The Swedish Automotive Cluster -
How will it be affected by foreign acquisitions
at the end of the value chain?

Master’s Thesis in Business Administration, MBA programme

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Abstract

In this master thesis it is analyzed how the Swedish automotive cluster will be affected by foreign acquisitions at the end of the value chain. This is a relevant topic as the Swedish automotive industry is a very important industry in Sweden. It is of interest to evaluate how the recent shifts of ownership for the Swedish automotive manufacturers will affect the Swedish automotive cluster as a whole.

It is also relevant from a theoretical point of view and this thesis draws on the extensive knowledge about agglomeration and industry clusters. Further, it also exploits the national competitive advantages and selected disadvantages that can affect a national industry cluster. Based on relevant theories, a research model is selected which combines Sweden’s competitive advantages, the Swedish automotive cluster’s dynamism and its development stage into a framework which allows for conclusions about how foreign acquisitions are likely to affect the Swedish automotive cluster.

By applying the research model it is shown that the Swedish automotive cluster is a dynamic and mature cluster and that this indicates that the affects of foreign ownership is believed to be positive. The foreign investments show that the Swedish automotive cluster is an attractive cluster that foreign companies want to tap into or invest in. Risks with foreign ownership in industry clusters are also pointed out based on a case study of the Swedish pharmaceutical cluster.

The thesis research is mainly based on a phenomenological philosophy and the research purpose is mainly exploratory although some parts are descriptive and explanatory. The method used is qualitative but some quantitative data is used to support relevant findings.
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1 Introduction

1.1 Background

The automotive industry in Sweden was founded in the early 1900s. VABIS, which later became Scania, built its first passenger car and truck in 1902 and Volvo produced its first car in 1927. The Swedish automotive industry has over the years been very successful and the companies have expanded in Sweden as well as abroad. Sweden’s national competitive conditions have laid the ground for a successful automotive industry and successful related and supporting industries. Together with the automotive companies these linked industries and institutions creates a Swedish automotive cluster.

The automotive industry is a very important industry in Sweden. Many companies and people in Sweden are directly or indirectly involved and dependent on the automotive industry. It is estimated that the automotive industry in Sweden in December 2008 employed about 125 000 people of which half were employed by automotive suppliers (Heper, 2010). Further it is estimated that each person employed within the automotive industry leads to an additional 1.6 job opportunities within other branches. Hence, the success of the industry is of utmost importance to the whole Swedish society and it should be of interest for Swedish automotive industry employees, local politicians, Swedish government as well as the Swedish society in general.

As the global automotive industry has been consolidating this has also affected the Swedish industry. Volvo Cars was in 1999 sold to Ford Motor Company. At the same time the Volvo Group tried to acquire Scania. This was not approved by the EU and Scania remained independent. In 1990 Saab was to 50% sold to General Motors and in 2000 they fully acquired Saab from Investor. Also the automotive supplier industry has been consolidating and companies such as e.g. Autoliv has merged or been acquired by global companies.

Now there have recently been other shifts of ownership in the Swedish automotive industry. It is discussed in this thesis how these recent changes that have taken place, with Volvo Cars being acquired by Geely, Saab being acquired by Spyker and Volkswagen and MAN being the main owners of Scania, will affect the Swedish automotive cluster as a whole.

1.2 Theoretical focus

The theoretical focus of this thesis is on industry clusters and how these can be affected by foreign acquisitions at the end of the value chain.

Value chain and value system theories (Porter, 2004) have for a long time been very popular when analyzing companies in order to find ways to differentiate or lower costs and thereby resulting in an increased profit margin. The activities within a company are divided into primary activities such as e.g. operations or outbound logistics and support activities such as e.g. human resource management or procurement. Companies are then trying to lower costs for selected activities e.g. by better capacity utilization, outsourcing activities to low cost countries or searching for economies of scale. Cost advantage can also be created by reconfiguring the value chain. Companies are also trying to differentiate and by that create a superior value for customers. This can be done either by changing individual value chain
activities to increase uniqueness in the final product or by reconfiguring the value chain. There is often a trade off between cost and differentiation advantages.

In addition the value chain of a company is linked to the value chain of other companies, creating a value system. For global companies their value chains can be spread over very different geographic areas and their success will then be depending on e.g. their ability to configure and coordinate their own value chain but also of their ability to create competitive advantages through their linkages within the entire value system.

The companies in the Swedish automotive cluster, which is the focus of this thesis, is part of global value chains and value systems. The recent shifts of ownership have taken place at the end of the value chain as Volvo Cars, Scania and Saab now have foreign ownership. However, value chain theory does not focus on the advantages created from geographically concentrated and interconnected companies, inter-firm cooperation, business associations, etc. Hence, for this study theories about agglomeration and clusters are also central.

Theories about agglomeration and clusters are based on the advantages of geographic concentration. An industry cluster is according to Porter (1998) “geographic concentrations of interconnected companies and institutions in a particular field” and “critical masses in one place of linked industries and institutions--from suppliers to universities to government agencies--that enjoy unusual competitive success in a particular field”.

The knowledge about agglomeration economies dates back to 1890 to the work of Marshall (Marshall, 1920). The basic foundations for agglomeration are identified to be: knowledge spillovers, labor market pooling, and input sharing (Rosenthal and Strange, 2001). It is believed that geographic location will become even more important (Porter, 1998; Enright, 2000). This is a paradox as the economy is becoming more and more globalized. E.g. in companies’ value chains anything that can be outsourced will no longer be considered a competitive advantage which means that the competitive advantages will to a greater extent have to be created locally.

There is an important area of research which is concerned with the link between industry clusters and national competitiveness. Central to this line of research is cluster sustainability or the ability for any cluster to stay competitive over a long period of time. According to Porter (1990) a nation’s competitiveness depends on the capacity of its industry to innovate and upgrade. Nations succeed in industries where the home environment is the most forward-looking, dynamic and challenging. The theory about the competitive advantages of nations is of significance for this thesis as the national “diamond” affects the dynamism of industry clusters. This means that the four attributes: factor conditions, demand conditions, related and supporting industries, and firm strategy, structure and rivalry will lay the ground for a successful industry cluster. In this thesis it is applicable to use this framework to analyze Sweden’s national competitive advantages and to identify what attributes in Sweden’s national diamond that have laid the ground for a successful automotive cluster.

Another line of theories is concerned with the roles that foreign owned companies play in leading edge clusters (Birkinshaw, 2000). The reasons for foreign investments can e.g. be to gather information and knowledge, to be corporate portfolio investments, to be subsidiaries for products supply or the reason can be to transfer skills and capabilities from the cluster to the rest of the company. By tapping into a leading cluster a company can gain access to leading-edge ideas and specialized talents. As local clusters are part of global value chains it is important for global companies to analyze how they can best benefit from their local
clusters. That is how these global companies can continue to build and create dynamic and successful local clusters as well as how they can tap into other successful local clusters.

Cluster dynamisms and development stage of the industry cluster are other important theoretical areas for the understanding of the Swedish automotive cluster and for understanding if the Swedish automotive cluster is an attractive cluster. Theories about cluster dynamism includes local rivalry, the entry of new firms or spin-offs, cooperation within the cluster, specialized and advanced factors of production, linkages to related industries and proximity to sophisticated and demanding buyers (Sölvell et al., 2003). Also the stage of development of industry clusters is very relevant to this study and it is interesting to investigate if the Swedish automotive cluster is considered to be embryonic, emerging or mature and if it is growing, stagnating or declining.

Finally, theories about foreign ownership in industry clusters and how this affects clusters as a whole are of importance for this study. An area of research has shown that cluster dynamism together with cluster life-cycle stage indicates whether foreign ownership will have a positive or a negative impact on an industry cluster (Birkinshaw, 2000).

1.3 Problem formulation

Based on the background and the available theories, the research question for this thesis has been formulated as follows:

**How will the Swedish automotive cluster be affected by foreign acquisitions at the end of the value chain?**

This research question was selected as the automotive industry is an interesting, global and highly competitive industry. Further, as mentioned in the background, the consolidation of the industry is ongoing and this has also affected the Swedish automotive manufacturers. As both Volvo and Saab quite recently changed owners it has caused a lot of media attention. The success of the automotive industry and related industries are of great importance for the Swedish economy and especially for certain regions in Sweden such as e.g. the west coast.

Further this research question was also selected as there is already relevant research performed and theories developed in the areas of value chains, agglomeration, industry clusters, cluster dynamism, etc. Based on these available theories it is interesting to discuss possible implications of ownership changes in the Swedish automotive cluster as a whole instead of the affects on an individual company.

1.4 Purpose

The purpose of this thesis is to discuss how the Swedish automotive cluster will be affected by foreign acquisitions at the end of the value chain. The central concepts being studied are the value chain, the national competitive advantages, cluster dynamism, cluster development stage and foreign acquisitions in industry clusters. Together with empirical data about the Swedish automotive cluster and the Swedish automotive manufacturers, the aim is to draw conclusions about how foreign acquisitions will affect the Swedish automotive cluster.

This thesis is intended to contribute to the knowledge mainly in the area of foreign ownership in industry clusters but also to the understanding of how a nation’s competitive advantages is related to cluster dynamism and cluster development and how this in turn will influence if
foreign ownership is likely to be positive or negative for an industry cluster. Further it is also intended to contribute to the knowledge about the Swedish automotive cluster, the Swedish automotive manufacturers and about the dynamism and development of this cluster.

There are many relevant theories about agglomeration, industry clusters and about how and why clusters evolve in certain areas such as e.g. the movie cluster in Hollywood, the automotive cluster in Detroit or the IT cluster in Silicon Valley. However, when researching the literature there were only a few theories and frameworks about how clusters are affected by foreign acquisitions. In this sense this thesis also adds to the field of research about foreign acquisitions in industry clusters.

1.5 Limitations
The focus is only on the Swedish cluster but the effects of foreign ownership in industry clusters is applicable also for other clusters as the economy is becoming more and more global.

This thesis will include data about the manufacturers: Volvo Cars, Saab, Volvo Trucks and Scania but when discussing the implications of foreign acquisitions the industry cluster will be analyzed as a whole.

Although the Swedish automotive industry also includes suppliers, transporting companies, etc, data about these stakeholders will not be included in detail. Further the geographic focus of the investigation will be Sweden although all the companies in focus are multinationals. Hence, it is the effects of the recent ownership changes on the Swedish industry cluster that will be analyzed.

1.6 Thesis outlay
In chapter 2 the research method is defined including research approach, literature review and data collection methods. This chapter also describes which methodology that was selected to perform the analysis. In chapter 3 the theoretical context for this master thesis is presented. It includes various theories from general business analysis to the importance of clusters, dynamic clusters and how these can be affected by foreign ownership.

Chapter 4 starts by describing Sweden’s competitive advantages and it continues by brief descriptions of the Swedish automotive manufacturers (Volvo Cars, Saab, Volvo Trucks and Scania) and their history. This chapter also includes the Swedish automotive cluster as a whole and a case study of the pharmaceutical cluster in Sweden. This case study is used as a comparison to the automotive cluster. In chapter 5 the selected methodology, based on the literature review, is used together with the data presented in chapter 4 to analyze the Swedish automotive cluster regarding its dynamism and life-cycle stage. The analysis also includes a discussion about how foreign acquisitions at the end of the value chain will affect the Swedish automotive cluster. In chapter 6 these conclusions are presented.
2 Methodology

Collis and Hussey (2003) define methodology to be the overall approach to the research process, from the theoretical underpinning to the collection and analysis of the data. This includes the answers to why certain data is collected, what data is collected, from where it is collected, when it was collected, how it was collected and how it will be analyzed. The intention with this methodology chapter is to provide these answers.

2.1 Defining the research question

Saunders et al. (2007) emphasize the importance of defining a clear research question at the beginning of the research process. For this thesis the relevant research question is “How will the Swedish automotive cluster be affected by foreign acquisitions at the end of the value chain?” This research question was selected based on practical issues and changes in the Swedish automotive cluster and on a relevant theoretical focus as described in the introduction in Chapter 1.

2.2 Type of research purpose

The type of research purpose, or the reason why it is conducted, can be classified according to if it is exploratory, descriptive or explanatory (Saunders et al., 2007).

