply the know-how to other products manufactured for other customers.

Collaborations in R&D have occurred on three occasions. When firms are engaged in such activities, one could consider this as a deepening of the above-mentioned category, feedback on product performance, hence creating the possibility for all parties to gain long-term benefits.

Table 2 - Percentage of Companies Performing Product Technology Transfers

	VTC towards FS Suppliers	FS Suppliers towards VTC
Product Design and Technical Specifications	100%	20%
Feedback on Product Performance	20%	10%
Collaborations in R&D	30%	30%

(Survey data)

6.2.1.2 Process Technology

This section will discuss the transfer of machinery and equipment in regards to process technology. The two main techniques that were transferred within this category were production equipment and testing equipment. These types of transfers can be broken down into two modes, direct transfer and advice. This section will analyse examples of the two modes. The transfer of production equipment and testing equipment has proved to be only one-way, from VTC to the FS suppliers. Six of the ten FS suppliers have benefited from TT of this sort. TT within this category has shown to vary substantially depending on the requirement of machinery necessary for producing the required product and/or performing necessary tests. In the cases of Hyva, specific machinery equipment was transferred in a direct manner as a result of the relationship with VTC. During the period of joint R&D between VTC and Hyva, as described above, equipment was moved from VTC's facilities in Bangalore to Hyva's plant in Mumbai. This is an example of a direct TT of machinery and equipment. Likewise in the case of Sundaram Clayton Ltd the transfer was also done in a direct manner. Sundaram Clayton Ltd received tooling through VTC, but the equipment came from VTC's former aluminium casting supplier, based in Sweden, still classified as a direct transfer. However, in the relationship between VTC and PL Haulwel Trailers process related advice concerning the use of a specific tool was provided. VTC enjoyed prior knowledge regarding a test method that was better suited to evaluate the product performance than PL Haulwel Trailers were currently using.

Production planning, quality management and inspection and testing incorporate a great amount of possible TT that can take place between parties. The elements incorporated in this category are closely connected. Quality management, inspection and testing can all be improved by better production planning, which also works as a foundation for the entire manufacturing process of an operation. An example of production planning related TT can be shown in the relationship between VTC and Krishna Fabrication. The TT occurred when the FS company visited VTC. During this visit, the FS company was able to learn how VTC operated its manufacturing process. The knowledge was later applied at Krishna Fabrication's plant in order to increase effectiveness. However, know-how from Krishna Fabrications was also transferred towards VTC. The know-how was related to performance in sheet metal processes, allowing for a two-way TT. In the case of VTC's relationship with PL Haulwel Trailers, an example of a test-related issue was generated. PL Haulwel Trailers had experienced problems regarding a brake adoption on a trailer. Due to lack of equipment, PL Haulwel Trailers were not capable of performing necessary tests, hence VTC assisted in the testing procedures. A different set of tests was performed early in relationship between VTC and Hyva. As Hyva was delivering trailers to VTC, it was essential that the duration and performance was satisfactory once the trailer was mounted on to the body of the truck. VTC carried out tests to establish its performance. Required action was taken when adjustments were needed. In addition, VTC assisted with the application of Total Quality Management procedures for Hyva. There have been occasions when VTC has consulted its parent company in order to verify test results or to use test facilities and techniques not available at VTC. An example of this occurred during the development of the paint order by VTC from Goodlass Nerolac Paints Ltd. VTC sent a sample to VTC Sweden for additional testing. Additional changes were made once the comments from VTC Sweden arrived.

VTC and the FS suppliers have all made visits to each other's factories, the frequency and the purpose of these visits have however varied. As previously mentioned, visits can lead to better process technology, feedback on product performance or just a visit in order to strengthen the relationship between the

companies. Visiting a firm's plant may be considered necessary before commencing a business relationship.

In regards to procurement issues, VTC supported their FS companies on three different occasions. In the relationship with Goodlass Nerolac Paints Ltd, VTC assisted in finding high quality pigments that the FS supplier uses when blending colours, and as a result, the quality of the product supplied to VTC was raised substantially. Furthermore, VTC assisted Sundaram Clayton Ltd in order to confirm quality standards of the FS supplier's subcontractor's products. VTC is the only company to have assisted Sundaram Clayton Ltd with issues of this kind. Lastly, VTC is responsible for the procurements of rubber necessary in order to finalize the ongoing development of floor mats, which are to be supplied by Krishna Fabrications.

Table 3 - Percentage of Companies Performing Process Technology Transfers

	VTC towards FS Suppliers	FS Suppliers towards VTC
Provision of Machinery and Equipment	60%	0%
Production Planning	50%	10%
Facility Visits	100%	0%
Procurement Assistance	30%	0%

(Survey data)

6.2.1.3 Organisational and Managerial Know-How

Concerning the TT of inventory management and forecasting, it is clear that the relationships between VTC and the FS suppliers were lacking this element to a great extent. Reoccurring purchase orders and forecasts were sent between the companies, but with different quality and intervals. The effects on the individual companies have therefore varied. However, the monthly schedule that VTC provided Krishna Fabrications has increased Krishna Fabrications' awareness of how to create more advanced schedules as well as creating better forecasts, creating a long-term benefit for the company. A similar scenario can be found at Kalyani Lemmerz.

A majority of the relationships between VTC and FS suppliers have been characterized by the TT of implementing quality and environmental assurance systems. Notable is that these FS suppliers all had initiated both quality and environmental systems, however not to the level of VTC's desire. Common for all cases is the support for environmental standards. The know-how has been transferred using different methods depending on the status of the receiving company. In some of the cases, VTC has strongly encouraged the FS suppliers to certify its compliance to more internationalized environmental standards, by embracing certificates such as ISO 14000. Furthermore, VTC has also distributed lists of environmentally hazardous substances, with the intention of upgrading the FS suppliers' production methods. On a couple of occasions, VTC has also assisted FS suppliers in complying with different quality insurances systems, such as ISO 9000.

VTC has on two occasions, in the relations to Elf Lubricants India and Sundaram Clayton Ltd, transferred specific know-how with regards to packing of the final product. The methods transferred by VTC were individual to the two companies and the products that they manufacture. Both companies have however been able to adapt the know-how given in order to serve other customers, generating long-term benefit for the FS companies.

Table 4 - Percentage of Companies Performing Organisational and Managerial Know-How Transfers

	VTC towards FS Suppliers	FS Suppliers towards VTC
Inventory Management and Forecasting	20%	0%
Quality and Environmental Systems	60%	0%
Other	20%	0%

(Survey data)

6.2.1.4 Providing Training

In-plant training sessions between VTC and FS suppliers have taken place on two different occasions. As mentioned above, ZF Steering Gear India enjoyed increased product quality performance due to improved painting technique and Hyva benefited from the joint R&D between them and VTC. Both of these occasion incorporated in-plant training sessions.

Table 5 - Percentage of Companies Providing Training

	VTC towards FS Suppliers	FS Suppliers towards VTC
In-plant Training Sessions	20%	0%

(Survey data)

6.2.1.5 Sharing information

The exchange of business-related information between VTC and the FS suppliers has been quite frequent; however the quality of the messages being transferred has often not been sufficient. Hence, only two of the FS suppliers,

Sundaram Clayton Ltd and Autoliv India, indicated that they were informed of the current and future business intentions of VTC.

The effort to improve inventory management has not been as efficient as desired as VTC only provided annual purchase orders on two different occasions. The two companies that have received annual purchase orders are Sundaram Clayton Ltd and Goodlass Nerolac Paints Ltd. Annual purchase orders allow the FS suppliers to more easily establish a business plan, including budgeting, procurement, marketing etcetera, for the forthcoming year.

The final issue regarding the section of sharing information highlights Hyva's commitment towards VTC. Hyva is the only FS supplier, without prior representation, which has established an office in the proximity of VTC's Bangalore plant. Some of the other FS suppliers were, however, already located within the Bangalore area before the relationship with VTC was established.

Table 6 - Percentage of Companies Sharing Information

	VTC towards FS Suppliers	FS Suppliers towards VTC
Exchange of Business Information	20%	0%
Providing Annual Purchase Orders	20%	0%
Representational Office	0%	10%

(Survey data)

6.2.1.6 Financial support

The only occasion when there has been financial support given from VTC towards a FS supplier was in the case of PL Haulwel Trailers. Before initiating the development phase between the two firms, an agreement holding both companies liable for the sharing of costs related to product testing was struck.

Table 7 - Percentage of Companies Performing Financial Support

	VTC towards FS Suppliers	FS Suppliers towards VTC
Sharing of cost	10%	0%

(Survey data)

6.2.2 Technology Transfers towards Second-tier Suppliers

VTC's quality and price demand on its FS suppliers has on a number of occasions affected the subcontractors of the FS suppliers. VTC cost minimizing efforts forced Sundaram Clayton Ltd to negotiate with its domestic supplier. The negotiation proved little success, therefore Sundaram Clayton Ltd found it more beneficial to switch to an international supplier. This is the only occasion on which VTC has forced through a change of second-tier supplier in their FS supply chain due to indirect pressure. In addition, this is also an example of an upgrade in quality- and production planning methods at the FS suppliers' subcontractors.

Another example of how VTC's quality and price demand has indirectly affected the operations of the FS supplier's subcontractors can be found in the relationship between VTC and Brakes India Ltd. As described in the empirical chapter, Brakes India Ltd had divided the development phase of VTC's product into four different phases. In order for Brakes India Ltd to enter the final stage of the development phase, the company is going to increase the amount of localized products. This may force Brakes India Ltd to raise the quality level of its current subcontractors. Brakes India Ltd is aware of the fact that the company may have to assist its subcontractors in the actual upgrading of processes and routines. In the event that Brakes India Ltd would need help to complete the upgrade, the company can get additional support from Meritor.

