

# Is cluster theory in need of renewal? – Porter's Diamond revised

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Tutors:     Christer Ekelund  
              Elin Smith

Authors:    Martin Persson  
              Adis Šabanović  
              Henrik Wester

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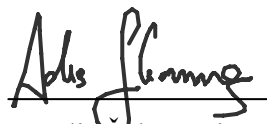
Finally, to our families for enduring absent family members.

Thank you.


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Martin Persson



Adis Šabanović



Henrik Wester

*Dedicated to*  
*Freja*  
*Edvin and Linnea*

## **Abstract**

In the globalized world of today, ironically, companies find competitive advantages in locating in proximity of each other. These highly present industrial groupings are called clusters. A popular model to describe the benefits of a cluster environment is the *Porter's Diamond*, also called *the Diamond Model*.

Since the Diamond Model was published in 1990, there is a need of complements, in order for it to fit the dynamic business world of today. Hence, the purpose of this thesis is to examine the benefits of a cluster environment with theories from four different designated perspectives other than Porter's Diamond. This, to see if these theories can complement the Diamond Model to show a more contemporary, and comprehensive picture of the benefits in a cluster environment.

The research is intended to examine if the theoretically stated benefits can be recognized by the companies situated in a cluster environment. A compilation is created by the theoretical framework and tested with the Diamond Model to see if it presents a better picture of cluster benefits. The thesis conclusions fortified the saying "age before beauty", at least if age is complemented with a social attitude.

**Key words:** Porter, Porter's Diamond, Perspectives, Cluster, Cluster benefits, Agglomeration

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# 1. Introduction

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*In the globalized world of today, ironically, companies find competitive advantages in locating in proximity of each other. These highly present industrial groupings are called clusters. This chapter describes the definition of a cluster, what the benefits are regarded to be, what the authors of this thesis consider to be a shortcoming in a well utilized cluster theory, and the purpose of this thesis. To start off, a short historical background is presented.*

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## 1.1 Background

In 1990, Professor Michael E. Porter published his book *The Competitive Advantage of Nations* where a new business term was introduced; *clusters*. The appellation referred to the paradoxical behaviour of related companies to localize in proximity of each other, in order to find competitive advantages in the globalized business environment. These groups of interlinked companies situated in a geographically limited area are today widely referred to as clusters. The tendency is hardly new, even though clustering has occurred throughout history in many epochs. During the late nineteenth century, macro economist Alfred Marshall pointed at the groupings of heavy industry companies, which became the industrial districts. Marshall called the behaviour “agglomeration” which is an ancestor to the term clustering (Marshall, 1890/1920).

The cluster environment is impelled by one, or a collaboration of three actors: The business-world, whose strive for competitiveness fuels cluster initiatives, the academic world, where advanced research contributes to the clusters attractiveness, and regional/national policy-makers, whose wish to attract business acts nurturing. This triad is sometimes referred to as *the triple helix* (Lindqvist, Malmberg & Sölvell, 2002).

Silicon Valley (semiconductors, IT) in California, USA, might be the world's most outstanding example of a cluster. Hollywood (movie production) also in California, USA, is a famous second one. These two areas are great examples of regions of agglomerated companies in high concentrations. Smaller industrial districts might be regarded as clusters by local policy-makers in order to market the region, while some do not consider them clusters. Lindqvist et al. (2002) distinguish between business-world clusters, which are big actors in a national perspective and smaller local clusters that are big actors in the local region (Lindqvist et al., 2002).

Clustering has many synonyms, depending on what author, theory perspective et cetera, one is studying. In the article "What qualifies as a cluster theory?" (Maskell & Kebir, 2004) the term cluster, along with its relatives, was looked up in the ISI (Institute for scientific information) knowledge database, to see how the occurrence of the terms has evolved over time (Table 1):

**Table 1 – Cluster publications 1953-2004**

Term looked up in ISI database	1950s-1980s	1990s	2000s
	<i>Frequency</i>		
Cluster(s)/clustering of firm(s)	0	9	15
Agglomeration	74	305	380
- geographic(al) agglomeration(s)	0	4	7
- spatial agglomeration(s)	3	17	23
- agglomeration(s) of (same industry) firm(s)	5	71	50
Geographic(al) concentration(s)	3	32	51
Spatial concentration(s)	7	32	30
Localised/localized industries/firms	0	5	7
Growth pole	9	12	5
Innovative milieu(s)	0	26	8
Industrial district(s)	10	126	95

*(DRUID Working Paper No. 05-09, what qualifies as a cluster theory, Maskell & Kebir, 2004, p 2, transcribed)*



As one can see from the table all the terms for clustering are not new, but are generally increasing in use and implementation over time. One example is “geographical concentration” which generated three hits in the database during the period 1950s - 1980s, 32 in the 1990s and finally 51 in the current decade.

## **1.2 Definition**

In Micro Economic theory a cluster can be defined as “geographic concentrations of interconnected companies, specialized suppliers, service providers, firms in related industries, and associated institutions in particular fields that compete but also cooperate” (Harvard Business School, 1999). This is the most commonly used definition, published by Porter in his book *The Competitive Advantage of Nations* from 1990 (Harvard Business School, 1999). Despite the fashion of using Porter’s definition, there is no general agreement of what exactly qualifies as a cluster and the concept has been criticized for having vague boundaries and limitations (Martin & Sunley, 2003).