Exploratory research is conducted into a research problem or issue where there are few or no earlier studies which to refer to for information about the issue or problem. It is often used when the research problem is badly understood (Ghauri and Gronhaug, 2002). There are three principal ways to conduct exploratory research: search of the literature, interviewing experts in the subject and conducting focus group interviews (Saunders et al., 2007). Exploratory research rarely provides conclusive answers to problems or issues but rather gives guidance on future research that could possibly be conducted. Key skills required are often to observe, get information and construct explanation i.e. theorizing.

Descriptive research describes phenomena as they exist. In descriptive research the problem is structured and well understood (Ghauri and Gronhaug, 2002). It can e.g. be used to identify and obtain information on the characteristics of a particular problem or issue. The data collected are often quantitative and statistical techniques are often used (Collis and Hussey, 2003). Key characteristics of descriptive research are structure, precise rules and procedures.

Explanatory research goes beyond the descriptive research and just describing the characteristics, to explaining why and how it is happening (Saunders et al., 2007). The emphasis of explanatory research is to study the situation of a problem and establish causal relationships between variables.

The research purpose of this study is mostly exploratory as it aims at investigating how changes of ownership will affect a specific industry cluster. There are many previous studies of clusters and agglomeration, but there are only a few about foreign ownership in industry clusters. In addition there is no previous studies of this specific topic which is “How will the Swedish automotive cluster be affected by foreign acquisitions at the end of the value chain?” This is why this study is considered mainly to be exploratory. However, in part the research is also descriptive. When it comes to describing the current Swedish automotive
cluster and the Swedish automotive manufacturers these are described as they are. In addition, also quantitative data is used in this study and in order to analyze this data, explanatory research is used to some extent. E.g. when analyzing the stage of development of the Swedish automotive cluster, one factor is if it is a growing cluster. To investigate this, quantitative data about historical employment rates are used to draw conclusions about the cluster growth.

2.3 Research philosophy

There are two main research paradigms: the positivistic paradigm and the phenomenological or the interpretivism paradigm (Blumberg et al., 2005).

Positivism is a research philosophy adopted from natural science and its three basic principles are:

- the social world exists externally and is viewed objectively,
- research is value-free and
- the researcher is independent, taking the role of an objective analyst

The phenomenological paradigm or interpretivism is a research philosophy that holds the view that the social world cannot be understood by applying principles adopted from natural science and it propose that social sciences require a different research philosophy. The basic principles of the phenomenological paradigm or interpretivism are:

- the social world is constructed and is given meaning subjectively by people,
- the researcher is part of what is observed and
- research is driven by interests.

Table 1 displays the features of the two main paradigms. There is however a continuum between the two paradigms and also a positivistic paradigm can e.g. produce qualitative data (Collis and Hussey, 2003). Blumberg et al. (2005) add a research philosophy, realism, in between the positivistic and the phenomenological paradigms. Realism holds the view that social science can rely on the research approach dominant in the natural science and it accepts the existence of a reality independent of human beliefs and behavior. Moreover, it also admits that understanding people and their behavior requires acknowledgement of the subjectivity inherent in humans.

<table>
<thead>
<tr>
<th>Positivistic paradigm</th>
<th>Phenomenological (interpretivism) paradigm</th>
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<tbody>
<tr>
<td>Tends to produce quantitative data</td>
<td>Tends to produce qualitative data</td>
</tr>
<tr>
<td>Uses large samples</td>
<td>Uses small samples</td>
</tr>
<tr>
<td>Concerned with hypothesis testing</td>
<td>Concerned with generating theories</td>
</tr>
<tr>
<td>Data is highly specific and precise</td>
<td>Data is rich and subjective</td>
</tr>
<tr>
<td>The location is artificial</td>
<td>The location is natural</td>
</tr>
<tr>
<td>Reliability is high</td>
<td>Reliability is low</td>
</tr>
<tr>
<td>Validity is low</td>
<td>Validity is high</td>
</tr>
<tr>
<td>Generalizes from sample of population</td>
<td>Generalizes from one setting to another</td>
</tr>
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</table>

Table 1 Features of the two main paradigms (Collis and Hussey, 2003)

Creswell (2009) presents yet another set of research philosophies. He uses the term “worldview” meaning a basic set of beliefs that guide action. Creswell presents four different worldviews: positivism, constructivism, advocacy/participatory and pragmatism. Social
constructivism is often combined with interpretivism and it is typically seen as an approach to qualitative research. The advocacy/participatory worldview hold that research inquiry needs to be intertwined with politics and the political agenda. The pragmatic worldview arise out of actions, situations and consequences rather than preceding conditions. Instead of focusing on methods researchers emphasize the research problem and use all approaches available to understand the problem.

<table>
<thead>
<tr>
<th>Positivism</th>
<th>Constructivism</th>
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<tbody>
<tr>
<td>• Determination</td>
<td>• Understanding</td>
</tr>
<tr>
<td>• Reductionism</td>
<td>• Multiple participant meanings</td>
</tr>
<tr>
<td>• Empirical observation and measurement</td>
<td>• Social and historical construction</td>
</tr>
<tr>
<td>• Theory verification</td>
<td>• Theory generation</td>
</tr>
<tr>
<td>*Advocacy/Participatory</td>
<td></td>
</tr>
<tr>
<td>• Political</td>
<td>• Consequences of actions</td>
</tr>
<tr>
<td>• Empowerment issue-oriented</td>
<td>• Problem-centered</td>
</tr>
<tr>
<td>• Collaborative</td>
<td>• Pluralistic</td>
</tr>
<tr>
<td>• Change-oriented</td>
<td>• Real-world practice oriented</td>
</tr>
</tbody>
</table>

Table 2 Four worldviews (Creswell, 2009)

In addition there are three major ways of thinking about research philosophy: epistemology, ontology and axiology (Saunders et al., 2007). Epistemology is concerned with what constitutes acceptable knowledge in a field of study. Ontology is concerned with the nature of reality and the aspects of objectivism or subjectivism. Finally, axiology is a branch of philosophy that studies judgments about value. E.g. positivists believe that science and the process of research is value-free.

The research process and the research method are influenced by the researcher’s background when it comes to research orientation (Ghauri and Gronhaug, 2002). In this study the basic philosophy is closer to the phenomenological paradigm than to the positivistic paradigm. The reason for this is that a major part of the theories used for this study are subjective and qualitative. Many of the theories are based on observations of companies and generalizations are made. Also the analysis, which combines the theoretical framework with the empirical data, is to a large extent qualitative and subjective. Though, the empirical data also contains quantitative data which is used in the analysis and to present more objective conclusions. This is also why this study is on the continuum between positivistic and phenomenological (however closer to phenomenological). The positivistic philosophy is a pure scientific approach and that has not been possible to use as a single philosophy for this research. If incorporating the four worldviews as presented by Creswell (2009), this thesis would be considered pragmatic as it draws on the advantages of multiple methods, different worldviews as well as different forms of data collection and analysis. This means that it has been the problem or the research question that has been the guide for what type of theories and data that has been used and analyzed. The advantage with the pragmatic worldview is that it gives the researcher freedom of choice when it comes to methods, techniques and procedures of the research that best meets the need and purpose.

2.4 Deductive or inductive approach

A research study can be either deductive or inductive. A deductive research is when a conceptual or theoretical structure is developed and then tested by empirical observations.
This means that conclusions are drawn based on logical reasoning (Ghauri and Gronhaug, 2002). An inductive research is when observations and empirical studies are performed and theories are based on these. This means that through induction general conclusions are drawn from empirical observations. Hence, this is the opposite of a deductive approach (see Figure 1).

![Image of Induction and deduction](Laws and theories)

**Figure 1 Induction and deduction (Ghauri and Gronhaug, 2002)**

This study has a deductive approach as conceptual and theoretical structures are developed which are then supported by empirical observations and findings (Collis and Hussey, 2003). For the contents of this thesis this means that the theoretical framework goes from general theories of business analysis to theories about clusters and foreign ownership in industry clusters. The theories are then used for analysis of the empirical findings regarding the Swedish automotive cluster and data about the Swedish automotive manufacturers.

### 2.5 Research methods

According to Creswell (2009) there are three types of research design: qualitative, quantitative and mixed methods research. Qualitative and quantitative methods should not be viewed as polar opposites but as representing different ends on a continuum. Mixed methods research is in the middle of this continuum.

Qualitative research is a means for exploring and understanding the meaning individuals or groups ascribe to a social or human problem (Creswell, 2009). A qualitative technique is used mainly for any data collection technique or data analysis procedure that generates or use non-numerical data (Saunders et al., 2007). In qualitative research the skills and experience of the researcher play an important role in the analysis of data (Ghauri and Gronhaug, 2002). Exploratory research usually relies more heavily on qualitative techniques (Blumberg et al., 2005).

Quantitative research is a means for testing objective theories by examining the relationship among variables (Creswell, 2009). A quantitative technique is used mainly for any data collection technique or data analysis procedure that generates or uses numerical data (Saunders et al., 2007).

Mixed methods research is an approach that combines or associates both qualitative and quantitative forms. It involves philosophical assumptions, the use of qualitative and quantitative approaches, and mixing of both approaches in a study (Creswell, 2009). There are also multi-methods techniques which refers either to the use of more than one data collection technique or to mixed methods which combines qualitative with quantitative techniques (Saunders et al., 2007). Multi-methods are increasingly advocated within business and
management research where a single study may use qualitative and quantitative techniques and procedures in combination. According to Ghauri and Gronhaug (2002) it is generally accepted that for inductive and exploratory research, qualitative methods are most useful as they can lead to hypothesis building and explanations. In line with this view, first when a problem is unstructured, qualitative methods are suitable. Secondly, when developed hypothesis are going to be tested, quantitative methods are most useful.

This study has a mixed-methods approach but with the focus on qualitative methods. As this study is mainly exploratory the most suitable research method is qualitative. This means that the information gathered and produced is mostly non numerical. Further the emphasis has been on understanding, interpreting and using previous theories within the selected research area. This study uses quantitative data to support and explain the qualitative findings. Examples of quantitative data used in this study, is data about e.g. number of employees in the Swedish automotive cluster or share of automotive manufacturing in Sweden. In an effort to evaluate the automotive clusters innovativeness, number or patents applied for in Europe and the US has been used as an approximation. It should be noted that the number of patent applications is for the Swedish industry in total and not separated for the automotive industry. Also the R&D expenditure is used as a means to estimate the innovativeness of the automotive industry.

2.6 Literature review and data collection

An important part of a thesis work is to perform a critical literature review as this provides the foundation on which the research is built (Saunders et al., 2007).

The data collected is only secondary (Saunders et al., 2007) and it comes from books, journals, newspaper articles, reports, agency publications, etc. Some data is also used in form of company’s annual reports and other relevant company information derived directly from the company’s home pages. No primary data was collected for this research as there are extensive secondary data available for this study. The advantage with secondary data is that it is timesaving. Another advantage with secondary data is that it helps the researcher better understand and formulate the research problem and also broadens the base from which scientific conclusions can be drawn (Ghauri and Gronhaug, 2002). This means that the verification process is more rapid and the reliability of the information and conclusions is greatly enhanced. The disadvantage is that the data has originally been collected for other studies and objectives and may not completely fit the research problem.

To decide what data to collect a relevance tree was used (see Figure 2). According to Saunders et al. (2007) relevance trees provide a useful method of bringing some structure to a literature research. The relevance tree starts with the research question or objective at the top level and is then broken down into subject areas, sub-areas, etc.
How will the Swedish automotive cluster be affected by foreign acquisitions at the end of the value chain?

As shown in the relevance tree, literature research has been done in the following areas: the Swedish automotive cluster, cluster theories, cluster dynamism, innovative clusters, successful clusters, Swedish R&D investments and patents, Swedish automotive manufacturers, foreign ownership in industry clusters, national competitive advantage in general and national competitive advantage for Sweden, industry competition, the Swedish pharmaceutical cluster and Swedish pharmaceutical companies.