The last example of know-how that has been transferred to FS supplier's subcontractors concerns the issue of environmental standards. As previously mentioned, VTC distributed a complete list of environmentally hazardous

components to Krishna Fabrications. The FS supplier assured that the standards were passed on to its suppliers.

Table 8 - Percentage of FS Companies Performing Technology Transfers towards Second-tier Suppliers

	FS Suppliers towards Second-tier Suppliers
Visits and Quality Audits	10%
Production Planning	20%
Quality and Environmental Systems	30%

(Survey data)

6.3 Indicators Influencing the Relationship and the Extent of Technological Transfers

The last section in the analysis will consist of three different types of categories: product, firms and industry; all categories include various indicators, influencing the relationship and the need for TT between VTC, FS suppliers and its FS suppliers' subcontractors. Notable is that this section is created from the basis of what has been discussed in the first two parts of the analysis and can consequently be considered as an extension of the analysis. The three different types of categories have been grouped into the above-mentioned categories in order to simplify the understanding of where efforts should be concentrated. If not performing a categorization, there is a risk of energy being projected to the wrong area or simply being lost due to lack of focus. When identifying the indicators that are in need of increased TT, it will be easier to create strategies, customize TT and target the areas of the relationship in a short- or long-term manner. Depending on the magnitude of the issue and whether it is found within the category of product-, firm- or industry specific indicators, this will influence the extent of the TT.

The ability for a TNC to influence the relationship with its FS suppliers with regards to firm specific factors may be considered easier than compared to influencing the product- and industry specific indicators, as firm specific

indicators are directly linked to various strategies within the TNC, hence within its control. Even though firm specific indicators require two-way communications between the TNC and the FS supplier, a change can be communicated directly towards the other party, making a required change easier to implement. On the contrary, the product specific indicators refer to the character of the product or component, which is only changeable through increased R&D or a change in production method. A firm can alter its production methods by for instance increasing the level of in-house production, hence limiting the need for TT to external parties. Similarly, industry specific indicators refer to competitive issues in the market in which the firm is active. As issues of this character are embedded within the external environment of the company, they are also considered to be outside of the firm's immediate control, hence a long-term strategy must be implemented if the firm has the desire to change this indicator.

6.3.1 Product Specific Indicators Influencing the Extent of Technology Transfer

6.3.1.1 Types of components

Within the section of product specific indicators, the issue regarding the type of components will be analysed. It is important to highlight, to what extent quality requirements and level of local adaptation are implemented in regard to the component. Depending on the level of adaptation needed, the level of interaction between the buyer and the seller varies. If a component requires a high level of adaptation, the two parties are often forced to work closely together, especially during the development phase. The length of the development phase depends on the complexity of the component as well as its level of adaptation.

Quality requirements and level of local adaptation, including potential design issues, are the two factors affecting the length and extent of the development phase. This will in turn partly determine the depth of the relationship between the buyer and the seller. All components bought by VTC from its FS suppliers

in the Indian market have gone through some form of adaptation. Even traditionally internationally standardized products such as lubricants, paint and wheel rims have undergone an extensive development phase in order to cope with VTC's requirement. Much of the development phase in circumstances like these has involved extensive testing of the product, where little energy is placed on design. In the relationship with FS suppliers manufacturing components of this type, the current level of interaction with VTC could be considered fairly low, as a result growing into a more stable phase of the relationship. However, other components such as trailers and couplings required a more extensive interaction both during and after the development phase was complete. Notable is however that interactions of this sort do not necessarily imply that a more solid development of the relationship actually took place between the buyer and the seller.

Finally, the ability to manufacture components required by VTC is tightly connected to the technological capability of the FS suppliers. If an FS supplier has a limited technical capability, that company is forced to achieve technological development, either from VTC or from its international network.

6.3.2 Firm Specific Indicators Influencing the Extent of Technology Transfer

Indicators that can be linked to individual firms and their actions will be discussed in this section. The indicators presented are handling of external relations, perception of the relationship and finally local industry knowledge. All the above-mentioned indicators will explain actions undertaken in a relationship between the buyer and the seller.

6.3.2.1 Handling of external relations

When analysing the effectiveness of external communications, two main issues are to be considered, the usage of single point of contact and homogeneity of the communication. Internal efforts are often needed in order to align all involved parties to ensure the sharing of information between firms. By

eliminating the usage of multiple contacts, firms can try to ensure that no information or knowledge is missed out. All firms analyzed in this thesis have noted the importance of this, but in reality the system has proven hard to apply.

6.3.2.2 Perception of the relationship

As discussed in the theory, the duration of the relationship should be determined before committing. In order to establish a long-term relationship between the parties involved, it is essential that both the buyer and the seller enjoy the same perception of the relationship. The importance of ensuring that the receiving party is getting the correct information is the essence of this indicator. Although it is important that a correct perception of the relationship is established, it is equally important that both parties are sending a clear message. By not sending a clear message, or if the receiver does not fully comprehend the information being transferred, will not automatically imply an unsuccessful relationship. However, the chances may be improved if communication is, as mentioned above, single and homogeneously transferred out from the company. When analysing the relationship between the VTC and its FS suppliers, it has been noted that some relationships indicated reluctance due to lack of business information being transferred. Half of the suppliers, Elf Lubricants, Hyva, Kalyani Lemmerz, Krishna Fabrications and PL Haulwel Trailers, indicated that they had a different perception, as compared to VTC, regarding the relationship. The most frequent misperception was FS suppliers hoping to achieve a more in-depth interaction similar to a business partnership. The different individuals at the involved firms may also be affecting the level of communication, as they have the power to choose how to apply the information being transferred. How business information and the image of the relationship between the companies is projected, will work as a foundation for alignment between the buyer and the seller.

6.3.2.3 Understanding of the local industry

The ability to understand trends and developments in the local industry is often closely related to the original structure of a company. The FS suppliers who enjoy an organization that is mainly incorporated with employees, routines and

knowledge from the local market may enjoy significant benefits compared to a newly established international supplier active in the same industry. When a FS supplier has extensive knowledge in an industry which the TNC is operating in, it is vital that this knowledge is shared and acted upon in order to stay competitive. In the case of VTC, there has been occasion of neglect from VTC's perspective in acknowledging local industry understanding held by the FS suppliers. A company with international experience does not necessarily have the appropriate knowledge in order to penetrate or understand a foreign market. VTC has shown tendencies to ride on its international experience, potentially affecting its market performance and the relationship with the FS supplier negatively. In order for a TNC to be successful in a newly established market, it is important that the company interacts closely with its FS suppliers and is willing to embrace feedback on product performance, specific conditions related to the product market and similar issues.

6.3.3 Industry Specific Indicators Influencing the Extent of Technology Transfer

In the last category of indicators focus will be emphasized on issues related to the industry in which the TNC is active. Indicators of this kind are as previously mentioned, often considered somewhat harder for the TNC to affect as they are embedded in its external environment. The issue being discussed is concerning the competition in the market with regards to backward linkages.

6.3.3.1 Competitiveness among component suppliers to the truck industry

A TNC operating in the truck industry of an emerging market is affected by the technological standards of the suppliers from which it purchases components. The number of active suppliers will indirectly limit the technological alternatives for the buyer. The lack of technology and skills available in the local market will create a dependency on the supplier that is able to provide the product or component demanded by the TNC. If the number of skilled suppliers is limited, the TNC is often forced to perform TT in order establish and

upgrade the relationship with the chosen supplier to a satisfactory level. The lack of sufficient skilled suppliers will create an artificial leverage of the bargaining power between the buyer and the seller, which the TNC may not be familiar with if originating from a developed market.

In order to determine the extent of technology necessary to be transferred as well as establishing the degree of dependency on the chosen supplier, the structure of the environment in which the supplier is acting must be considered. If the chosen supplier which the TNC is purchasing components from, is considered to be of a low developed character, it is likely that TTs are conducted at all levels at the supplier. In a scenario of this type, the supplier will enjoy good bargaining power in its relations with the TNC, as a direct result of lack of competitive suppliers. This can be linked to VTC's relationship with PL Haulwel Trailers, where VTC is clearly dependent on the delivery of PL Haulwel Trailers' locally adapted couplings. However, in a market situation where a certain few of the suppliers are fairly advanced, less amount of TT is needed to all the levels of the supplier. Again, this supplier will enjoy a high level of bargaining power in its relations with the TNC. This could trigger the supplier to put increased pressure on various aspects of the relationship with the TNC. This could be considered a direct result due to the supplier being more highly developed than the other suppliers in the market. For instance, Hyva demanded VTC to change their procedure regarding the payment of Hyva's tippers.

7 Conclusion and Recommendations

This chapter features the conclusion and recommendations regarding the aspects discussed throughout the thesis. The discussion will have its core in the thesis' main research question, ***how can relationships between TNC's and their suppliers be developed in emerging markets?*** *The first section contains the conclusion of the thesis, which will highlight the characteristics of the FS suppliers and their networks, and how that is affecting the relationship with VTC. The different features of the analysis are compiled and structured in the three forthcoming parts of the conclusion.*

In the second section, recommendations answering the main research question will be presented. The recommendations will commence with a discussion concerning long-term recommendations and later deal with short-term recommendations. This is to provide the overall recommendations and clarify the short-term goals which are needed to be achieved in order to reach the long-term goal. Finally, this chapter will discuss Theoretical Implications executed by the authors within the Theoretical Framework, followed by the authors' Suggestions for Future Research.