2.7 Case studies
A case study is an extensive examination of a single instance of a phenomenon of interest and is an example of a phenomenological methodology (Collis and Hussey, 2003). According to Yin (1994) case studies are the preferred strategy when “how” and “why” questions are being posed, when the investigator has little control over events and when the focus is on contemporary phenomenon with some real-life context.

In this thesis the focus is on the Swedish automotive cluster and on the manufacturers Volvo Cars, Saab, the Volvo Group and Scania. For this reason this thesis includes information about the Swedish automotive manufacturers in a condensed way, both historically and regarding the current situation.

For this thesis it has been relevant to compare the development of the Swedish automotive cluster with another important Swedish industry cluster. In order to compare and contrast the Swedish pharmaceutical cluster is presented as a case study. The development for the pharmaceutical cluster has not been all positive and it is therefore interesting to use as a case study in order to analyze what led to a good cluster development and what did not.

2.8 Selected methodology for the analysis
The main challenges with qualitative data analysis are: reducing the data, structuring the data and detextualizing the data (Collis and Hussey, 2003). When adopting a phenomenological approach the mentioned challenges can e.g. be solved through four steps: comprehending, synthesizing, theorizing and re-contextualizing. The analysis in this study mainly follows these steps. It started with comprehending by acquiring a full understanding of the setting, culture and study topic before the research commenced. Secondly, different themes and
concepts from the research were drawn together into new integrated patterns in order to give an explanation of what is occurring. This was done by creating a research model (see chapter 3.5). Third, selected theories where used to give the qualitative data structure and an application. Fourth, emerging conclusions where generalized and the result put in context with existing theories.

In summary the above steps means that in chapter 3, context of investigation, relevant theories are presented from the general to the specific. Porter’s framework for the competitive advantages of nations (Porter, 1990 and Sölvell et al., 1993) is used to analyze and to draw conclusions about Sweden’s national competitiveness regarding advantages and disadvantages. Theories about agglomeration and clusters (Rosenthal and Strange, 2001; Wennberg and Lindqvist, 2008; Porter, 1998; Porter and Stern 2001; Delgado et al., 2010; BSI, 2010) and cluster dynamism (Sölvell et al., 1993) are used to analyze the Swedish automotive cluster regarding its dynamism. The automotive cluster’s stage of development is analyzed using theories about cluster development (Enright, 2003).

Finally the analysis includes the possible effects of foreign ownership on the Swedish automotive cluster. Theories about foreign ownership in industry clusters (Birkinshaw, 2000; Enright, 2000) together with data from Runnbeck (2009) and Eliasson et al. (2003) are used to do this analysis. To contrast and compare, it is also analyzed how foreign acquisitions have impacted the Swedish pharmaceutical cluster (Bergstrand, 2008; Eliasson, 2003). Figure 3 shows the selected methodologies for the analysis.

![Figure 3 Selected methodologies for the analysis](image)

### 2.9 Reliability and validity

Reliability is concerned with the findings of the research (Collis and Hussey, 2003). It is the extent to which data collection techniques will yield consistent findings, give similar observations or reach the same conclusions by another researcher (Saunders et al., 2007). The findings of this research are qualitative and as such it can be discussed if similar observations and interpretations would have been made by different observers. As the research approach in this study is mostly phenomenological it also means that the researcher’s opinion and experience has an impact on the research results. E.g. the obtained results has been derived by the researcher based on the researcher’s interpretation of the qualitative data, decision about which research method to use and which quantitative data to select to back up the findings. As such this study is subjective and it is not certain that another observer would have reached the
same conclusions. The quantitative data used for this study is considered reliable as the data is mostly facts such as number of employees, number of patents, etc. The data has been extracted from trustworthy sources such as companies’ annual reports and patent organizations’ statistics.

Validity is the extent to which the research findings accurately represent what is really happening in the situation (Collis and Hussey, 2003) or the extent to which research findings are really about what they claim to be about (Saunders et al., 2007). A phenomenological paradigm is directed at capturing the essence of the occurrence and extracting data which is rich in explanation and analysis. Hence, validity is usually high in a research under a phenomenological paradigm. This study, being mainly a phenomenological study, is rich in explanation and analysis. Hence, the validity of the findings and conclusions are thought to be high.
3 Theoretical framework

The theoretical framework presented below is intended to give a theoretical context and a basis for the analysis of how the Swedish automotive industry is likely to be affected by the recent changes that has taken place in the industry.

The text below starts with presenting general theories for industry analysis such as Porter’s value chain and value system and how a nation’s competitive advantage depends on a set of determinants. The term cluster is then introduced and theories about the characteristics of and the importance of industry clusters are presented. It is also shown how the national diamond acts as an engine of cluster growth and innovation. Further, critical success factors for industry clusters and potential pitfalls for clusters are exemplified. Finally, theories are presented about how foreign ownership can affect an industry cluster.

3.1 The value chain and the value system

This framework is presented in order to introduce the value chain model (see Figure 4) and to give an understanding about what develops competitive advantage and what creates shareholder value (Porter, 2004). This is a generic model with a sequence of activities that are common for most firms. The activities are divided into primary and support activities. Primary activities are: inbound logistics, operations, outbound logistics, marketing and sales and service. Support activities are: firm infrastructure, human resource management, technology development and procurement. The goal of the activities is to offer the customers value that exceeds the cost of the activities and thereby resulting in a profit margin.

![Figure 4 The value chain (Porter, 2004)](image)

The firm can then create competitive advantages as cost advantages or differentiation advantages. Ten cost drivers related to value chain activities has been identified (Porter, 2004) and by controlling these drivers better than competitors a cost advantage can be developed. These cost drivers are:

- economies of scale,
- learning,
- capacity utilization,
- linkages among activities,
- interrelationship among business units,
• degree of vertical integration,
• timing of market entry,
• firm’s policy of cost or differentiation,
• geographic location,
• institutional factors (regulation, union activity, taxes, etc.).
A cost advantage can also be created by reconfiguring the value chain. Examples of structural changes are new production processes or new distribution channels.

To create a differentiation advantage either individual value chain activities can be changed to increase uniqueness in the final product or by reconfiguring the value chain. Drivers of uniqueness are:
• policies and decisions,
• linkages among activities,
• timing,
• location,
• interrelationships,
• learning,
• integration,
• scale,
• institutional factors.
Several of these are also cost drivers and there is often a trade off between cost and differentiation advantages.

The value chain activities are interlinked and one value chain activity often affects the cost and performance of another value chain activity. There are linkages between primary activities as well as between primary and support activities.

Linkages do not only connect activities within a firm but also with the activities of its suppliers, channels and buyers (Porter, 1999). This means that a firm’s value chain is part of a larger system, a value system (see Figure 5). This includes the value chains of upstream suppliers and downstream channels and customers. The connections among activities in this vertical system also become essential to competitive advantage. The degree of vertical integration indicates to what extent a company is coordinated with its downstream suppliers or upstream channel partners or customers.

![Figure 5 The value system (Porter, 1999)](image)

Further, Porter (1999) identifies four basic dimensions of competitive scope:
• segment scope, or the range of segments served by the firm,
• industry scope, or the range of industries the firm competes in with a coordinated strategy,
• vertical scope, or what activities are performed by the firm versus suppliers and channels and
• geographic scope, or the geographic regions the firm operates in with a coordinated strategy.
A firm that competes internationally must decide how to spread the activities in the value chain among countries. In international strategy Porter (1999) identifies two key dimensions for how a firm competes internationally. These are configuration and coordination. Configuration refers to where in the world each activity in the value chain is performed, including in how many places. Coordination refers to how like activities performed in different countries are coordinated with each other. The configuration and coordination dimensions lead to a set of choices for each activity for the firm.

Value chain analysis has been a very useful tool for companies in developing competitive advantage. However, it pays little attention to the local competitive advantages or the advantages created from geographically concentrated and interconnected companies, inter-firm cooperation, business associations, etc (Humphrey and Schmitz, 2000). According to Humphrey and Schmitz the value chain approach downplays the role of local innovation systems. Although in a global economy the local innovation systems are part of global companies’ value chains and global value systems.

3.2 A nation’s competitiveness

According to Porter (1990) a nation’s competitiveness depends on the capacity of its industry to innovate and upgrade. Nations succeed in industries where the home environment is the most forward-looking, dynamic and challenging. This means that nations can be successful in selected industries but not in all industries. Further he states that competitors will eventually take over companies that stop improving and innovating. To keep a competitive advantage a company must continuously upgrade it. Porter also provides a theoretical framework “the Diamond of National Advantage” (see Figure 6).

![Figure 6 Determinants of National Competitive Advantage (Porter, 1990)](image)

Porter (1990) argues that certain companies become successful in certain nations because of four attributes: factor conditions, demand conditions, related and supporting industries, and firm strategy, structure and rivalry. These four attributes affect each other.

3.2.1 Factor conditions

Factor conditions are the nation’s position in factors of production, such as skilled labor or infrastructure. Factor conditions will determine the flow of trade. Nations succeed in industries where they are particularly good at factor creation (Porter, 1990).
3.2.2 Demand conditions
Demand conditions are the nature of the home market demand for the industry’s product or service. Nations gain competitive advantage in industries where home demand gives their companies a clearer or earlier picture of emerging buyer needs and where demanding buyers pressure companies to innovate faster. The size is less important than the character of home demand (Porter, 1990).

3.2.3 Related and supporting industries
Related and supporting industries involve the presence or absence in the nation of supplier industries and other related industries that are internationally competitive (Porter, 1990).

3.2.4 Firm strategy, structure and rivalry
Firm strategy, structure and rivalry involve conditions in the nations governing, how companies are created, organized and managed. The presence of strong local rivals is a powerful stimulus to the creation and persistence of competitive advantage (Porter, 1990).

It is the responsibility of the companies to achieve and sustain a competitive advantage and it requires efforts such as: creating a pressure for innovation, seeking out the most capable competitors as motivators, establishing early warning signals that can be transformed into early-mover advantages, improving the national diamond by taking an active role in the creation of the cluster in the home nation, welcoming domestic rivalry, selectively tapping into sources of advantage in other nations’ diamonds, selectively use alliances, and locating the home base to support competitive advantage.

In Porter’s “Clusters and the new economics of competition” (1998) he goes further into the importance of geographic location. As industries compete in more and more global environments and outsourcing is common everywhere, Porter discusses how location still remains central to competition. He argues that competitive advantage depends increasingly in local things such as knowledge, relationships, and motivation which distant rivals cannot replicate. This affect competition in three ways: it increases the productivity of companies based in the area, it drives the direction and pace of innovation and it stimulates the formation of new businesses within the cluster. The advantages that the companies within the cluster have are difficult to tap from a distance.

Also Enright (2000) supports the importance of geographic location. According to Enright the geographic or location-specific sources of competitive advantage will become more important. This is a paradox as the economy on the other hand becomes more and more globalized. As globalization can result in a geographic spread of economic activities over space, it can allow firms and locations with specific competitive advantages to exploit these advantages over even wider geographic areas (Enright, 2003). This means that globalization and localization tendencies will determine whether a given place will benefit or suffer and this is therefore very important to a region’s economic well being.

The micro foundations for agglomeration are identified to be: knowledge spillovers, labor market pooling, and input sharing. Rosenthal and Strange (2001) performed a study that showed evidence for all three of these localization economies. The evidence was strongest for labor market pooling which had a positive impact on agglomeration on all levels of geography. Knowledge spillovers impacted agglomeration on a highly localized level or small geographical level, “zip-code” level. Input sharing had an effect at “state level” but had little effect on agglomeration at lower levels of geography.
When looking at two well known clusters, the automotive cluster in Detroit and the semiconductor cluster in Silicon Valley it has been suggested that the organizational reproduction and heredity were the primary forces underlying the clustering of these industries (Klepper, 2009). This means that there was an early leading exemplary performer which in turn influenced the rate at which employees left to form spin-offs. Both Detroit and Silicon Valley had an early exemplary performer that got the spinoff process going in their regions. As the spin-offs did not localize far from their geographic origins this lead to a build-up of superior firms in Detroit and Silicon Valley.