7.1 The Follow Source Phenomena

The technological know-how that a FS supplier is required to posses is often too low in order to meet the product demands from a TNC. After having studied the relationship between VTC and its FS suppliers, it is clear that the FS suppliers are working actively to gather any know-how, which is in relation to the company and its activities. This is done to accumulate information that is later implemented within the organisation in order to create better components, products and processes within its field of business. This will in the long-run give the FS suppliers a larger share of responsibility which will add value to their products and services, as discussed in the Theoretical chapter. Furthermore, the actual TT can take different forms. The two most obvious forms, direct transfer and indirect transfer, are to be discussed in this section.

A direct form of transfer has been generated when VTC has directly provided the FS suppliers with technology, knowledge, skill and information in order to supply VTC with the ordered components. One of the more apparent situations of this kind is when VTC has transferred tooling equipment to its FS supplier, where the equipment has been in VTC's ownership. However, the direct form of transfer can also appear in other shapes. When a TNC offers assistance regarding procurement of tooling by advising the FS supplier where to purchase the object at the most beneficial place, this transfer could also be regarded of as a direct form of transfer.

On the contrary, a TT could also be performed in an indirect manner. The network in which the FS supplier is situated can most often contribute with the type of technology required in order to produce the components ordered by the TNC. However, even though the FS supplier has the appropriate technology within its reach it is not utilized until a foreign firm establishes a relation with the supplier. This may appear strange at first, but considering that there is no real demand for products containing the featured technology, suppliers may not feel motivated to acquire new know-how until it is demanded. Consequently, TT can be accomplished by for instance a JV or a TNC-TT.

In practice, most of the relationships between VTC and its FS suppliers have shown a combination of both direct and indirect TT. The ratio between direct and indirect transfers varies between the different relationships. The reason for this can be found in such factors as the complexity and structure of the FS supplier's network as well as in its prior TC level before the commitment to VTC. Examining FS suppliers such as, Brakes India Ltd, ZF Steering Gear India and Krishna Fabrications, it has been noted that these suppliers have received indirect TT largely from their international network as a result of the collaboration with VTC. Both Brakes India Ltd and Krishna Fabrications have gained TT through the TNC-TT that they have with Meritor and Isringhausen respectively. Notable is that the relationship between Isringhausen and Krishna Fabrication was a result of VTC demanding Isringhausen's products on the Indian market. Isringhausen is still Krishna Fabrications' only international contact. On the contrary, Hyva India Ltd has received far more direct TT from VTC than the two above-mentioned firms. Much of this is related to the joint R&D the two companies did in the initial stage of the relationship.

7.2 Perceptions and Short-Term Visions

It has been noted that VTC and some of its FS suppliers have different perceptions regarding the extent and the outcome of the relationship. This has in turn created lack of shared vision. Miscommunication and lack of communication regarding business information, is often to blame for the different perceptions. From VTC's point of view, a more short-term focused approach towards its FS suppliers has been created. The FS suppliers on the other hand, are hoping to experience the creation of a business partnership between the firms.

In general, the FS suppliers are of the perception that VTC is a long-term player in the Indian truck industry. As VTC is a globally renowned firm, with high quality standards and innovative technology, it is becoming a popular company to be associated with. Several of the FS suppliers are expecting the entrance of VTC in the Indian market to change the structure and the standards of the whole truck industry. Some of these changes have already taken place.

Several of the suppliers have noted that competitors to VTC have started to change their business solutions. An example of this is the increased manufacturing of complete solutions, offing a combination of both trailers and bodies, which was not common before the entrance of VTC in the market. The same competitors are also offering better maintenance offerings as well as improved overall transport efficiency and capacity of the products being sold, as competition is becoming more intense.

As a result, many of VTC's FS suppliers are under the impression that their relationship with VTC will generate extensive business opportunities in the future. However, this is yet to materialize, as VTC's orders are still very limited. Furthermore, the FS suppliers have good reason to believe that orders from VTC are to pick up as VTC on several occasions has announced the creation of an export hub in India for the Asian market. This has created an optimistic picture among suppliers offering export opportunities within VTC's network to foreign markets, hence making the current low volumes an opportunity for growth rather then a concern.

VTC on the other hand is portraying a more short-term vision through some of its actions in regards to different FS suppliers. For example, VTC has not communicated a long-term vision incorporating the business plans of VTC. Such a business plan is necessary in order to develop a business relationship between the companies. Furthermore, parts of the internal environment of VTC do not fully encourage employees to take active part in the effort to learn from their suppliers. The result is a lack of two-way communication, which is hampering the companies to develop their understanding of the market.

The factors discussed above are part of the explanation to why VTC has developed a short-term perspective which does not fit an emerging market in which the suppliers are limited and lack a technical standard. In order to improve the technological standards of these suppliers, time and capital must be invested on a long-term basis in order to achieve the required demands set by VTC.

7.3 The Extent of Technological Transfers

The resources that a TNC is required to spend on upgrading its FS suppliers by using different measurements of TT have been proven hard to estimate. The character of the component or product together with the structure of the FS supplier's international network of TNC-TTs and JVs will colour the extent of TT required from the TNC. This was furthermore mentioned in the above discussion regarding the Follow Source Phenomena. Thus, it is impossible to generalize to what extent the need for TT is before entering a relationship.

As previously indicated in the analysis, there has been a clear focus regarding a certain type of TTs that VTC has preformed. Product design, provision of machinery and tooling, plant visits and assistance regarding quality and environmental assurance systems were the technological know-how which was most frequently transferred. TT in the opposite direction proved however very limited. The obvious reason for the lack of TT from the FS supplier towards VTC is due to lack of knowledge and highly developed skills, in comparison to VTC. Apart from this, it may again be notable that the lack of two-way communication efforts generated at VTC, discussed previously, will not benefit the situation. The amount of technology that was transferred from VTC to its FS suppliers, which in turn was promoted further down the supply chain proved limited. The most frequent transfer involved environmental issues and production planning and quality management. One of the reasons why the 2nd tier suppliers have not gained much TT through the influence of VTC is because the 2nd tier suppliers often produces basic raw material with simple quality and production methods, which limits the possibility for an upgrade.

7.4 Recommendations for Developing a Relationship

The authors believe that the mindset of VTC indicates that FS suppliers do not require support to the same extent as purely local suppliers in the Indian market. To some extent, FS suppliers have a higher technological standard or the possibility to acquire more advanced technology in their international

network, compared to local suppliers who are lacking the international network. However, this study indicates several gaps in the technological know-how of the FS suppliers, which sometimes calls for action. As a result, the FS suppliers should therefore be evaluated according to their present knowledge, and not according to whether the company has a purely local or a FS character. The opinion of the authors is that development phases could be shortened and relationships strengthened even further if the present mindset of VTC was to be improved. In order to facilitate a fruitful relationship, VTC should more proactively provide support to its FS suppliers. This may require somewhat more time and capital; however higher quality and a more controlled flow of components can be accomplished. The control may provide a platform for long-term co-operation, which will result in cost efficiency of the activities performed in VTC's supply chain. In order to reach the above-mentioned long-term goal, a number issues need to be considered in the short-term by VTC regarding its current TTs. These issues are described with the intention of strengthening the already established relationship with the company's FS suppliers.

As described in the analysis, a number of specific TTs in VTC's supply chain commonly took place. Specifically *provision of machinery and equipment* and *assistance in implementing quality and environmental assurance systems,* were areas of transfers that were actively promoted by VTC. These transfers resulted in significant upgrades within the receiving companies which in the end provided VTC with improved component quality. The authors believe that these types of TTs should be transferred to the same extent also in the future, hence on a need to need basis.

As described in the analysis, the three different firm specific indicators, namely *handling of external relations*, *perception of the relationship* and *understanding of the local industry*, are key areas which need to be improved in order to strengthen a relationship. These indicators will be referred to throughout the recommendation and will point out specific TTs in the Linkage Programme which need to be upgraded.

The *collaborations in R&D* has currently been utilised to a limited degree. The authors are under the impression that this is a resource that could be further developed since the FS supplier often has a fairly high TC and a relatively higher *understanding of the local industry* than compared to VTC. By jointly developing the required components, VTC will be able to actively take part in the development process to a larger extent and at the same time gain increased understanding of the customizations needed for the local industry. This can shorten the overall development time, as VTC will be able to share knowledge from the company's international experience that may be applicable in the situation.

The usage of *co-operations clubs* is currently non-existent according to this study. This appears to be somewhat surprising as this forum has great potential. The authors would strongly recommend the implementation of such clubs or associations. A potentially large pool of knowledge can be created when facilitating a learning environment when combining firms from different industries and/or geographical locations with a common theme. Consequently, the authors believe that VTC should actively support the formation of a co-operation club, which would encourage the spread of knowledge between both VTC and its suppliers as well as between the suppliers. This will make it possible to convey know-how on both local and international level. The authors of this thesis firmly believe that through the creation of co-operation clubs a more open and friendly environment between all parties involved will be formed, providing a platform for long-term cooperation and a relationship built on trust and *unified perceptions*.

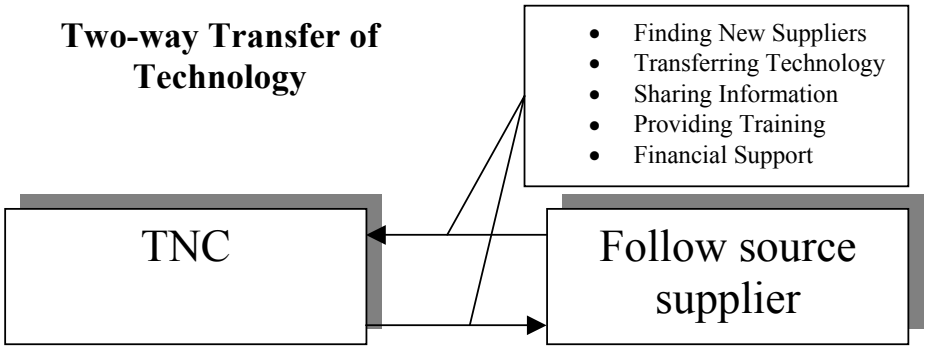
A constant flow of *business information* is often a prerequisite for the establishment of a healthy relationship. It has been noted that VTC and its FS suppliers have different perceptions of the many key aspects of the relationship. These misperceptions are often due to lack of business information or the spread of wrong business information. The authors believe that this can be avoided by establishing a communication plan with an upgraded system for *handling external relations* at VTC. This plan should incorporate tools in order to establish two-way communication with a single point of contact at VTC. By keeping to the current structure at VTC, the contact person should be the person

responsible for the purchases done from the FS supplier. Notable is that if the FS supplier required special attention from personnel other then the normal contact person at VTC, it is still necessary that the FS supplier communicates that message to the normal contact person in order to avoid problems associated with multiple contacts. The communication plan must furthermore include information which eliminates the possibility of delivering an incorrect image of VTC, its operations and future plans. As the authors have previously promoted increased communication between the different suppliers, it is crucially important that all the suppliers share the same picture of the company in order to avoid clashes.

7.5 Theoretical Implications

As described in the theoretical study, the authors were required to adjust the linkage programme in order to comply with the empirical findings. The original model described the strengthening of linkages towards purely local firms; however, the presence of international suppliers in the supply chain of VTC implied a change of character in the original version of the model. The high technological know-how of the FS suppliers highlighted the occurrence of TTs not only from VTC to the FS supplier but also from the FS supplier towards VTC. The result was an appliance of two-way transfers in the Linkage Programme, which forced the authors to re-evaluate several tools in the model. For example, product technology and business information were as likely to be transferred from the FS supplier as the other way around. The authors believe that the newly-designed model can be utilised in a similar study of the same character.

Figure 3 - Two-way Transfer of Technology



(Robye and Rosander, December, 2002)

7.6 Suggestions for Future Research

As mentioned in the theoretical implications, the authors are of the opinion that the modified version of the Linkage Programme could be utilised in order to perform future studies of supplier relationships, extending the findings of this thesis.

Firstly, studies of relationships between TNCs and follow source suppliers in a different manufacturing industry could be performed in order to analyse the diversities of industry character and its influence on TT.

Secondly, a study could also be performed in another emerging market, possibly facilitating interesting results stemming from the level of technological development of a specific market or country.

Thirdly, a continuing study could focus on the importance of the different types of JVs or tie-ups of FS companies in order to establish effective cooperation between a TNC and its FS suppliers in an emerging market.

Lastly, the authors believe that studies could also be performed in order to facilitate a further understanding of the effect of TNCs' global sourcing programs on FS suppliers in emerging markets.

8 Bibliography

8.1 Literature

Alvstam, C-G., Ivarsson, I., 2002, New TNC-Strategies and International Technology Transfer to Developing Countries: The Case of the Component Suppliers of Volvo Global Truck in India, School of Economics and Commercial Law, Gothenburg, Sweden

Amsden, A., 1989, Asia's Next Giant: South Korea and Late Industrialization, Oxford University Press

Chen E., Dunning J., 1994, *Transnational Corporations and Technology Transfers to Developing Countries*, United Nations Library on Transnational Corporations, Volume 18, Routledge, London, U.K.

Dicken, P., 1998, Global Shift: Transforming the World Economy, London: Paul Chapman

Dunning, J., 1993, *Multinational Enterprises and the Global Economy*, Addison-Wesley Publishers ltd, U.K.

Hill, C. W.L., 1998, International Business: Competing in the Global Marketplace, 3rd Edition, Irwin McGraw-Hill; USA

Howells, J., Wood, M., 1993, *The Globalisation of Production and Technology*, Belhaven Press, London, U.K.

Humphrey, J., Lecler, Y., Sergio Salerno, M., 2000, *Global Strategies and Local Realities*, Mac Millan Press Ltd, Great Brittan

Kim, L., Nelson, R., 2000, Technology, Learning & Innovation – Experiences of Newly Industrializing Economies, Cambridge University Press, Cambridge, U.K.

Kinnear, T.C., Taylor, J.R., 1996, *Marketing Research: an Applied Approach*, Fifth edition, USA

Lall, S., 1987, *Learning to Industrialize*, The Macmillan Press LTD, Hong-Kong

Lall, S., Streeten, P., 1980, *Foreign Investment, Transnationals and Developing Countries*, The Macmillan Press LTD, Hong-Kong

Merriam, S., 1998, Qualitative Research and Case study applications in Education, Jossey-Bass Publishers, San Francisco

Patel, R., Davidson, B., 1994, Forskningsmetodikens grunder: att planera, genomföra och rapportera en undersökning, Studentlitteratur, Lund

UNCTAD, 1995, Science and Technology in the New Global Environment: Implications for Developing Countries, United Nations, New York and Geneva

UNCTAD, 2000, The Competitiveness Challenge: Transnational Corporations and Industrial Restructuring in Developing Countries, United Nations, New York and Geneva

UNCTAD, 2001, World Investment Report 2001 – Promoting Linkages, United Nations, New York and Geneva

Yin, R., 1994, *Case Study Research: Design and Methods*, Second edition, Sage Publications, Thousand Oaks, California, USA

8.2 Articles

Chaudhary, A., *Competition could get viscose,* Business Line, 2002-04-07

Corporate tax reduction will ruin economy, says Yechury, The Hindu, 2002-11-04

En komplett missuppfattning, Göteborgs-Posten, 2002-09-04

India will replace Singapore as hub for South Asian Region, Asia Africa Intelligence Wire, 2002-09-20

India, China will get big chunk of FDI pie, The Times of India, 2002-10-25

India: In for the Long Haul, Business Line, 2000-05-11

Indian sell-out, Financial Times, 2002-09-10

Jacob, R., Asia looks to its domestic market to drive growth of exports, Financial Times, 2002-10-08

Kumar, R., V., *Ambitious plan to improve highways*, The Hindu, 2002-11-04

Luce, E., Delhi insists privatisation "on track and irreversible", Financial Times, 2002-10-07

Luce, E., *Go-ahead for India's reform programme*, Financial Times, 2002-11-13

Myrsten, J., Handelsbanden mellan Sverige och Indien stärks igen, Svenska Dagbladet, 2002-10-08

Nair, G., *ZF Steering Gear to foray into systems supplies*, Financial Express, 1999-07-07

Scania exporterar från Braslienfabrik, Dagens Industri, 2002-09-03

Telco stages major turnaround, The Hindu, 2002-10-31

Tisco net zooms to Rs. 269 cr., The Hindu, 2002-10-31

Volvo Buses, The Times of India, 2002-10-23

Volvo India launches FM7 truck series, Business Line, 2000-01-07

Volvo India to increase truck production 10 fold, Asia Pulse News, 1999-12-14

Volvo ökar i Indien, Göteborgs-Posten, 2002-09-22

8.3 Internet Sources

http://kfabs.com, 2002-11-08

http://www.autoliv.com, 2002-11-12

http://www.brakesindia.com, 2002-11-08

http://www.hayes-lermmerz.com, 2002-11-08

http://www.hyva.com, 2002-11-11

http://www.kineticindia.com, 2002-12-01

http://www.nerolac.com, 2002-11-12

http://www.sundaram-clayton.com, 2002-11-13

http://www.totalfinaelf.com, 2002-11-09

http://www.volvotrucks.volvo.co.in, November 2002

http://www.volvo.com, November 2002

http://www.worldmarketanalysis.com, November 2002

8.4 Interviews

Ahuja, Nettika, Vendor Development, Volvo Truck Corporation, Bangalore, India, 2002-10-31

Balan, N., General Manager – Operations, Krishna Fabrications Limited, Bangalore, India, 2002-11-02

Bhat, Ramachandra G., Vendor Development, Volvo Truck Corporation, Bangalore, India, 2002-10-31

Dange, C.K., Vice President – Works, ZF Steering Gear India, Pune, India, 2002-10-23

David, Emmanuel, Director Human Resource, Volvo Truck Corporation, Bangalore, India, 2002-11-31

Khanolkar, P.S., Director Industrial Marketing, Goodlass Nerolac Paints Limited, Mumbai, India, 2002-10-22

Mittal, P.K., Vice President - Sales, Elf Lubricants India Limited, Mumbai, India, 2002-10-21

Muthukumarasamy, V., Vendor Development, Volvo Truck Corporation, Bangalore, India, 2002-10-31

Pimpale, Vanayak, Assistant Manager – Marketing, Kalyani Lemmerz Limited, Pune, India, 2002-10-25

Prabhu, Sudhir, Managing Director, Hyva India PVT Limited, Mumbai, India, 2002-10-21

Prasanna, Suhas, Vendor Development, Volvo Truck Corporation, Bangalore, India, 2002-10-31

Ramasubramanian, S., President and CEO, PL Haulwel Trailers, Chennai, India, 2002-10-29

Rao, Harikrishna, Vendor Development, Volvo Truck Corporation, Bangalore, India, 2002-10-31

Sridharan, A.N., Division Manager – OEM Marketing, Brakes India Limited, Chennai, India, 2002-10-28

Subramania, K. Silva, General Manager Operations, Autoliv IFB India Limited, Bangalore, India, 2002-10-31