3.3 Industry clusters and their importance

Porter defines clusters as “geographic concentrations of interconnected companies and institutions in a particular field” and “critical masses in one place of linked industries and institutions--from suppliers to universities to government agencies--that enjoy unusual competitive success in a particular field” (Porter, 1998). Today, there is a clear trend indicating the growth of industrial networks as innovation and economic growth is often situated within a unique combination of firms tied together by knowledge and production flows (The World Bank Group, 2010). Clusters represent a new and complementary way of understanding an economy (Porter, 2000)

The term cluster differs from a segment or an industry. A segment generally describes a large part of the economy while an industry generally describes a more specific group of companies or businesses. By using this traditional approach important interconnections and knowledge flows within a network of production is not always taken into account (The World Bank Group, 2010). Cluster analysis offers an alternative to the traditional approach and is more in line with the changing competitive environment in today’s market-based innovation systems. According to Sölvell et al. (2003), clusters consist of co-located and linked industries, governments, academia, finance and institutions for collaboration (see Figure 7).

![Figure 7 Five sets of actors composing a cluster (Sölvell et al., 2003)](image)

A dynamic cluster is typically characterized by (Sölvell et al., 2003):

- intense local rivalry,
- dynamic competition emanating from the entry of new firms including spin-offs,
- intense cooperation organized through various institutions for collaboration,
- access to increasingly specialized and advanced factors of production and sometimes linkages with universities and research institutes,
- linkages to related industries, sharing pools of talent and technological advancements,
- proximity to sophisticated and demanding buyers.
Further according to Sölvell et al. (2003) it is well established that firms active in strong clusters and regions with strong clusters perform better. Important is also that clusters offer a fertile ground for innovation and upgrading of competitive advantage by firms. This is also supported by Delgado et al. who have evaluated the role of regional cluster composition in the economic performance in industries, clusters and regions (Delgado et al., 2010a). They found that there is significant evidence for cluster-driven agglomeration and that industries participating in strong clusters register higher employment growth as well as higher growth of wages, number of establishments and patenting. Cluster growth increase with the strength of related clusters in the region and with the strength of similar clusters in adjacent regions. In addition, they also found that new industries emerge where there is a strong cluster environment. These strong clusters also contribute to start-up firm survival (Delgado et al., 2010b) and they are also associated with the formation of new establishments of existing firms.

Innovation and the commercialization of new technologies take place much more frequently in industry clusters (Porter and Stern, 2001). Clusters provide both the need for and the opportunity for innovation. It also provides the possibility to rapidly turn new ideas into reality by e.g. sourcing new components, services, machinery, etc as local suppliers and partners are nearby. Also Wennberg and Lindqvist (2008) points out that entrepreneurship is known to be enhanced in regions with strong clusters. Entrepreneurial firms are attracted to clusters by the pool of skilled and trained labor, access to risk capital, favorable demand conditions, reduced transaction costs and motivational factors such as prestige and priorities. Firms located in strong clusters create more jobs, higher tax payments and higher wages to employees.

Globalization and the easy of transportation and communication have lead to outsourcing and relocation of many facilities to low cost countries. This have in turn lead to that any-thing that can be sourced from a distance has been obsolete as a competitive advantage in advanced economies. Global sourcing can mitigate disadvantages but it can not create advantages. Hence, it is still within the local cluster that the most enduring competitive advantages can be created (Porter, 2000).

According to Porter and Stern (2001) the competitiveness of a cluster and its innovativeness depends on the quality of the diamond in the country. Further, a strong innovative environment within national clusters is the foundation for global competitive advantages in many fields. Hence, the development and upgrading of clusters is an important agenda for governments, companies, and other institutions. This can also be seen as cluster initiatives have become a central feature in improving growth and competitiveness of clusters (Sölvell et al., 2003). Cluster initiatives are defined as “organized efforts to increase growth and competitiveness of clusters within a region, involving cluster firms, government and/or research community” (Sölvell et al. 2003). The national environment in which firms emerge and develop consists of three levels: the cluster, the microeconomic business environment and the general business environment.

Sölvell et al. (2003) presents “the Funnel Model” (see Figure 8) where the general business environment consists of the national legacy and culture, the geographical position, general institutions and legal framework and the macroeconomic environment. The general business environment imposes almost deterministic forces from history, geographical position and culture and it is influenced by macroeconomic policy. The microeconomic business environment is Porter’s “diamond” with factor conditions, demand conditions, related and
supporting industries and firm strategy, structure and rivalry. According to Sölvell et al. (2003) dynamic diamonds acts as engines of cluster growth and innovation. Microeconomic policies, including cluster initiatives, influence the “diamond” and the clusters as does company strategies and entrepreneurial activities. The main objectives of cluster initiatives are in the areas: research and networking, policy action, commercial cooperation, education and training, innovation and technology and cluster expansion.

Enright (2003) provides a set of dimensions along which clusters can be understood and their potential and problems evaluated. These are:

- Geographic scope – the territorial extent of the firms, customers, suppliers, support services and institutions that are embedded in the ongoing relationships and interdependent activities that characterize the cluster.
- Density – the number of and the economic weight of the firms in the cluster.
- Breadth – the range of horizontally related industries within the cluster
- Depth - the range of vertically related industries within the cluster
- Activity base – the number and nature of the activities in the value chain that are performed within the region
- Geographic span of sales – an indication of the reach of the cluster
- Strength of competitive position – from world-leading to leading within a national region and with strong to weak competitors
- Stage of development – clusters can be embryonic, emerging or mature and the cluster can be growing, stagnating or declining.
- Technological activities – clusters can be technology generators, technology adapters or technology users
- Innovative capacity – the ability of the cluster to generate the key innovations that are relevant to competitive advantage in the industries in question
- Ownership structure – whether the cluster largely consists of locally owned firms, foreign owned firms or some combination of the two.

Clusters can also be characterized by the stage of their development (Enright, 2003).

- Working cluster - A well developed cluster in which there is a critical mass of local knowledge, expertise, personnel and resources which create agglomeration economies that are used by firms to their advantage in competing with those outside the cluster.
• Latent cluster - Cluster with a critical mass of firms but with a low level of interaction and information flow due to lack of trust, low co-operation and high transaction costs which hamper the cluster from the benefits of co-location.

• Potential cluster – Cluster that has some key elements in place but where these need to be deepened and broadened to benefit from agglomeration.

• Policy driven cluster – Cluster chosen by government for support but which lacks a critical mass or favorable conditions for organic development.

• “Wishful thinking” clusters – policy driven clusters that lacks critical mass and any other particular source of advantage that might promote organic development.

This characterization can be useful for cluster promotion policies. For working clusters it can e.g. be important to help them further penetrate export markets, for latent clusters it can be important to help them reach a level of self-realization and inter-firm linkages, for potential clusters it can be important to help them attract a sufficient critical mass to become a working cluster.

3.3.1 Critical factors for successful cluster development

Critical factors for successful cluster development have been suggested to be: the presence of networks and partnerships, a strong skills base, innovation and R&D capacity (BSI, 2010). Successful clusters tend to have strongly embedded networks and relationship systems. These networks generate formal and informal flows of knowledge and information that binds a successful cluster over time and creates a “knowledge community”. The presence of a strong skills base is a key factor in attracting and retaining companies as well as a key factor in successfully develop companies within the cluster. This means that the quality and the quantity of the available labor force is a critical component in the development of successful clusters. Finally, the innovation and R&D capacity is critical as innovations keep the cluster at the forefront of the market and a strong R&D base can provide ideas and products for future development. Successful clusters are inherently innovative and it is important to support the innovation process through encouraging networking and sharing of ideas.

3.3.2 Failure modes of regional clusters

There are five basic failure mechanisms for industry clusters (Enright, 2003). These are:

• Falling demand for a cluster’s products – e.g. as products become obsolete this will affect the cluster as a whole.

• Organizational obsolescence – e.g. when mass production replaced artisan production.

• Competition from similar clusters – when a regional cluster is displaced by a more competitive cluster elsewhere.

• Loss of the ability to coordinate activities – loss of cooperative relationships and information flow within the cluster.

• Loss of internal dynamism through ossification – when the same forces that promote cluster formation sometimes prevent firms from reacting to stimulus from outside clusters.

3.4 Foreign ownership in industry clusters

Birkinshaw (2000) has investigated the characteristics of foreign subsidiaries in industry clusters. Interesting here is that subsidiaries in leading-edge clusters will over time develop characteristics that mirror the characteristics of other firms in those clusters. This means that in order for the foreign subsidiary to realize the benefits they have to become fully-fledged "insiders". This also indicates that foreign owned subsidiaries in leading-edge industry
clusters will have greater decision making autonomy than those in other industry sectors. Further, these subsidiaries also have a more international market scope.

The Invest in Sweden Agency, ISA, has published a report about the effects of foreign ownership in Swedish industries (Eliasson et al., 2003). The report concludes that during the down turn in the Swedish economy around 2001, foreign owned companies were not more likely to cut down on their Swedish operations than were Swedish owned companies but rather the opposite that foreign ownership has sometimes “saved” Swedish production from being shut down. The reasons for this have often been that Swedish competence and resources have not been enough. ISA believes that there in the future need to be a better mix of Swedish ownership and foreign ownership in Swedish industry and that this is a must in order to commercially develop Swedish technology and innovations. This is not an isolated development in Sweden as all successful industrial nations become more and more globalised. Between 1990 and 2007 foreign investments in Sweden increased from 5.2% of GDP to 56.0% of GDP (see Appendix 8.2). This can be compared with the European average for foreign investments which increased from 10.6% to 40.9% of GDP between 1990 and 2007. This also means that about 600 000 or a quarter of the Swedish employees are working for foreign companies (Runnbeck, 2009).

Birkinshaw (2000) points out that there is a concern about the role that multinational corporations play in the evolution of clusters as the process of globalization has meant that clusters have increasingly significant levels of foreign ownership. Some industry clusters such as e.g. in Singapore and Ireland have emerged in large part through foreign investment while others such as e.g. Detroit and Hollywood were domestically owned and are now facing increasing levels of foreign ownership. Birkinshaw presents three different approaches/views of foreign ownership in industry clusters. The first one is the belief that foreign ownership is bad for cluster upgrading as foreign subsidiaries tend to be less deeply embedded in the local economy and more prone to move than indigenous firms. The second view is that foreign ownership is a sign of good health in a leading-edge cluster as it signals that foreign multinational corporations want to tap into the leading-edge cluster. The third and final view is more neutral and holds the perspective that foreign ownership is irrelevant for the cluster. To bring these views together, Birkinshaw, adds the aspect of maturity, or the life-cycle stage, of the industry and the dynamism of the cluster.

As mature industries are usually in a state of consolidation it is natural to make choices among industry clusters e.g. when locating R&D units or head offices. There is a shake out of firms and also a shake out among the different industry clusters. Under these conditions Birkinshaw believes that foreign investments are in general positive as this is a sign that the cluster in question is attractive. However, it can have negative implications if the acquiring firm divests or closes important activities.

For high-growth industries it is different and high levels of investment mean that many clusters emerge and can thrive while the industry is growing. The foreign investments are positive in the short term as jobs are created in a high growth sector. In the medium term it is more complex as the firms that make up the cluster are usually weakly embedded in the local business environment which creates a “fragile” cluster.

Also the dynamism of the cluster is an important aspect in understanding the role of foreign investments. In mature industries the relative dynamism of clusters is well understood and investments flow toward more dynamic clusters. In high-growth industries the relative
dynamism is less understood and there are struggles for position among clusters. There are four generic cluster types when industry life-cycle and cluster dynamism is considered together (see Figure 9).

![Figure 9 Cluster types defined by dynamism and industry life-cycle stage (Birkinshaw, 2000)](image)

Clusters in the top right quadrant will benefit from foreign investment as it is a sign of confidence in the cluster. Also the foreign investment has little impact on the cluster dynamics in mature industries. Clusters in the bottom right quadrant can benefit from foreign investments if the investment results in technology transfer and access to the investing company’s global market presence. However it can have a negative effect if the foreign ownership leads to consolidation and closure of the acquired firm.

For clusters in the top left quadrant such as e.g. Silicon Valley, foreign investment is wholly positive. For clusters in the bottom left quadrant foreign investment is mostly positive but it depends in the quality of the investment as clusters in this quadrant are fragile and likely to suffer when they enter the phase of consolidation.