9 Appendix

Table 9 - Volvo Truck Corporation's Follow Source Suppliers in India

Company	Ownership
Hyva India Transportation Systems	*Hyva International, Holland*
Sundaram Clayton Ltd. Foundry Div.	*Tie-up with Wabco, Belgium*
Hindustan Hardy Spicer	JV with GKN Automotive, UK
Automotive Axles Ltd.	Tie-up with Meritor, USA
Elf Lubricants India Ltd.	*Elf Lubricants, France*
Krishna Fabrications Ltd.	*JV with ISRI, Germany*
ZF Steering Gear Ltd.	*JV with ZF, Germany*
Goodlass Nerolac Paints Ltd	*JV with Kansai Paints, Japan*
Anand Nisikawa Co Ltd	Sumimoto, Japan
Hongo India Pvt Ltd	Hongo Co Ltd, Japan
Asahi India Safety Glass Ltd	Asahi Glass Co. Ltd, Japan
J.M.A Industries Ltd.	JV with Hella, Germany
Enginetech	JV with Raydot, UK
Brakes India Ltd. Brakes Division	*Tie-Up with Lucas Ind, UK*
Kalyani Lemmertz Ltd.	*Hayes-Lemmertz International, USA*
Tudor India Ltd.	Chloride Motive Power Batteries, USA
Autoliv IFB India Ltd.	*JV with Autoliv, Sweden*
SKF Bearings India Ltd.	*SKF, Sweden*
PL Haulwel Trailers Ltd.	*Tie-Up with George Fischer(GF), UK*

(Alvstam, Ivarsson, 2002)

Table 10 - Commercial Vehicles, Production by Manufacturer

	Jan - Jul 2002	Jan - Jul 2002 Market Share %	Jan - Jul 2001	Jan - Jul 2001 Market Share %
Light Commercial Vehicles				
Telco	22,682	47.6	20,358	55.4
M&M	11,367	23.8	6,537	17.8
Eicher	5,809	12.2	4,054	11
Swaraj Mazda	4,391	9.2	3,136	8.5

Bajaj Tempo	2,151	4.5	1,627	4.4
Hindustan Motors	1,015	2.1	753	2
Ashok Leyland	267	0.6	313	0.9
Total	47,682	100	36,778	100
Medium and Heavy Commercial Vehicles				
Telco	44,610	62.3	35,859	64.8
Ashok Leyland	21,755	30.4	17,861	32.3
Eicher Motors	4,587	6.4	1,196	2.2
Swaraj Motor	587	0.8	369	0.7
Hindustan Motors	52	0.1	72	0.1
Total	71,591	100	55,357	100

(http://www.worldmarketsanalysis.com, 2002-11-16)

Table 11 - Demographic Statistics

Area (sq. km)	3,287,590
Population (Millions)	1,029.991
Population Growth (2001 Estimate)	1.55%
Vehicles in Use: Commercial Vehicles (2000)	2,610,000

(http://www.worldmarketsanalysis.com, 2002-11-16)

Table 12 - Key Economic Indicators

	1997	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**
GDP % Change, Constant Prices	4.6	6.8	6.6	5.2	5.6	6.0	7.1
GDP, Current Prices (US$bn)	402.1	417.6	441.5	474.2	502.7	540.8	567.4
GDP per Capita, Current Prices (US$)	423	432	449	475	500	-	-
Inflation (% Average)	702	13.2	4.7	7.2	2.0	1.5	3.0

(http://www.worldmarketsanalysis.com, 2002-11-16)

9.1 Follow Source Supplier Information

The following information will briefly describe the FS suppliers which were interviewed during the field trip. Much of the information that will be found in this part of the Appendix has been presented in the company matrix, in a slightly comprised manner, in the Empirical chapter.

9.1.1 Autoliv Incorporated

Autoliv Inc. is a worldwide leader in automotive safety, producing both seat belts and airbags, and offers an array of services for automotive safety, such as crash test tracks. The company was established in 1997 as a merger between Autoliv Sweden AB, a producer of seatbelts since 1956 and Morton ASP, a company focusing on airbag production. (Subramanian, 2002-10-31)

Autoliv Inc. has 80 subsidiaries and JVs in 29 countries and employs over 30 000 people. The business idea of Autoliv is to develop, produce and sell systems worldwide for mitigation of injuries to automobile occupants and pedestrians, and for avoidance of traffic accidents. (http://www.autoliv.com, 2002-11-12)

Operations in India started in 1994, and customers in the market include Telco, GM, Hyundai, Daewoo, Volvo, Ashok Leyland and MB. Autoliv has about 65 percent of the market but aims to reach 80 percent within a short time. There are mainly two domestic competitors to Autoliv; Habisec industries in New Delhi which has a JV with a Japanese firm and TRW from Chennai which is a US firm. The autonomy of Autoliv India is rather low considering that the regional office for Asia in Bangkok controls much of the strategic decisions. (Subramanian, 2002-10-31)

Autoliv has their own test facility for both sled crash test and body weight tests. The technology used in these tests was taken from Autoliv in Germany. Autoliv's test facility provides services to a number of car manufacturers in the country as well as competitors in the seatbelt industry in India. The company is

certified with ISO 9001, QS 9000, ISO 14001 and the German standard VDA. (Subramanian, 2002-10-31)

9.1.2 Brakes India Limited

Brakes India is a manufacturer of braking systems in India. The company was established in 1962 with the formation of a JV between T V S Group and Lucas Industries Plc. Brakes India is profiting from strong in-house R&D efforts, making it possible for the company to supply products to a wide range of customers. Brakes India enjoys access to technology through collaboration with TRW as well as technical association with companies such as Meritor, Tokico, Akebono, Freudenberg, and Hitachi. (http://www.brakesindia.com, 2002-11-08)

Brakes India is primarily a brake systems supplier, but has a comprehensive product line that incorporates various products for cars, trucks, tractors and two-wheel vehicles. The products supplied are master cylinders, vacuum boosters, valves, and drum brakes for the car segment. In the truck segment, Brakes India manufactures S Cam, simplex air cam, wedge and hydraulic brakes. In the tractor segment Brakes India is supplying drum, dry and oil immersed disc brakes and hydraulic brakes. In addition to this, Brakes India produces brake hoses, brake fluid and rubber seals for all types of vehicles. Brakes India also has grey iron and S.G. Iron castings to support its products. (http://www.brakesindia.com [2002-11-08])

Brakes India spends about 2 percent of the company's turnover in engineering related R&D and employs over 80 engineers in its R&D unit. (http://www.brakesindia.com, 2002-11-08) Brakes India is in the initial phase of implementing TPM and TQM systems. Brakes India is using a Japanese consultant firm to ensure successful applications of these systems. (Sridharan, 2002-10-28)

Brakes India 's list of customers includes Ashok Leyland, Bajaj, Bosch, Eicher Motors, Escorts, Fiat, Ford, ITL, Mahindra & Mahindra, Maruti, Massey Ferguson, Mercedes Benz, Meritor, Swaraj Mazda, TAFE, Telco, Toyota,

TRW, TVS-Suzuki and Volvo. (http://www.brakesindia.com, 2002-11-08) As Brakes India is in every segment of the brake market, the company is experiencing solid but slow growth, benefiting from their spread of customers in various market segments. (Sridharan, 2002-10-28)

During the initial phase when VTC was establishing its operations in Bangalore, the company was searching for a brakes assembler in India for localization of the product. As mentioned above, Meritor, which is in a technical collaboration with Brakes India, is currently supplying brakes to VTC Sweden. It was therefore a natural step for VTC to contact Brakes India in order to evaluate the company's appropriateness for supplying VTC with the desired products. (Sridharan, 2002-10-28)

The technical agreement between Brakes India and Meritor includes the exchange of drawings, quality information as well as all other necessary details in relation to the VTC project. Similar agreement between Brakes India and Meritor exists for other projects, not involving VTC. Meritor is in addition to this, currently supplying brakes to VTC Sweden. (Sridharan, 2002-10-28)

9.1.3 Elf Lubricants India Limited

Elf Lubricants India Limited is a part of Total Fina Elf, a French industrial company with a group turnover of 8.2 billion US dollars. The group has interests which incorporate petroleum activities, exploration, refining and marketing, and is the foremost industrial group in France and amongst the largest in the world. (http://www.totalfinaelf.com, 2002-11-09)

Elf Lubricants India has been active in the Indian market for approximately 10 years and is presently the fourth largest company in the lubricants sector in India. The company currently has an 8 percent market share with products sold to a variety of firms. Elf's primary focus has been the consumer market and after-sales market for cars, busses, trucks or fleet owners. As of today, this segment holds 90 percent of Elf's total sales and the other, 10 percent, is delivered to industrial companies in a wide range of businesses. Elf is

represented by offices in Mumbai, Delhi, Calcutta, Chandigarh and Chennai in order to support its extensive distribution network. (Mittal, 2002-10-21)

Elf is ISO 9000 certified, as well as the majority of the company's larger vendors. The certification has been achieved as a result of the general pressure from original equipment manufacturers entering the Indian market. Elf India's products are approved by major OEMs like Maruti, Daewoo, Hindustan Motors, Telco, Punjab Tractors, Escorts, Tafe, Eicher, HMT Tractors, SAME, Simpson, Greaves, Bajaj Auto, LML, Kirloskar Cummins, Volvo, Ashok Leyland, Jenbacher, Watseka, Waukesha and more. (Mittal, 2002-10-21)

In order to produce the lubricant, Elf purchases the input components from abroad and then blends the product almost entirely in India. The basic raw materials are in a majority of the cases purchased from large oil manufacturers already associated with Elf in the international market. The lubricant is also primarily blended in-house, although about 15 percent is third party blending. (Mittal, 2002-10-21)

The growth in the lubricants sector last year was around minus five percent, and this year sales have increased somewhat to an estimated two percent increase in the industry. There are a number of reasons for the slow growth in the sector, however, the main reason is the progress in mechanical engineering. In the commercial sector, and specifically the truck industry, overall consumption of lubricants has decreased because of more efficient techniques and engines, which require less oil. (Mittal, 2002-10-21)

For a long time the trend in the industry has been to focus on core business activities. Elf Lubricants India does not aim to produce raw materials themselves, at least not on a short- term perspective. Hence, vertical integration in the industry is very rare. (Mittal, 2002-10-21)