Clusters attract foreign investments more than other locations (Enright, 2003). Enright (2000) refers to four general types of foreign direct investments: natural-resource seeking, market seeking, efficiency seeking and strategic-asset seeking. Natural-resource seeking and market seeking is obvious. The efficiency seeking means that the company tries to rationalize the structure of its market-seeking and resource-seeking investments by exploiting economies of scope, scale or risk reduction. The strategic-asset seeking means that firms invest abroad to obtain access to the specific assets of other companies through acquisitions or joint ventures.

Further Enright (2000) identifies four different roles that a subsidiary placed into a foreign cluster might play for a multinational corporation. First they can be “listening posts” in order to gather information and knowledge. Second, they can be stand alone corporate portfolio investments, e.g. a corporation’s centre for a particular business. Third, they can be a subsidiary that supply products and activities from a particular cluster and which are then put through the company’s existing distribution system. Fourth, subsidiaries can be used to transfer skills and capabilities from the cluster to the rest of the company. This would provide the most benefits to the multinational corporation but is also the most difficult as these mechanisms are embedded in the cluster. Finally, Enright states that foreign firms can be the dominant force in a vibrant, knowledge-intensive cluster.
3.5 Summary of theories used for the analysis

The theories presented in this chapter goes from general theories for industry analysis to more specific theories that will be relevant for the analysis and the research question “How will the Swedish automotive cluster be affected by foreign acquisitions at the end of the value chain?”.

Figure 10 shows the research model that has been created based on the theoretical framework in this chapter.

![Figure 10 Selected research model]

The first step is to analyze the Swedish national diamond regarding its advantages and disadvantages. This is based on Porter’s framework for the competitive advantages of nations, which is used to analyze and to draw conclusions about Sweden’s national competitiveness (Porter, 1990 and Sölvell et al., 1993). Porter (1990) argues that certain companies become successful in certain nations because of four attributes: factor conditions, demand conditions, related and supporting industries, and firm strategy, structure and rivalry. This is relevant to this research as the national diamond can be a good engine for cluster growth and innovation as shown in the Funnel model (Sölvell, 2003). This means that the national diamond and its advantages and disadvantages affect the dynamism of the Swedish automotive cluster and the development stage of the Swedish automotive cluster.

The second step is to analyze the dynamism of the Swedish automotive cluster using a set of six characteristics for a dynamic cluster (Sölvell, 2003). These characteristics are: intense local rivalry, dynamic competition emanating from the entry of new firms including spin-offs, intense cooperation organized through various institutions for collaboration, access to increasingly specialized and advanced factors of production and sometimes linkages with universities and research institutes, linkages to related industries, sharing pools of talent and technological advancements and proximity to sophisticated and demanding buyers. To be able to evaluate these six characteristics, also the theories about clusters and agglomeration, as presented in this chapter, are relevant (Rosenthal and Strange, 2001; Wennberg and Lindqvist, 2008; Porter, 1998; Porter and Stern 2001; Delgado et al., 2010; BSI, 2010).

Third, the life-cycle stage of the Swedish automotive cluster is a part of the selected research model and to analyze this, theories about cluster development are used. The cluster will be analyzed regarding if it is a working cluster, latent cluster, potential cluster, policy driven cluster or a “wishful thinking” cluster (Enright, 2003). It will also be analyzed if the cluster is embryonic, emerging or mature in combination with growing, stagnating or declining.
The fourth step is to combine the cluster dynamism and the cluster life-cycle stage as presented by Birkinshaw (2000) in the matrix “cluster types defined by dynamism and industry life-cycle stage”. This framework gives four generic cluster types when industry life-cycle and cluster dynamism is considered together. Based on this framework, the fifth step is to analyze how foreign acquisitions at the end of the value chain will affect the Swedish automotive cluster. Theories about foreign ownership in industry clusters are used for this final part of the analysis.
4 Empirical findings

This chapter includes Sweden’s national diamond and an overview of the Swedish automotive manufacturers: the Volvo Group, Volvo Cars, Scania and Saab. Their history is briefly presented and the Swedish automotive cluster is described. To use as a comparison the pharmaceutical/medical cluster in Sweden and the major changes that have taken place with Pharmacia and Astra are described as a case study.

4.1 Sweden’s national diamond

For being a small nation, Sweden has a high number of large, global companies (Porter, 1990). Most of the top industries in Sweden are natural resource-related or machinery and mechanical industries that co-exists with the natural resource-related industries. Consumer goods industries are almost abundant but there are exceptions such as e.g. IKEA.

Porter (1990) identified Sweden’s top five clusters to be transportation and logistics, forest-related industries, ferrous metals and fabricated metal product, health-related products and telecommunications. Sweden’s position in transportation and related machinery is connected to the demanding needs from the mining/metals and forest products industries.

4.1.1 Swedish factor conditions

Sweden’s economy has its roots in its natural resources with extensive forests, iron ore and hydroelectric power (Porter, 1990). However, Sweden has been unique in its ability to upgrade and to create advanced and specialized factors of production that has been a sustainable base for competitive advantage (Sölvell et al., 1993). One important area has been its human resource conditions with solidarity wages, a high level of education especially in engineering, a common language, religion and a common school curriculum (Porter, 1990). Further Sweden has invested heavily in R&D and has a strong international outlook.

Selective factor disadvantages such as e.g. high wages have encouraged industry automation. Further, the cold climate has lead to sophisticated energy conservation and the long distances in Sweden have lead to advanced transports and logistics solutions. Also Sweden’s distance from market has driven foreign direct investments.

4.1.2 Swedish demand conditions

Swedish buyers of industrial products are demanding (Porter, 1990). Again the long distances within the country and to outside markets, have driven sophisticated transportation solutions. The harsh climate and rugged geography has lead to very tough conditions from the mining industry and e.g. the transportation and rock drilling industries have had to respond with advanced solutions. Hauling heavy timber loads long distance in a harsh climate with far apart service stations has driven the development of heavy trucks with durability and quality (Sölvell et al., 1993). Sophisticated heavy vehicles have been the basis for international expansion for both Volvo and Scania.

Further the attitudes and culture in Sweden has also put forward demands such as e.g. safety and concern for the environment. This is e.g. the reason why safety has already from the start been a core value for Volvo. On the contrary Sweden’s high value added taxes and high income taxes restrains the demand conditions for consumer goods and personal services and this is also a reason for why Sweden lags behind in these areas.
4.1.3 Related and supporting industries
In Sweden there are many supporting and related industries and several Swedish industries have emerged from a down stream industry or from an upstream industry (Porter, 1990). E.g. a strong position in hard metals was developed in response to the demanding metalworking and mining industries. Another example is Volvo which was originally a spin-off from SKF. Swedish industries are known to have close collaboration between suppliers, buyers and related industries. One reason is the ownership links among the Swedish companies (Sölvell et al., 1993). Swedish industries are also good at cooperating abroad. In the Swedish industry clusters other important players are the universities, private research institutions and government organizations.

4.1.4 Firm strategy, structure and rivalry
Swedish companies compete well in complex, technically sophisticated industries with extensive networks and subsidiaries (Porter, 1990). Leaders in Swedish organizations are non directive, communication is open and employees committed. Further Swedish companies are very open to internationalization and Swedish neutrality and the tradition of travelling has played a role.

Historically the public capital markets have not had a great impact and capital has been invested for sustained periods. Now more and more companies have foreign shareholders.

Sweden has a competitive advantage in that it has many related industries and domestic rivalry. E.g. Volvo Cars and Saab and Volvo Trucks and Scania have been fierce competitors. Although in some industries there is but one significant Swedish industry as e.g. mergers have lead to domestic monopolies. Swedes are used to cooperate instead of compete and this is an advantage in vertical relations and interactions with related industries but can eliminate the competition necessary to drive innovation. However, Sweden is a very open market and exposed to imports and Swedish companies have a high degree of foreign direct investments. This means that the Swedish domestic competitive climate is mixed and Sweden does well in large multinational industries but has a problem with entrepreneurship and developing new companies.

The government has a supportive role of Swedish industry in e.g. taxation and diplomatic assistance. There is an extensive regulation of industry, such as e.g. engine emissions for trucks, and this has set high industry standards. Also government procurements have played a constructive role. However the government is focused on large corporations and small companies gain little attention.

To keep the Swedish national diamond dynamic Sölvell et al. (1993) mentions some important company strategies. It is necessary for the Swedish multinationals to keep investing in the Swedish home base and to play an active role in creating a cluster of suppliers, buyers and channels and to help them upgrade and stay competitive. The sophisticated domestic demand is crucial as are the domestic rivalry. In addition Swedish multinationals should continue to increase and deepen involvement in foreign clusters in order to keep the competitive advantage.

In 2006 Sweden had the highest gross domestic expenditure rate on R&D (3.7%) as a percent of GDP of all countries within the EU (Eurostat, 2010). In 2007 Sweden had 298.36 number of patent applications per million inhabitants to the European Patent Office (Eurostat, 2010). This can be compare with the average number of patent applications per million inhabitants
within EU which at the same time was 116,54. Sweden was at the same level as Germany. If looking at the number of patent applications per million inhabitants as granted by the United States Patent and Trademark Office, USPTO, in 2004 Sweden and the EU were far behind the US, Japan and South Korea. Sweden was only granted 56,76 number of patent applications per million inhabitants while the US was granted 273,81 number of patent applications per million inhabitants. The EU average was 32,27 number of patent applications per million inhabitants.

4.2 Foreign investments in Sweden
In Sweden over 600 000 people are employed by foreign owned companies (Runnbeck, 2009). This corresponds to about a quarter of all employees within the private sector. Further, foreign investments make up over a third of all R&D investments. The foreign investors bring capital, new technologies, marketing channels and new competence through foreign managers, experts and researchers. In 2007 the foreign ownership in terms of percent of GDP was 56,0%. At the same time Sweden’s foreign direct investments augmented to 67,8% of GDP. As a comparison the average percentage of foreign direct investments in Europe were 40,9% (see Figure 11).

![Figure 11 Foreign investments in Sweden and Swedish foreign investments as a percent of GDP (Runnbeck, 2009)](image)

4.3 The automotive manufacturers in Sweden and their history
Sweden has two of the world’s leading manufacturers of heavy duty vehicles, the Volvo Group and Scania. Further Sweden has two passenger car manufacturers, Volvo Cars and Saab. This is unique in an international perspective for such as small country as Sweden. In addition Sweden also has relatively many international operative suppliers.

Figure 12 shows the number of vehicles globally produced by the Swedish automotive manufacturers between 1980 and 2008 (Heper, 2010).
Figure 12 Swedish automakers’ global production in number of vehicles. Note that Volvo Truck’s production also includes Mack and Renault Trucks from 2001, Nissan Diesel from 2007 and Eicher from 2008 (Heper, 2010).

Figure 13 shows the share of the Swedish automotive manufacturers’ global manufacturing in Sweden. E.g. in 2008 about 12% of the trucks were manufactured in Sweden while over 50% of the passenger cars were manufactured in Sweden.

Figure 13 Share of the Swedish automakers’ global manufacturing in Sweden. Note that also trucks manufactured by Mack and Renault are included from 2001, Nissan Diesel from 2007 and Eicher from 2008 as these are owned by the Volvo Group (Heper, 2010).

The Swedish automotive manufacturers and their history are described in brief below.

4.3.1 The Volvo Group

After Volvo Cars was sold the Volvo group’s focus is on commercial transport solutions and the group provides trucks, buses, construction equipment, drive systems for marine and industrial applications as well as aircraft engine components (AB Volvo, 2010). Volvo’s strategy is based on customers’ requirements and is focused on profitable growth, product renewal and internal efficiency. During 1998-2008 Volvo has grown through acquisitions and now the strategic focus is shifted towards product renewal and internal efficiency. Volvo’s brands consist of Volvo, Renault Trucks, Mack, UD Trucks (former Nissan Diesel), Prevost (North American coach manufacturer) and Nova (North American transit bus manufacturer). Further, through partly-owned companies and joint-ventures, the Volvo Group also sells
Lingong's brand SDLG (construction equipment mainly in China), Eicher (trucks and buses mainly in India) and Sunwin and Silver (buses in China).