9.1.4 Goodlass Nerolac Paints Limited

The company was founded in 1920 as Gahagan Paints and Varnish Co Ltd in Bombay. In 1930, three British companies merged to formulate Lead Industries

Group Ltd. In 1933, Lead Industries Group Ltd. acquired the entire share of Gahagan Paints and thus, Goodlass Wall (India) Ltd. was born. (http://www.nerolac.com, 2002-11-12)

In 1957, Goodlass Wall Pvt Ltd. became Goodlass Nerolac Paints Pvt Ltd. and the same year the company went public. In 1986, Goodlass Nerolac Paints Ltd. enrolled in a JV of Tata Forbes and Kansai Paints with the latter acquiring 36 percent of its share capital. (http://www.nerolac.com, 2002-11-12)

In 1999, Kansai Paints Company Ltd., Japan took over the entire stake of Tata Forbes group and by this Goodlass Nerolac Paints became a wholly owned subsidiary of Kansai Paints Company Ltd, which is the largest paint manufacturer in Japan. Today the company has 2400 employees and has become the second largest coating company in India with a market share of around 19 percent and the market leader in the industrial and automotive segment supplying about 90 percent of the OEMs active in the Indian market. The company has its own manufacturing in Mumbai and Chiplun and Kandapur and Guajrat and in Chennai. The company is ISO 9000 and QS 9000 certified. (http://www.nerolac.com, 2002-11-12, Khanolkar, 2002-10-22)

The products required by VTC were very special which is why the testing and equipment had to be different from what Goodlass had used earlier. All truck manufacturers have their own testing methods. Therefore, according to Mr. Kahnolkar, a company like Goodlass needs to be aware of the fact that customized products and processing methods need to be developed. The whole process of development and selling in the case of VTC has been quite normal to Goodlass. (Khanolkar, 2002-10-22)

Goodlass is a member of Confederation of Indian Industry (CII), which is one of the largest interest associations in the country. In addition, Goodlass has also joined conferences with international suppliers of paint, which gave the company knowledge which could later be used in their own business. (Khanolkar, 2002-10-22)

Goodlass did not receive any financial benefits associated with the relationship with VTC. On the contrary, since VTC's quantities are so small profit margins are low. However, the company does not consider the financial aspects to be any issue since VTC is a well renowned company which provides Goodlass with goodwill. In the long term, the company also hopes to export products through VTC's network to neighbouring countries. (Khanolkar, 2002-10-22)

9.1.5 Hyva India Limited

The Hyva Group was founded in Alphen aan den Rijn, Holland in 1979. The company produces hydraulic cylinders for the truck industry. In 1998 the company started a production facility in Brazil, and nowadays 40 percent of the cylinders are manufactured there. In 2002 Hyva started production in Mumbai India, having previously only distribution in the country. In 2001 the Hyva Group employed 600 people with exports to more than 110 countries. In 12 of these countries Hyva operates through fully owned subsidiaries, in the other countries, Hyva reaches the market through agents or direct customers. The company does not only focus on hydraulics but also oil tanks, pumps, hoses, adapters and couplings. The objective is to provide full solutions on tippers and tipping trailers. (http://www.hyva.com, 2002-11-11)

Hyva India is a fully owned subsidiary of Hyva Holdings and operates in the transport efficiency industry. Hyva's core business is to produce hydraulic tipper kits for the truck industry in India, including both the tipper and the hydraulic lift system associated with the tipper. The core issue for Hyva India is to provide solutions in order to uphold efficiency needs for unloading and loading in the truck industry. The manufacturing sites in India are located in Bombay, Bangalore and Jamshedpur. Both hydraulic systems and tippers are made at these manufacturing sites. (Prabhu, 2002-10-21)

In India, Hyva is engaged both in the manufacturing industry as well as the trading industry of tipper systems. Hyva India is an agent for tipper systems manufacturers JOST and Ringfeder from Germany and also HMS from Denmark. This year the company is also starting the production for hydraulic

cylinders. A vast amount of this production is exported to sister companies in neighbouring countries. (Prabhu, 2002-10-21)

Mr. Prabhu believes that all truck manufacturers are increasingly using the fully built vehicle system, aiming to get completely finished products at their manufacturing sites. As a result, there is clearly a trend of consolidation at the first-tier of the supply chain in order for the supplier to accomplish the sale of a complete system rather than individual components. This will increase the liquidity of the truck manufacturers since they will not have to store a lot of material waiting to be assembled. This development will help the truck industry since a more limited number of suppliers are able to provide more complete warranty packages making the purchase simpler to co-ordinate. The first-tier supplier becomes the most important player, since he coordinates the change in the industry. As a result, Hyva aims to learn as much as possible about the tipper systems in order to deliver complete packages. In addition, Hyva has also developed skills in regards to the manufacturing of the body, which is the base of the truck. (Prabhu, 2002-10-21)

Hyva has had a rapid growth over the last few years. This has resulted in a lack of capacity which limits the business. Therefore, the company has started their own domestic manufacturing this year in order to overcome import-restrictions and long lead times associated with the international trade. (Prabhu, 2002-10-21)

In India, all office and production buildings are rented and the number of production machines is limited which results in a very low fixed cost. The only substantial expenditure for Hyva is the human resource costs. Hyva India has 38 people working in offices and around 150 people in factories. However, the administrative staff will increase to 55 people this year. (Prabhu, 2002-10-21)

The design of VTC's FM7 truck was originally made for the tipping industry. However, both Hyva and VTC noticed that the product was not used in the field as it was originally intended. Indian customers were overloading the tippers creating imbalance in the truck, which damaged the vehicle. Hyva had initially suggested to VTC that they should have a longer test period with

approximately 10 trucks in the market to observe and allow the two companies to solve certain design issues before the market had reacted negatively. Mr. Prabhu believes that 3-6 months trial period in the market would have given sufficient time to react to various changes. VTC was so confident of the product that no trial period was considered to be necessary. However, this was not a result of miscommunication, rather due to a different mindset between the parties involved in the two companies. (Prabhu, 2002-10-21)

In Hyva's opinion, VTC is selling its tippers as a cheaper alternative to dumpers. However, in the Indian market customers used tippers as dumpers, loading overly heavy weights on the tipper which should have been loaded on a much stronger dumper, for example the Volvo BM. The reason for the buyer's preference in tippers was the price issues. The tippers were much cheaper, both in terms of investment costs and fuel consumption and spare parts. Volvo provided the tippers anyhow and could not oppose guarantee systems when these tippers broke down since this was an established customer base that VTC did not want lose. As a result, VTC put too much faith in the FM7 truck since they thought they could enter the dumper market with a truck not adjusted for that kind of heavy usage. In Mr. Prabhu's, opinion, VTC's FH12 tipper truck produced by VTC abroad, would be a better product to use in the Indian mining industry where the largest demand is to be found. This model is smaller than the FM7 truck and can therefore operate more effectively with less risk for product failure. Mr. Prabhu believes that VTC has not listened to Hyva's suggestions regarding marketing and sales in India. (Prabhu, 2002-10-21)

Hyva has tried to implement a JIT system, but has failed as there are so many uncertainties, which affect the system such as inputs of steel, delivery time, administrational issues such as import restrictions. With no JIT system, Hyva is forced to keep a solid inventory. (Prabhu, 2002-10-21)

Hyva is not actively involved in any industrial associations, as they do not feel that they have the time to do it. In addition, Hyva believes that the reward for being actively enrolled in an organization is too small compared to the time and effort one has put into in. (Prabhu, 2002-10-21)

9.1.6 Kalyani Lemmerz Limited

Hayes Lemmerz, which is the majority owner of Kalyani Lemmerz, has been operating in wheel technology since the early 1900s. Hayes Lemmerz' first product was used on the Ford Model T more than 90 years ago. About the same time, the Lemmerz family had begun wheel production in Germany following the First World War. Today, Hayes Lemmerz ships steel and aluminium wheel systems to customers throughout North America, South America, Europe and Asia. (http://www.hayes-lemmerz.com, 2002-11-08)

In 1992 Hayes Lemmerz signed a license agreement with Bharat Forge Limited in India. This made it possible for Hayes Lemmerz to operate in the Indian market. Kalyani Lemmerz is currently an underlying company to Bharat Forge Limited. Hayes Lemmerz purchased an additional 60 percent of Kalyani Lemmerz in 1998, bringing its ownership to 85 percent. (http://www.hayes-lemmerz.com, 2002-11-08)

In the 1960s, the companies Bajaj and Telco established their operations in Pune in India. This has later proved to be the starting point and the foundation for an industrial condominium or an industrial cluster for automobile manufacturers, hence, building what is referred to within the industry as the Detroit of India. Kalyani Lemmerz started its operations in 1995 within proximity of this industrial condominium. The company was first created as a part of Bharat Forge Ltd. Hayes Lemmerz later increased its equity share in the company, which ensured that Kalyani Lemmerz could function as an independent firm. Kalyani Lemmerz experienced solid growth during 2001, with as much as 48 percent in parts of the company. The company does not have R&D efforts with other firms nor do they have any strategic alliances within the industry. Kalyani Lemmerz has its own R&D centre and R&D team located in Pune, India. (Pimpale, 2002-10-25)

Hayes Lemmerz is the world's largest manufacturer of automotive wheels, supplying approximately 32 percent and 23 percent of the automotive wheels in North America and Europe, respectively. The company is the largest global supplier of wheels to OEMs producing passenger cars, light trucks and

commercial highway vehicles, and is one of the leading producers of automotive brake products in North America. Hayes Lemmerz has an extensive list of customers including General Motors, Ford, DaimlerChrysler, BMW, Renault, Fiat, Volkswagen, Porsche, Audi, Volvo, Citroën, Peugeot, Skoda, Seat, Toyota, Mazda, Nissan, Honda, Mitsubishi, Suzuki and Isuzu. (http://www.hayes-lemmerz.com, 2002-11-08)