Volvo’s head office is in Gothenburg, Sweden and Volvo operates in about 180 countries mainly in Europe, Asia and North America. Volvo’s core values are safety, quality and the environment.

The Volvo group has more than 90,000 employees world wide and Volvo has manufacturing facilities in 19 countries. The average number of employees in Sweden during 2009 was about 23,800 (AB Volvo, 2010). Volvo’s largest owners are Renault who has about 20% of the capital and the votes and Industrivärden who has about 4% of the capital and 10% of the votes. Volvo’s net sales for 2009 augmented to 218 billion SEK and the operating income to a negative of 17 billion SEK (a loss).

4.3.2 Volvo Cars

Volvo Cars’ provides passenger cars such as SUV’s, sedans, station wagons and coupes. Volvo Cars’ goal is to achieve sustainable profitability. Volvo Cars is as a company positioned in the premium segment and their main differentiators are safety, environmental care and modern design. The head office is located in Gothenburg, Sweden as are the main units for product development and design. Volvo Cars has sales in about 100 markets whereof USA, Sweden, Great Britain, Germany and China are the largest markets. The production facilities are located in Sweden, Belgium, China and Malaysia (Volvo Car Corporation, 2010). The main suppliers are located in Sweden, Germany, Belgium, France and Great Britain.

Volvo Cars is owned by Zhejiang Geely Holding Group since August 2010 and was before that owned by Ford Motor company since 1999. The sales in 2009 was about 335,000 units and revenue for 2009 was about 12,4 billion USD. Volvo Cars employs about 20,000 people world wide and the average number of employees in Sweden during 2009 was about 13,900 (Volvo Car Corporation, 2010).

4.3.3 The history of Volvo in brief

In 1927, Volvo was started by Assar Gabrielsson and Gustaf Larson as a spin-off firm from the bearing manufacturer SKF (Sölvell et al., 1993). The first car was produced in 1927 and the year after in 1928, the first truck was produced. In the 1930’s Volvo started to export trucks to Europe. Safety was already from the start an important company value. Marine Engines, Pentaverken, which were founded in 1907, were acquired by Volvo in 1935. The first bus was launched in 1934 and aircraft engines were introduced in the beginning of the 1940’s. Volvo started production in 1964 at the Torslanda plant, Sweden and in 1965 in Ghent, Belgium.

In 1980 Volvo bought a portion of White (US trucks) which was located in Greensboro, NC and with plants in Virginia, Ohio and Utah. In 1986 General Motors heavy duty trucks where added to Volvo White and Volvo WhiteGMC was created. In 1997 the name was discontinued and only Volvo or Autocar was used.

In 1999 after deciding that the Volvo group should focus on commercial vehicles, Volvo decided to sell the car business to Ford Motor Company. Volvo also tried to take over Scania but this was not improved by the European commission and Volvo had to divest its shares over a period of time (Eliasson et al., 2003).
In 2001 Renault trucks and Mack trucks were purchased and by that Volvo became the largest heavy truck manufacturer in Europe (Eliasson et al., 2003). In 2006 and 2007 Volvo acquired the Japanese truck manufacturer Nissan Diesel. Also Ingersoll Rand’s road development division was purchased in 2007 (AB Volvo, 2010).

4.3.4 Scania

Scania’s focus is on heavy commercial vehicles for transporting goods and people by road and their strategy is profitable growth. Scania delivers trucks, buses, engines and services. Scania’s head office and technical center is located in Södertälje, Sweden and Scania operates in about 100 countries in Europe, Latin America, Asia, Africa and Australia. Scania has about 34 000 employees worldwide and Scania’s manufacturing facilities are located in Europe and South America. The average number of employees in Sweden during 2009 was about 12 400 (Scania, 2010).

Scania’s largest owners are Volkswagen with about 70% of the votes and MAN with about 17% of the votes, as per Sept 30 2010 (Scania group, 2010). Scania’s net sales for 2009 augmented to 62 billion SEK and the net income to 1,1 billion SEK (Scania, 2010).

Scania’s core values are: customer first, respect for the individual and quality. Further, Scania is known for its modular product system that with a limited number of main components still allows for customizations and flexibility while keeping down the cost for product development, production and parts management.

4.3.5 The history of Scania in brief

VABIS, Vagnsfabriks-Aktiebolaget i Södertälje, was started by Surahammars Bruks AB in Södertälje in 1891. Their first passenger car and also their first truck was built in 1902. In 1911 VABIS merged with Malmö-based Scania and formed Scania-Vabis AB (Sölvell et al., 1993). The head office was placed in Södertälje. In 1915, Scania-Vabis delivered 151 vehicles whereof 76 cars, 74 trucks and one bus. The early years were not without problems and in 1921 Scania-Vabis were forced into liquidation. A new company was established under the same name and in 1922 Scania-Vabis developed their first buses for the Swedish postal services. During World War II Scania-Vabis produced mainly for the Swedish defense and after the war Scania was well prepared for peacetime production which lead to a competitive advantage relative to foreign competitors (Scania group, 2010).

During the 1950’s Scania-Vabis relied on its brand loyal dealers. However the dealers demanded a broader product range and larger sales volume. As a solution imported general brands were added and one of the two was Volkswagen. Also exports increased immensely during the 1950’s and reached over 50% of sales. During the 1960’s Scania-Vabis expanded by adding production sites in Sweden and abroad in the Netherlands and Brazil.

In 1969 Saab acquired Scania-Vabis and formed Saab-Scania. Both companies were owned by the Wallenberg group. The new Saab-Scania included production of cars, trucks, buses and military aircraft. Scania remained an independent part of the Saab-Scania group and in the late 1980’s Saab was to 50% sold to General Motors due to difficulties in the car division (Sölvell et al., 1993).

In 1996 Scania was introduced on the stock market and in 1999 Volvo AB tried to take over Scania but the European commission did not approve the purchase and Volvo had to divest its
shares. Volvo was looking for scale economies through acquisitions while Scania wanted to grow organically. However, in 2000 Volkswagen purchased 34% of the votes or 18% of the capital. In 2010 Investor sold its shares to Volkswagen who is now the main owner of Scania together with MAN.

4.3.6 Saab

Saab provides passenger cars such as sedans, station wagons and convertibles. Saab is just as Volvo Cars a company positioned in the premium segment and since the beginning Saab has been known for engineering innovations, green technology, safety and turbo charging. The head office is located in Trollhättan, Sweden as are the main units for product development and design. Saab has sales in more than 60 countries whereof USA, United Kingdom, Sweden, Germany and Switzerland are the most important markets. The production facilities are located in Sweden and Austria (Saab, 2010).

Saab is owned by Spyker Cars N.V. since January 2010 and was before that owned by General Motors Company to 50% and Investor to 50% since 1990 and solely by General Motors between 2000 and 2010. Saab’s sales in 2008 was about 93 000 units globally and Saab has not made a profit since 2001 (Reuters, 2009). Saab employed about 3355 people world wide in December 2009 (Saab, 2010).

4.3.7 The history of Saab in brief

Saab was originally founded as an aircraft manufacturer and the name Saab is short for ”Svenska Aeroplan AktieBolag”, that is “Swedish Airplane Corporation” (Swedecar, 2010). In 1938, the Saab factory was built in Trollhättan, Sweden and the focus was on providing the Swedish air force with airplanes for World War II. After the war in 1945 Saab decided to venture outside the airplane manufacturing and started to manufacture cars and civil aircraft (Saab, 2010). The first car was presented in 1947 and it was front wheel driven and aerodynamic shaped (Lucas, 2009).

In 1969 Saab partnered with Scania and formed Saab-Scania. Together they included production of cars, trucks, buses and military aircraft (Sölvell et al., 1993). Saab developed international positions much slower than Volvo and the first foreign production site was started in Finland in 1968. In 2003 the production was moved from Finland to Graz, Austria.

4.4 The Swedish automotive cluster

According to Porter (1990) the largest cluster in Sweden in terms of exports is transport and logistics. This cluster includes passenger cars, trucks, ships, engines, associated machinery, transportation services, products for material handling, welding machines, tools of various sort and robots. The second largest cluster in Sweden (Porter, 1990) is in forest related industries. This cluster includes timber, pulp and paper, papermaking machinery and other related machinery and chemicals connected to pulp and paper.

If looking at some more recent figures from December 2008 for Swedish exports (see Appendix 8.1) machinery, motor vehicles and also chemicals and chemical products are the largest exports. However, it should be noted that these figures are not based on the same clusters as above and can not be compared. E.g. the forest related industry cluster as described by Porter includes pulp and paper, pulp and paper machinery and related chemicals.
Örjan Sölvell et al. (1993) describe the Swedish automotive cluster with cars, trucks and buses as primary goods and specialty inputs, related industries, machinery and buyers as other important parts of the cluster (see Figure 14). Specialty inputs come from suppliers such as SKF, SSAB, Volvo Köping, Volvo Olofström, Trelleborg and Autoliv (Swedish-American). The machine tool industry is an important supporting industry with companies such as ESAB (owned by British Charter International) and ABB Robotics (Headquarter in Switzerland). Also forwarding companies are an important part of the cluster. Examples of forwarding companies in Sweden are Posten Logistik, DHL (Germany) and Schenker (Germany). Related industries are the air and space industry with Volvo Aero and RUAG Space AB (former Saab Space AB), the fork lift industry with e.g. Atlet and the tractor industry with e.g. Volvo CE.

Figure 14 The Swedish Automotive Cluster (Sölvell et al., 1993)

Figure 15 shows how the automotive cluster is geographically spread over Sweden. The quote of specialization (Specialiseringskvot) that is used is a measurement that at the value of 1 indicates that the region has a share of the workforce in a cluster that corresponds to the size of the region. If the value is 2 the region has twice the share as expected within the cluster and if the value is 10 the region is extremely specialized to a certain cluster. The circles also show the number of people employed within the regional cluster (Lindqvist et al., 2002).
Lindqvist et al. (2002) identifies the largest clusters in Sweden to be company services, transport & logistics, research & development, building & construction and metalworking. The automotive cluster is largely specialized to certain regions.

Figure 16 shows the number of employees per Swedish automotive manufacturer in December 2008.

As a comparison in 1997 the Swedish transport industry in total employed 86,862 whereof the automotive vehicle industry employed 47,125 (see Figure 17). In 2007 the Swedish transport industry in total employed 97,645 whereof the automotive vehicle industry employed 50,539. This means that the number of employees in the industry has been increasing.
Figure 17 Number of employees 1997 and 2007 in the Swedish transport industry divided by the automotive vehicle industry and other industries (NUTEK, 2009).

4.5 Comparison with another important industry cluster in Sweden
Sölvell identifies five important clusters in Sweden: IT/telecom, automotive, pharmaceutical/healthcare (life-science), paper/pulp and steel/material (Affärsvärlden, 2000). As in the automotive industry cluster, these industry clusters are also consolidating and have experienced foreign acquisitions. For the subject of this thesis it is relevant to discuss how these Swedish clusters have been affected by foreign acquisitions. It is also interesting to discuss the reasons for these changes, both positive and negative. However, due to the scope and timeframe of this thesis, only the pharmaceutical industry cluster is studied in this thesis. Although, it would have been very relevant to also look at the other important Swedish industry clusters, hence this will be a recommendation for future research.

Below follows a review of the Swedish pharmaceutical/healthcare cluster with its strengths and weaknesses pointed out. Thereafter, follows brief descriptions of Astra and Pharmacia.

4.5.1 The Swedish pharmaceutical/healthcare cluster
The life-science sector is of major economical importance for Sweden in forms of employment, exports and R&D investments (Bergstrand, 2008). In 2006 the pharmaceutical, medical equipment and biotechnology industry in Sweden consisted of 820 companies and about 42 000 employees.

A large part of the sector is foreign owned and by that dependent on foreign companies for investments. Twenty-five years ago Sweden was world leading within the pharmaceutical sector. Today Sweden’s position as international prominent within R&D has been weakened and Sweden has not been able to compete against other countries for new investments of R&D and production. Countries such as Ireland, Canada and Singapore have during the past 15-20 years managed to build powerful life-science sectors which attracts R&D and production investments.

The weaknesses within the Swedish life-science sector are mainly the dependence on one large company, AstraZeneca, and an industry structure with a few large, many small but only a few middle sized companies. There is also a risk of decreased export incomes due to expiring patents in combination with a lack of replacement products. In 2007 Sweden was ranked nr 13 in the share of global biotechnology patents or equivalent to 1,2% of the global biotechnology patents (Bergstrand, 2008).

Table 3 shows the strengths and weaknesses for foreign direct investments in the life-science sector in Sweden (Bergstrand, 2008).
Sweden’s strengths for foreign direct investments

- High quality research is performed in Sweden
- Sweden has a relatively large and diversified life science-sector
- Sweden offers an attractive business environment and is one of the world’s most competitive nations
- Sweden has attracted a few major production investments

Sweden’s weaknesses for foreign direct investments

- No new foreign establishments for R&D or production has been made for 20 years
- Sweden lacks a basic R&D incentive
- Sweden doesn’t provide the same company support as other countries
- Swedish R&D isn’t given as much attention as previously
- Sweden can not show a coordinated governmental effort in bio-technology
- The Swedish life-science sector does not have any increase in employment rates

Table 3 Strengths and weaknesses for foreign direct investments (Bergstrand, 2008)

In the life-science cluster, Astra and Pharmacia have for a long time been the core companies in a strong cluster and they have been closely linked to the public health care system, universities, the government and suppliers. Now with their foreign owners/mergers it is no longer obvious to establish operations and activities in Sweden and Sweden now, as mentioned above, have to compete with other alternatives. For Pharmacia this has lead to the majority of the company now being located outside of Sweden. For Astra it has been different and AstraZeneca has still a strong position in Sweden both in research and development and in manufacturing.

Lindqvist et al. (2002) described the Swedish pharmaceutical and medical equipment cluster in 2002 as shown in Figure 18.

The quote of specialization (Specialiseringskvot) is a measurement that at the value of 1 indicates that the region has a share of the workforce in a cluster that corresponds to the size of the region. If the value is 2 the region has twice the share as expected within the cluster and if the value is 10 the region is extremely specialized to a certain cluster. The circles show the number of people employed within the regional cluster.

Figure 18 Pharmaceutical and medical equipment clusters in Sweden in 2002. (Lindqvist et al., 2002.)
4.5.2 Astra in brief
Astra was founded in 1913 in Södertälje, Sweden. In 1999 Astra merged with its British competitor Zeneca. AstraZeneca’s head office is located in London and the company has about 62 000 employees world wide whereof about 9 650 in Sweden (AstraZeneca, 2010). AstraZeneca has 17 R&D units in 8 countries and 20 manufacturing facilities in 16 countries. In Sweden AstraZeneca has R&D units in Mölndal, Lund and Södertälje and manufacturing facilities in Södertälje. AstraZeneca invests about 12 billion SEK in R&D in Sweden. About 19% of the capital has Swedish ownership.

4.5.3 Pharmacia in brief
Pharmacia was founded in Sweden in 1911 and in 1950 Pharmacia moved to Uppsala to be close to the Uppsala University. In 1995 Pharmacia merged with American Upjohn. Before the merger Pharmacia had operations in 22 countries and about 20 000 employees whereof about 2 500 in Uppsala (Stolt, 2010). In 2003 Pfizer acquired Pharmacia (Pfizer, 2010). Pfizer’s head office is located in New York and they have about 85 000 employees and 70 manufacturing facilities world wide. In Sweden Pfizer have about 600 employees and 1 manufacturing facility. The restructuring of Pharmacia has been the so far severest among the foreign owned companies in Sweden. It is also considered by many to have weakened the Swedish competence within the pharmaceutical cluster even if there is promising examples of “creative destruction” and “spill over”-effects (Eliasson et al., 2003).
5 Analysis

Based on the theories presented in chapter 3 and on the empirical findings in chapter 4 it is relevant to ask the following question: "How is the Swedish automotive cluster likely to be affected by foreign acquisitions at the end of the value chain?".

In order to discuss this research question the analysis will be based on the research model as introduced in chapter 3.5 (see Figure 19). This model consists of the following:

- The Swedish diamond and its role as an “engine” for the Swedish automotive cluster. What are the advantages and what can be the disadvantages.
- The dynamism of the Swedish automotive cluster
- The development stage of the Swedish automotive cluster
- The cluster dynamism and life-cycle stage of the Swedish automotive cluster.
- How foreign acquisitions is likely to affect the Swedish automotive cluster.

![Figure 19 Selected research model as presented in chapter 3](image)

This model is a combination of Porter’s framework “the national diamond” (Porter, 1990), Sölvell’s characteristics for a dynamic cluster as part of the “the funnel model” (Sölvell, 2003) and Enright’s factors for development stage of an industry cluster (Enright, 2003). These separate analyses are then combined and put together using Birkinshaw’s framework which combines cluster dynamism with cluster life-cycle stage and which allows for an evaluation of how foreign acquisitions are likely to influence the cluster (Birkinshaw, 2000).

5.1 Diamond analysis

Table 4 summarizes the advantages and disadvantages found in the Swedish national diamond in terms of factor conditions, demand conditions, related and supporting industries and firm strategy, structure and rivalry.
<table>
<thead>
<tr>
<th>National Diamond determinants</th>
<th>Advantages</th>
<th>Disadvantages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Factor conditions</td>
<td>• Natural resources with extensive forests, iron ore and hydroelectric power</td>
<td>• Relatively high wages</td>
</tr>
<tr>
<td></td>
<td>• Highly skilled workforce and a high level of education e.g. in engineering</td>
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<tr>
<td></td>
<td>• Advanced schools and universities</td>
<td></td>
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<tr>
<td></td>
<td>• Well developed infrastructure</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Heavy investments in R&amp;D</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Strong international outlook</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• High level of industry automation</td>
<td></td>
</tr>
<tr>
<td>Demand conditions</td>
<td>• Demanding buyers of industrial products</td>
<td>• High value added taxes and high income taxes restrains demands for consumer products</td>
</tr>
<tr>
<td></td>
<td>• Long distances and harsh climate demands sophisticated transport solutions</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Safety and environmental concerns</td>
<td></td>
</tr>
<tr>
<td>Related and supporting</td>
<td>• Many related and supporting industries. For the automotive cluster inputs</td>
<td></td>
</tr>
<tr>
<td>industries</td>
<td>from e.g. SKF, SSAB and Autoliv, machine tools from e.g. ABB Robotics,</td>
<td></td>
</tr>
<tr>
<td></td>
<td>forwarding companies such as e.g. DHL and Schenker and related industries</td>
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</tr>
<tr>
<td></td>
<td>such as e.g. Volvo Aero and RUAG.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Close collaboration between suppliers, buyers and related industries</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Interlinked industry ownership</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Close collaboration with universities, private research institutions and</td>
<td></td>
</tr>
<tr>
<td></td>
<td>government organizations</td>
<td></td>
</tr>
<tr>
<td>Firm strategy, structure,</td>
<td>• Complex, technically sophisticated industries with extensive networks and</td>
<td>• A lack of medium sized companies</td>
</tr>
<tr>
<td>structure and rivalry</td>
<td>subsidiaries</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Very internationalized with a high level of foreign investments</td>
<td>• Difficulty to bring new innovations to market</td>
</tr>
<tr>
<td></td>
<td>• High level of foreign ownership</td>
<td>• Sometimes leadership is thought to be “slow” due to too much consensus leadership</td>
</tr>
<tr>
<td></td>
<td>• Domestic rivalry in related</td>
<td>• Some mergers have lead to</td>
</tr>
</tbody>
</table>
National Diamond determinants | Advantages | Disadvantages
--- | --- | ---
industries • Swedish leadership that is non-directing and open communication • The government has a supportive role e.g. with taxation and diplomatic assistance • High industry standards and government regulations | domestic monopolies |  

Table 4 Advantages and disadvantages in the Swedish national diamond

By analyzing Sweden’s national diamond and its advantages and disadvantages (see Table 4) it is clear that the Swedish diamond determinants are mostly positive. This means that the national conditions are favorable for the Swedish automotive cluster and that the national diamond can be considered to be a good “engine” for the cluster (see Figure 20).

![Figure 20 The Funnel Model - The firm and its environment (Sölvell et al., 2003)](image)

As was pointed out in chapter 3 Sweden should continue to invest in the Swedish home base, continue to create a cluster of suppliers, buyers and channels and help them stay competitive and upgrade. The manufacturing industry’s investments in the Swedish automotive industry stood for about 13% in 2008. Further, the domestic demand is very important as is the domestic rivalry. It is also important to deepen the involvement in foreign clusters. In 2007 foreign investments made by Sweden corresponded to 67.8% of GDP.
5.2 The dynamism of the Swedish automotive cluster

In Table 5 the Swedish automotive cluster is discussed along a set of dimensions useful when evaluating the potentials and limitations of a cluster. This is presented for the understanding of the Swedish automotive cluster and for the following analysis of the cluster’s dynamism.

<table>
<thead>
<tr>
<th>Cluster dimension</th>
<th>The Swedish automotive cluster</th>
</tr>
</thead>
<tbody>
<tr>
<td>Geographic scope</td>
<td>The geographic scope of the four automotive manufacturers is extensive. The geographic scope of the truck manufacturers is more wide-spread than the geographic scope of the car manufacturers. The Volvo group has manufacturing facilities in 19 countries and operates in 180 countries. Scania has manufacturing facilities on two continents (Europe and South America) and operates in 100 countries. Volvo Cars has production facilities in 4 countries (in Europe and Asia) and operates in 100 countries. Saab has manufacturing facilities in 2 countries (in Europe) and operates in 60 countries. As car customers are mainly consumers their geographic reach is local while the truck customers can be large fleet owners with a far reaching territory, e.g. across Europe or the US. Also many of the automotive suppliers are global players but there are also local suppliers as there is a variation in size and territorial spread.</td>
</tr>
<tr>
<td>Density</td>
<td>Volvo and Saab manufactured 457 000 cars out of about 53 million cars produced globally in 2008. This corresponded to about 1 % of the world market in 2008. Volvo Trucks and Scania produced 324 000 trucks in 2008 which corresponded to 26 % of the trucks manufactured in Western Europe, US and Japan. For the cluster as a whole it can be concluded that the economic weight of the truck manufacturers are much larger than the economic weight of the car manufacturers.</td>
</tr>
<tr>
<td>Breadth and depth</td>
<td>As shown in chapter 4.4 there are horizontally related industries within the cluster. E.g. there are car, truck and bus manufacturers in the same cluster. There are also many vertically related industries within the cluster. Examples are SKF, ESAB, Autoliv and ABB Robotics.</td>
</tr>
<tr>
<td>Activity base</td>
<td>All companies have local manufacturing facilities within the cluster, hence much of the value chain activities are performed within the region. However, as the automotive manufacturers are global companies they also have a large part of their value chains in other countries e.g. as they have several manufacturing facilities abroad. This is also shown by the number of employees abroad in comparison with the number of employees in Sweden. The Swedish automotive manufacturers have 38% of their employees in Sweden and the rest abroad. However there is a large variation between the car manufacturers and the truck</td>
</tr>
</tbody>
</table>
### Table 5 Description of the Swedish automotive cluster

In some of the above areas the car manufacturers have a weaker position than what the truck manufacturers have. These areas are: geographic scope, density, geographic span of sales and strengths of competitive position. This is important to point out as these areas for the cluster as an entity are somewhat weaker than the strongest company would be individually. However, this thesis analyzes the cluster as a whole.
In chapter 3 a set of characteristics for a dynamic cluster were presented. In Table 6 the automotive cluster is analyzed in relation to these characteristics.