Kalyani Lemmerz is a producer of aluminium wheels. The company has plants in India, Germany and Brazil, but is represented in 27 countries all together. Kalyani Lemmerz produces wheel rims, supplied to all major manufacturers, including Telco, Tata, Tatra, Ashok Leyland, VTC, as well as local firms. In addition to this, Kalyani Lemmerz is conducting export to Korea, Spain and Sweden. (Pimpale, 2002-10-25)

The industry has experienced a shift from single axle to multi axles according to Kalyani Lemmerz, as this structure will reduce the overall fuel consumption of the vehicles. The underlying reason for this is the fluctuation in global oil prices, making multi axle vehicles more cost efficient. The fuel price has risen over 100 percent in 10 years; in addition, the government have deregulated the fuel industry, resulting in rising prices. As the infrastructure of the country is becoming better, the demand for multi axel vehicles will rise. This can be described as a golden circle, which many firms related to the trucking industry are hoping to be a part of, as trucks are needed to improve the infrastructure as well as better road conditions will encourage the use of trucks. This gives a great opportunity for growth in this part of the industry. (Pimpale, 2002-10-25)

There has been an upgrade of skills in Kalyani Lemmerz during the last years. Products that traditionally have been produced in Germany have been transferred in order to have the manufacturing process carried out in India. To facilitate such a transfer, in-house training was conducted, this incorporated both manufacturing issues and tooling issues. 20 members of the staff from Kalyani Lemmerz were sent to Germany for training. The staff members were from all levels of the company. The transfer of production and the in-house training has lead to an increase of the product range, which prior to this event was 6 to 7 products. Once the transfer and the training were complete, the

product range had increased to 50 to 60 products in 1999. This has also lead to less waste of raw material as production has become more efficient. The underlying reason for the general upgrade in the product range is more due to macro economic factors rather than the entrance of a specific TNC. Apart from special occasions, such as the above described, the Indian plant does not have much communication with the Germany plant and no communication at all with the plant in Brazil. Kalyani Lemmerz is operating much as an independent plant. (Pimpale, 2002-10-25)

Kalyani Lemmerz tries to be in the forefront of the industry. The company therefore regularly invests in R&D in order to offer its customers new solutions that could lower costs for both parties. This has however not yet occurred with regard to VTC. Normally, customers approach Kalyani Lemmerz with what type of products they want, this is also what happened with the relationship between Kalyani Lemmerz and VTC. At present, Kalyani Lemmerz believes that the wheel rims being used by VTC are appropriate. Once the relationship is well-established, Kalyani Lemmerz could suggest a different product to its customers if they feel that this may be appropriate. (Pimpale, 2002-10-25)

9.1.7 Krishna Fabrications Limited

Krishna Fabrications Limited is a family managed company which is a part of the Suvir Group of companies. The Suvir group has been operating for over 25 years and has various business units located all over India. (http://kfabs.com, 2002-11-08)

Krishna Fabrications was established in 1975. The company's basic philosophy is to be a direct supplier to the OEM companies in the automobile industry and to be as near its customers plants as possible in order to ensure a good and solid relationship. Krishna Fabrications hold an ISO 9000 certificate. (Balan, 2002-11-02)

Krishna Fabrications is engaged in a JV with a German company called Friedrich Boysen in the field of exhaust systems. Together they have a joint product facility near New Delhi that is referred to as Krishna Boysen. The JV is

known as an Indian company with international know-how. The company is benefiting from the market presence and local knowledge of Krishna Fabrications but also reaping the benefits from Friedrich Boysen's experience of design and production technology in this field. (http://kfabs.com, 2002-11-08, Balan, 2002-11-02)

Krishna Fabrications also has a TNC-TT, in addition to the JV, with Isringhausen in Germany. This TNC-TT is the key in the relationship between Krishna Fabrications and VTC. (Balan, 2002-11-02)

Product wise, one can label Krishna Fabrications' products into three different categories, namely: seating systems, sheet metal structures and operator cabins for heavy earth moving equipment. (Balan, 2002-11-02)

The seating system category can be divided into two different areas. The first area covers commercial vehicles. In this area Krishna Fabrications is producing driver and co-passenger seats as well as luxury seats for coaches and various models of suspension seats. The suspension seats are designed to reduce friction caused by rough surface. The sheet metal structure part of Krishna Fabrications' business is mainly focusing on the commercial vehicle sector, where the company is producing the front end of the chassis of the truck. The last category is self-explanatory as it focuses on operator cabins for heavy earth moving equipment. (Balan, 2002-11-02)

Krishna Fabrications operates plants in Bangalore, Chennai, Pune, Hyderabad and New Delhi. The plant in Bangalore incorporates a sheet metal shop with up to 500 tons capacity, full welding facilities, parts treatment and painting facilities. (Balan, 2002-11-02)

Krishna Fabrications delivers products to several of the well-known OEMs in India such as Telco, Bharat, Maruti, Harlan, L&T, Tractor & Farm Equipment, VTC, and Ashok Leyland. Furthermore the company has a very limited export to an American company. (Balan, 2002-11-02)

9.1.8 PL Haulwel Trailers

PL Haulwel Trailers is a division of Automotive Coaches and Components Limited, an associate company of Ashok Leyland Limited since 1996. Originally PL Haulwel Trailers was promoted by Pierce Leslie India Limited and was incorporated as a company in the year 1984, and was functioning as its subsidiary until 1990 when Ashok Leyland joined as co-investor. PL Haulwel Trailers has been operating in India for 15-18 years. The trailer units were added about 6 years ago. At that time, the turnover increased exponentially. PL Haulwel Trailers has three production units, two in Pondicherry and one in Chennai. (Ramasubramanian, 2002-10-29)

PL Haulwel Trailers has acquired technical know-how for design, development and manufacturing of trailers, fifth wheel couplers and special purpose trailers through in-house development of design and through technical collaboration with various technology leaders in the field. (Ramasubramanian, 2002-10-29)

PL Haulwel Trailers has 8 different collaborations with various companies: Hammer, Fischer, Hyva, Cometto, Callahan, Marathon Electronics, C&B, and Swing Thru International. The nature of the collaborations between the different companies varies. Most of the collaborations are a matter of cost cutting efforts from PL Haulwel Trailers. In addition to the above-mentioned, there is a new agreement with BPT, an Australian company that produces cement blocks. (Ramasubramanian, 2002-10-29)

PL Haulwel Trailers designs, manufactures and sells different types of products. The first category includes 2’ and 3½’ Fifth Wheel Couplers, the second category contains trailers and semi-trailers for on and off highway application, the third category includes container side loader, cement bulkers, trailers with hydraulic suspension and forced steering. The last category incorporates power pack items for engine-assembly. (Ramasubramanian, 2002-10-29)

The initial contact between PL Haulwel Trailers and VTC took place four years ago during an expo in New Delhi. VTC later visited PL Haulwel Trailers’

factory with the intention of ensuring PL Haulwel Trailers as supplier. VTC basically approved of the product and the way of producing the coupling. VTC did however suggest a few things that they thought could be improved in the initial stages of the relationship. Some of these suggestions were later implemented and the production of couplers was started. (Ramasubramanian, 2002-10-29)

With regards to the trailers attached to the VTC trucks it is important to reflect on the fact that if a trailer is produced by PL Haulwel Trailers, it will be specifically positioned and marked with the name of PL Haulwel Trailers. VTC is producing some trailers in-house and the rest is purchased from PL Haulwel Trailers. VTC considers PL Haulwel Trailers to provide an excellent level of service with good problem-solving capabilities. (Muthukumarasamy, 2002-10-31)

9.1.9 Sundaram Clayton Limited

Sundaram Clayton Limited (SCL) is part of the TVS group of companies, employing 29 000 people, which is the largest automotive component manufacturing and distributing group in India. SCL began its operations in Chennai in 1962, in collaboration with Clayton Dewandre Holdings PLC, UK and was the first company to engage in manufacturing of air-assisted and air brake systems for commercial vehicles in India. Over the last few years the company has achieved an 85 percent market share OEM segment. SCL has three business areas: foundry, air-brakes and ABS. The company has its own research and development centre for design, development, simulation and testing. (http://www.sundaram-clayton.com, 2002-11-13)

SCL established its foundry division in 1968 for quality and high precision aluminium castings. The division's two plants, one at Chennai and the other at Hosur are equipped with technology in pressure die casting; gravity die casting and low pressure die casting. (Gopal, 2002-10-30)

Having a wide customer base, SCL is one of the largest suppliers of aluminium die castings in the country. The company has focus mainly on the domestic

market. However, SCL exports some of its products to international OEMs. (http://www.sundaram-clayton.com, 2002-11-13)

In 2000, the company worked hard in order to rearrange the foundry business into an external customer driven business. SCL decided to focus on large TNC's with global customer databases with large aluminium consumption. The reorganization led to a primary objective to work towards the transportation industry of which the truck industry accounts for 33 percent of all aluminium consumption, and the rest is the automotive. Analysis of the truck industry showed that the aluminium consumption was quite stable and could not be substituted with plastics or other materials, and so this business seemed like a profitable area to gain customers in. (Gopal, 2002-10-30)

The company decided to focus on engine transmission components including clutch hosing, transmission casings and transport cases. These products had a high demand in the market, and SCL already had the tooling in order to produce these types of components. The main objective for the company is to deliver complete solutions in the aluminium foundry business, which means SCL is working hard to establish skills and knowledge in component design in order to not just be a manufacturer but also a consultant. (Gopal, 2002-10-30)

SCL does not use any ICT or JIT system in the collaboration with VTC, even though SCL is starting to use online driven purchasing systems with other customers. Eventually, these kinds of techniques will probably be used in the relationship with VTC as well. Mr. Gopal believes that VTC is in the middle of a turbulent period right now, with the integration of MACK and the establishment of the operations in India. Therefore, the company needs some time to adjust. VTC cannot implement ICT systems in the middle of a transforming period. (Gopal, 2002-10-30)

SCL is an active member of ACMA, and the president of SCL is the chairman in this interest organization. Mr. Gopal believes it has been useful for SCL to be a member in the association. (Gopal, 2002-10-30)

9.1.10 ZF Steering Gear India

ZF Steering Gear India is manufactures power steering gears for light, medium and heavy vehicles in collaboration with the German company ZF Friedrichshafen. ZF Steering Gear India has been operating in the Indian market since 1981. Notable is that this does not incorporate the production of steering gears for passenger cars. (Financial Express, 1999-07-07, http://www.kineticindia.com, 2002-12-01)

ZF Steering Gear India manufactures mainly two sorts of steering gears, a mechanical steering gear and a power steering gear. The annual production is 85 000 and 30 000 respectively. (Dange, 2002-10-23)

ZF Steering Gear India is enjoying some 60 percent of the market in the power steering for heavy and medium commercial vehicle segment. The company is supplying to various Tata vehicles, Tempo Traveller and Excel, Mahindra & Mahindra, Punjab Tractors and VTC. (Financial Express, 1999-07-07) ZF Steering Gear India has the intention of selling the product that is currently being sold only to VTC to other customers, such as Ashok Leyland and Telco, within the forthcoming years. (Dange, 2002-10-23)

Table 13 - Analysis of Technology Transfers

VTC --> FS	1A	1B	2A	2B	2C	2D	2E	2F	2G	2H	2I	2J	2K	2L	2M
Brakes India Ltd.			x			x		x					x		
Kalyani Lemmerz			x					x				x	x		
Krishna Fab.			x			x	x	x			x	x	x		
PL Haulwel Trailers			x	x	x	x	x	x					x		
ZF Steering Gear			x	x			x	x							
Sundaram Clayton			x		x	x		x			x		x		x
Autoliv India			x			x		x							
Elf Lubricants			x					x					x		x
Goodlass Nerolac			x				x	x			x				
Hyva			x		x	x	x	x							
TOTAL			10	2	3	6	5	10			3	2	6		2
FS --> VTC	**1A**	**1B**	**2A**	**2B**	**2C**	**2D**	**2E**	**2F**	**2G**	**2H**	**2I**	**2J**	**2K**	**2L**	**2M**
Brakes India Ltd.															
Kalyani Lemmerz															
Krishna Fab.							x								
PL Haulwel Trailers				x	x										
ZF Steering Gear															
Sundaram Clayton			x		x										
Autoliv India															
Elf Lubricants															
Goodlass Nerolac															
Hyva			x		x										
TOTAL			2	1			1								
FS --> 2nd Tier	**1A**	**1B**	**2A**	**2B**	**2C**	**2D**	**2E**	**2F**	**2G**	**2H**	**2I**	**2J**	**2K**	**2L**	**2M**
Brakes India Ltd.							x						x		
Kalyani Lemmerz															
Krishna Fab.													x		
PL Haulwel Trailers															
ZF Steering Gear															
Sundaram Clayton		x					x						x		
Autoliv India															
Elf Lubricants															
Goodlass Nerolac															
Hyva															

VTC --> FS	**3A**	**3B**	**3C**	**4A**	**4B**	**4C**	**4D**	**5A**	**5B**	**5C**
Brakes India Ltd.										
Kalyani Lemmerz					x					
Krishna Fab.										
PL Haulwel Trailers										x
ZF Steering Gear			x							
Sundaram Clayton				x	x					
Autoliv India				x						
Elf Lubricants										
Goodlass Nerolac										
Hyva			x							
TOTAL			2	2	2					1
FS --> VTC	**3A**	**3B**	**3C**	**4A**	**4B**	**4C**	**4D**	**5A**	**5B**	**5C**
Brakes India Ltd.										
Kalyani Lemmerz										
Krishna Fab.										
PL Haulwel Trailers										
ZF Steering Gear										
Sundaram Clayton										
Autoliv India										
Elf Lubricants										
Goodlass Nerolac										
Hyva							x			
TOTAL							1			
FS --> 2nd Tier	**3A**	**3B**	**3C**	**4A**	**4B**	**4C**	**4D**	**5A**	**5B**	**5C**
Brakes India Ltd.										
Kalyani Lemmerz										
Krishna Fab.										
PL Haulwel Trailers										
ZF Steering Gear										
Sundaram Clayton										
Autoliv India										
Elf Lubricants										
Goodlass Nerolac										
Hyva										
TOTAL										

9.2 Explanation to Abbreviations in Table 13 – Analysis of TT

1. Finding new suppliers

A. Public announcements
B. Visits and quality audits

2. Transferring technology

Product technology

A. Product design and technical specifications
B. Feedback on product performance
C. Collaborations in R&D

Process technology

D. Provision of machinery and equipment
E. Production planning, quality management and inspection and testing
F. Visits to each other's facilities
G. Co-operation clubs
H. Assistance to employees to set up own firms
I. Procurement assistance

Organisational and managerial know-how

J. Assistance regarding inventory management and forecasting
K. Assistance in implementing quality and environmental assurance systems
L. Introduction to new marketing techniques
M. Other

3. Providing training

A. Arrange training courses at affiliates
B. Access to internal training programme
C. In-plant training sessions

4. Sharing information

A. Exchange of business information
B. Providing annual purchase orders
C. Encourage to join business associations
D. Other

5. Financial support

A. Create special and favourable pricing

B. Purchasing in advance

C. Other

9.3 Questionnaire

Introduction

1) Company/Your Name/Your position/Phone

2) Briefly describe your company? How was the operations in India established and when? Autonomy towards TNC affiliate?

3) What was the turnover/growth rate of your Company in 2001? (Ask for a copy of the annual report.)

4) Please describe the operations run by your company in India. Overall product and market strategy. (Single/multiple sourcing, LT/ST supplier relationships, buy/make ratio, outsourcing of design to suppliers, vertical integration?) How do you predict the future industry for your business?

5) Please describe you company's relationship with Volvo Truck Corporation? How did the contact get established? How is your contract formed (no. of years?) How long have your company been a supplier to Volvo? How big is VTC as customer compared to annual turnover?

Hands on – Linkage programme

6) Has your company at any occasion received any form of help or assistance from VTC?

Product Technology

7) Has VTC performed any transfer of product design and technical specifications?

8) Has VTC performed any transfer of advice regarding procurement and other input components?

9) Have there been any technical consultations in order to comprehend new technologies?

10) Have VTC offered any feedback regarding the products in order for your company to improve performance? What kind of feedback does VTC give your company in regards to the product?

11) The product that your company is supplying VTC with, was that product unknown before VTC requested it? If so, was there any collaboration

with regards to R&D in order to speed up the development process? (How did you gain knowledge about this product?)

Process Technology

12) Have VTC offered any technical support with regards to production planning, quality management and/or inspection routines and testing?

13) Have VTC offered machinery or similar equipment required during the manufacturing of the final product? Have they offered financial support to items of such nature?

14) Have advise been offered on production layout and organisation surrounding the process of manufacturing the final product?

15) Are there any social gatherings that you or anyone from your company attends with the intention of sharing and spreading company/industry knowledge? Is VTC involved in this or similar events? How would you describe the relationship developed between different parties during such events? How has this affected your operations?

Organisational and Managerial Know-How

16) Has your company received any assistance from VTC regarding inventory management and the use of JIT systems or similar?

17) Has for your company new managerial practises been introduced to you by VTC? (Example marketing techniques)

18) Has your company implemented any quality control systems, such as ISO certification etc? If so, have VTC been involved in that process?

Providing Training

19) Please advice if any training for managers, technicians and/or workers has been arranged at your facilities has been provided by VTC?

20) Have any training for managers, technicians and/or workers been provided at VTC's facilities?

Sharing Information

21) Is there a flow of information going from your company to VTC and vice versa? Please describe the nature of the information and the process surrounding it. Informal exchanges of business information? Annual purchase orders from VTC?

Extending Financial Support

22) Have the relationship with VTC offered any financial benefits? (Indirect financial support from VTC provided bank loans etc.)

Effects of Linkage programme

Project Execution

23) If you try to summarize all the assistance received from VTC, how would you describe its affect on organisational capabilities, managerial know-how and basic engineering?

Plant operations

24) Has the support from VTC lead to modification in existing technology or basic operations regarding quality control and inventory control?

Technological improvement

25) Have any of the assistance and help given by VTC generated the development of new technology (or anything) within your company? (Has the information provided by VTC lead to your company using that information, developing it further and created new/additional information/knowledge from it?)

26) Have the technology provided by VTC been used in any R&D practises within your company which has lead to the creation of new technology?

Technology transfer

27) Do you feel that your company have the ability to transfer technology that is present within your company to other external parties? Is that done? To what external parties?

28) If so, does any of the technology that has been transferred originate from VTC?

Customers

29) In your opinion, to what extent has the assistance received from VTC changed your company's relationship with existing customers?

30) In your opinion, to what extent has the assistance received from VTC provided the foundation for finding new customers?

Suppliers

31) In your opinion, to what extent has the assistance received from VTC changed your company's relationship with existing suppliers? Please consider the categories of, product technology, process technology, organisational and managerial knowledge, provision of training, sharing information and financial support.

32) Could you give examples of your company providing technology to your suppliers? What was the intention of this action? What was the outcome?