<table>
<thead>
<tr>
<th>Characteristics of a dynamic cluster</th>
<th>The Swedish Automotive cluster</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intense local rivalry</td>
<td>The Swedish automotive cluster is characterized by intense local rivalry as Volvo Cars and Saab has always been fierce competitors as has Volvo Trucks and Scania.</td>
</tr>
<tr>
<td>Dynamic competition emanating from the entry of new firms including spin-offs</td>
<td>Historically the competition emanating from the entry of new firms or from spin-offs has been dynamic. Examples here are companies such as Autoliv who pioneered in 1956 with seatbelt technology and who is know a world leader in automotive safety. However, further investigation to compare if the level of spin-offs and entry of new firms are still at a high level would be interesting as the Swedish automotive industry is a mature industry.</td>
</tr>
<tr>
<td>Intense cooperation organized through various institutions for collaboration</td>
<td>Swedish automotive companies cooperate in various organizations and institutions on different levels. There are e.g. industry organizations for passenger car, truck and bus manufacturers such as BIL Sweden. Further there are several governmental initiated areas were Volvo, Saab and Scania cooperates. An example of this is FFI “Fordonsstrategisk Forskning och Innovation” which is a cooperation between the government and the automotive manufacturers concerning the environment and safety. Swedish companies are also known to cooperate abroad and there are institutions supporting Swedish exports such as e.g. the Swedish Trade Council and institutions supporting regional development and entrepreneurship such as e.g. Tillväxtverket.</td>
</tr>
<tr>
<td>Access to increasingly specialized and advanced factors of production and sometimes linkages with universities and research institutes</td>
<td>Through out the history of the Swedish automotive manufacturers there has been an increase in specialized and advanced factors of production. E.g. ABB has developed highly sophisticated robots used by the automotive manufacturers for automated production. Research that benefits the automotive industry is also performed at the Swedish universities such as e.g. Chalmers and KTH.</td>
</tr>
<tr>
<td>Linkages to related industries, sharing pools of talent and technological advancements</td>
<td>The linkages to related industries are strong and Swedish companies collaborate across the value chain. Where the automotive clusters are developed there are pools of talent as there are many successful companies</td>
</tr>
</tbody>
</table>
Characteristics of a dynamic cluster | The Swedish Automotive cluster
--- | ---

as well as good educational institutions. The automotive manufacturers have also developed through technology advancements. Examples of important innovations are the three point seatbelt and the turbo-charged engine.

Proximity to sophisticated and demanding buyers. | Swedish customers are demanding as e.g. distances are long and the climate cold. In the truck industry the sophisticated demands from e.g. the forest industry (heavy timber haulage) and the mining industry (rough roads and heavy loads) have lead to high quality and durable trucks. Safety and environmental concern is a characteristic of Swedish automotive buyers. Further, Swedish automotive manufacturers, Volvo in particular, were early in internationalizing and investing abroad. This also lead to access to foreign market demand.

Table 6 Dynamism of the Swedish automotive cluster

The Swedish automotive cluster fulfils the characteristics for a dynamic cluster (see Table 6). The only area that could be of concern is the “Dynamic competition emanating from the entry of new firms including spin-offs”. This would need to be further investigated to make any conclusions about the current entry of new firms or spin-offs in the Swedish automotive cluster. This is important as strong clusters are considered to be fertile grounds for innovations and upgrading of the competitive advantage of firms.

However, it can be noted that the Swedish automotive industry stands for about a quarter of all the manufacturing industry’s investments in R&D. In comparing with EU, Sweden has a very high level of investment in R&D. Sweden also has a high level of European patent applications which is in level with Germany, above the EU average.

5.3 The development stage of the Swedish automotive cluster

In chapter 3 five different stages of cluster development was presented: working cluster, latent cluster, potential cluster, policy driven cluster and “wishful thinking” cluster. The Swedish automotive cluster is a working cluster as it is well developed, has a critical mass of local knowledge, expertise, personnel and resources. The agglomeration economies that this creates are used as advantages by the firms in the cluster to compete with those outside the cluster.

The stage of development of a cluster was also presented in a different form in chapter 3. The stage of development was divided into: embryonic, emerging or mature in combination with growing, stagnating or declining. Along this set of characteristics the Swedish automotive cluster must be considered to be mature as the industry has been consolidating for quite some time. E.g. the Volvo Group has over time acquired other manufacturers such as White, GMC heavy duty trucks, Renault Trucks, Mack Trucks and Nissan Diesel. Scania is owned by Volkswagen and MAN, Volvo Cars by Geely and Saab by Spyker cars.
If continuing on to look at whether the cluster is growing, stagnating or declining it is interesting to look at the number of employees over a period of time. It has been shown that between 1997 and 2007 the number of employees in the transport industry in total increased with about 10,800 employees and in the automotive vehicle industry with about 3,400 employees. This is an indication that the Swedish automotive cluster is still a growing cluster.

It has also been shown that the percentage of employees outside of Sweden differs between the car manufacturers and the truck manufacturers. Saab and Volvo cars had in 2008 100% and 73% respectively of its employees in Sweden while the truck manufacturers Scania and Volvo Group had 39% and 28% respectively of its employees in Sweden. Hence, the truck manufacturers are much more international and the majority of their growth takes place outside of Sweden.

5.4 The effects of foreign ownership

Based on the life cycle stage of the Swedish automotive cluster and on the dynamism of the cluster, the Swedish automotive cluster can be plotted in Birkinshaw’s framework. As the dynamism analyzed above is considered to be mostly dynamic and as the life-cycle stage is considered to be consolidating the Swedish automotive cluster would be in the upper right quadrant.

![Figure 21 Possible placement of the Swedish automotive cluster considering cluster dynamism and cluster life-cycle stage.](image)

This is positive and it indicates that the Swedish automotive cluster will benefit from foreign investment as it is a sign of confidence in the cluster. Also the foreign investment has little impact on the cluster dynamics in mature industries. This is also supported by the facts that Saab, Scania and Volvo Cars have all been attractive companies for foreign investments. It is further supported by that Volvo Cars and Saab have been foreign owned since 1999 and 2000 respectively and there has been no major effects on the cluster.

If the Swedish automotive cluster would have been in the bottom right quadrant this would have been positive if the cluster could benefit from the technology transfer and the investing companies global market presence. This is in part the case for Volvo Cars which will likely benefit from much better access to the large Chinese market through the new owner Geely.
However it would be negative if the foreign ownership would lead to the consolidation and closing of the acquired firm. It should be noted that in Figure 21 above the Swedish automotive cluster is considered as a whole. To regard the automotive manufacturers individually is not within scope of this master thesis.

Foreign direct investments are made for four reasons: natural-resource seeking, market seeking, efficiency seeking and strategic-asset seeking. In the Swedish automotive cluster the reason for foreign investments is considered to be strategic-asset seeking.

In mature consolidating industries foreign investments are generally positive. However, it can have negative implications as mature industries are usually in the state of consolidation and this means that there is a shake out of firms and different industry clusters. This is e.g. noted when locating R&D units and head offices. It is therefore important to point out that although it is positive with the foreign investments in the Swedish automotive cluster it is still very important that the cluster stays dynamic and growing and by that attractive for new investments.

5.5 Lessons learned from the Swedish pharmaceutical cluster

Some lessons might be learned from the Swedish pharmaceutical cluster which used to be very successful 25 years ago and which has now been weakened and other more competitive clusters have gained more of the investments in R&D. There seem to have been a lack of the ability to continuously innovate and upgrade. In chapter 3 five failure mechanisms for industry clusters was described. One of these is the competition from similar cluster and another is falling demand for a cluster’s product. These failure mechanisms are both partly relevant in the case with the Swedish pharmaceutical cluster as other more successful clusters in e.g. Ireland and Canada have gained more of the investments in R&D. In addition, there is also a risk for falling demand as e.g. important patents are expiring and there are not enough new products.

The above underlines the importance of continuous investments in R&D and the importance of the innovations and spin-offs that this can create. It is also important for a foreign owned firm to really be embedded in the local cluster so that it can continue to benefit from the cluster and not get to focused on internal coordination with the investing company and by that lacking the so important networking and knowledge sharing within the regional cluster.
6 Conclusions

The purpose of this master thesis has been to analyze how the Swedish automotive cluster will be affected by the foreign acquisitions of Volvo Cars, Saab and Scania. In addition, this thesis is intended to add to the knowledge about local industry clusters and the potential effects of foreign ownership in these.

This thesis takes its starting point in theories about agglomeration, cluster dynamism and cluster development in order to create an understanding for how clusters can be influenced by foreign acquisitions.

It has been shown in this study that Sweden has many competitive advantages as a nation and these advantages work as a good “engine” for the Swedish automotive cluster. Further it has been shown that the Swedish automotive cluster is a mature cluster as the industry is consolidating. It has been discussed if the cluster is growing, stagnating or declining and it has been concluded, by looking at the cluster as a whole, that it is still growing. This conclusion has been made based on an increase in the number of employees within the Swedish automotive industry.

Further the Swedish automotive cluster displays the characteristics of a dynamic cluster. These are intense local rivalry, dynamic competition emanating from the entry of new firms including spin-offs, intense cooperation organized through various institutions for collaboration, access to increasingly specialized and advanced factors of production and sometimes linkages with universities and research institutes, linkages to related industries, sharing pools of talent and technological advancements and proximity to sophisticated and demanding buyers. The Swedish automotive cluster clearly displays five of these characteristics but when it comes to “dynamic competition emanating from the entry of new firms including spin-offs” it has not been possible to fully evaluate the current level of new entry or spin-offs. Historically the cluster has grown from new entrants and spin-offs but another research would be needed before any conclusions can be made about this characteristic. However, based on the other five characteristics and on the fact that Sweden has very high investments in R&D in the automotive industry and as Sweden as a nation has a high level of patent applications, it is concluded that the Swedish automotive cluster is a dynamic cluster.

As the Swedish automotive cluster is considered to be dynamic and consolidating (although partly growing) it is concluded that foreign investments is a sign of confidence in the cluster as a dynamic and attractive cluster attracts foreign investors who continues to invest in the cluster. As the economy gets more and more global also foreign investments in Sweden will increase and foreign investments are a sign of a healthy cluster. Also foreign investments have little impact on the cluster dynamics in mature industries.

However there are some risks. When looking at the Swedish pharmaceutical cluster it can be concluded that the Swedish pharmaceutical industry has become less competitive than previously. With the foreign owners/mergers that have taken place in the pharmaceutical industry it is no longer obvious to establish operations and activities in Sweden and Sweden now have to compete with other alternatives. In the pharmaceutical industry other clusters such as Ireland and Canada have become more competitive than Sweden for investments.
This is an important learning and it underlines the importance of investments in the regional cluster and in R&D in order to stay competitive. It is therefore very important that the new owners Geely, Spyker and Volkswagen continue to invest in and upgrade the Swedish cluster.

This study underpins the importance of research in the field of how local industry clusters are affected by foreign acquisitions. Very often companies optimize their value chain and value system but cluster effects are disregarded possibly as they are more difficult to measure. Although the economy is very global and as pointed out in the theoretical section of this thesis, the local competitive advantages due to geographic concentration are still very important in creating a successful industry cluster. It is further successful clusters that attract foreign investors who seek to gain from the advantages within the cluster.

For further research it would be interesting to investigate what effects foreign ownership has over time on Swedish industry clusters and other local clusters. It would e.g. be relevant to perform future research on more in depth case studies of clusters with foreign ownership. It would also be relevant with more quantitative studies of clusters regarding e.g. cluster size and cluster growth in combination with degree of foreign ownership. If studied, this would be a good base for comparisons of different clusters and it would lay the ground for more qualitative studies in this research area.
7 References


8 Appendices

8.1 Swedish exports

Statistics from “Statistiska Centralbyrån”

Export fördelad på varugrupper

Enligt svensk produktindelning efter näringsegenskap (SPR 2002)
Löpande priser: Mkr Trend

Källa: SCB  Data 1 o m december 2008

Export fördelad på varugrupper

Enligt svensk produktindelning efter näringsegenskap (SPR 2002)
Löpande priser: Mkr Trend

Källa: SCB  Data 1 o m december 2008
8.2 Foreign ownership in Sweden

The table to the left below shows the foreign ownership in Sweden as a percent of GDP. The table to the right shows the foreign ownership in Sweden and Sweden’s foreign ownership abroad as a percent of GDP (Runnbeck, 2009).