A list of recognized clusters can be found on the European Cluster Observatory (ECO) Webpage. This webpage lists clusters, according to Porter’s definition, within the 27 European Union countries along with Iceland, Norway, Switzerland, Turkey and Israel (ECO, 2007). The list acknowledges more of the local clusters as well, but is similar in character to the definition used by Lindqvist et al (2002). The ECO webpage will be used for this thesis to facilitate the definition of a cluster, because the deficiency of a generally accepted definition of the term *cluster* could easily turn out to be problematic otherwise.

## **1.3 Benefits in a cluster environment**

Every day, companies all over the world are fiercely trying to find competitive edges in order to stay ahead of competition. A paradox in today’s world of globalization is that one way of finding this edge, is for companies to settle in the same geographical location, thus finding

strength in numerous alleged benefits. Such benefits are stated to be: lower costs of infrastructure, boosted technological level by intense competition, increased level of trust, suppliers and customers in the proximity, et cetera. Opinions on clusters' stated benefits are not homogenous but vary a lot. Some claim that the combined good of a successful cluster is higher than the combined good of the same companies if scattered, and some say that cluster is just a fashionable term lacking empiric evidence.

Studies have shown that a global market is well functioning for standardized and preferably digitalized information, but when a particular solution is needed and innovations and people are volatile, a localized market (e.g. clusters) works better, as human capital moves slow and social capital does not move at all (Lindqvist et al., 2002).

Sölvell explains that companies are rarely highly innovative in isolated environments. Researches show that a big part of all innovations is a result of the interplay with the environment (Sölvell, 2002).

As stated before, the cluster environment has vividly been argued for by Michael E. Porter. His easy applied theories have caught the attention of many policy-makers around the globe. One of his most criticized models for benefits of cluster environments is called *Porter's Diamond* (referred to as *The Diamond Model*). The Diamond Model enumerated numerous benefits, for example supporting industries, competition, the in-flow of a specialized labour-force, boosted innovation, et cetera. But even the widely acclaimed Diamond Model gets older and this leaves gaps to fill.

#### **1.4 Critics of Porter's cluster theories**

Ron Martin and Peter Sunley of University Of Cambridge, UK, have pointed massive critique at the "cluster-thinking" in general and specifically towards Michael Porter. They argue that even though the cluster concept is indeed very popular, the rush to employ it has resulted in

many missed fundamental empirical and theoretical questions (Martin & Sunley, 2003). They claim that what Porter is presenting, with his Diamond Model, is not a model but a mere “way of thinking” concerning national economy. They also claim that (*ibid.*, p 9):

However, although the definition and conceptual elasticity of the cluster concept can be seen as a positive strength, in that it permits a wide range of cases and interpretations to be included, we consider it to be problematic.

Thus calling the cluster thinking a “chaotic concept”, Martin & Sunley would have wished for a more academic approach to Porter’s theories. To conclude Martin and Sunley’s article, here is a quote from the chapter “selective empirics and the cluster creation game” (*ibid.*, p 18):

Obviously, a vaguely defined and theorized concept does not lend itself to easy or precise empirical definitions. In fact, in most applications the geographical mapping of clusters is surprisingly unsophisticated and stylistic. Whilst Porter’s diagrammatic ‘flow diagrams’ of particular cluster of (upstream and downstream) interlinked activities are often detailed, his ‘cluster maps’ are extraordinary simplistic and unexplained.

Martin & Sunley mean that Porter gives an all too simplistic view of clusters, with vague boundaries and too many question marks left unanswered. The pointed critic at Porter is one of the reasons why the purpose of this thesis is to examine if Porter’s Diamond is in need of renewal. This is further discussed in the next paragraph.

### **1.5 Research objectives**

Porter’s research from 1990 is today seventeen years old. During this period of time important factors, for example the Internet, have entered the dynamic business world and influenced companies and how they relate to competitors, suppliers, customers, networks, knowledge et cetera. This means of course that the rules of competition have changed.

Porter often sees clusters from a Micro Economic perspective, videlicet, how the companies benefit from a cluster environment. Since the introduction of the Diamond Model, a number of theories from different schools have been presented. Each theory present its own cluster benefits, although some benefits occur in more than one theory, only slightly disguised. Porter argues his Diamond Model to be generally applicable, but as other theories are presented over time, there are a number of benefits not accounted for in the Diamond Model.

An article search provided reasons to suspect that the Diamond Model does not reveal the whole picture of cluster benefits; hence it leaves some important aspects out. In addition to some other Micro Economic benefits which have not been taken in consideration, benefits from a few other angles would help to fill out the gaps that are present in Porter's Diamond Model.

The obtained benefits from the additional cluster theories have been classified into four perspectives; *Micro Economic*, where benefits are accounted for in terms of competitiveness for the companies, for example boosted innovation, shared costs, scope et cetera. The Diamond Model will be presented in the Micro Economic perspective. The *Macro Economic* perspective points out the clusters contribution to a nation's competitiveness. The *Social Science* perspective deals with relations, networking and other social factors that are critical for the business environment, and finally *Economic Geography*, which resembles the Macro Economic perspective but focuses on a geographical region instead of the whole nation, for example, a cluster.

Benefits are presented after each perspective in the theoretical framework chapter, and compiled into a figure which adds the new benefits to the popular Diamond Model. This compiled figure will provide more of a complete picture of the benefits of the cluster environment, not only from a Micro Economic point of view. It is found after the four perspectives in the theoretical compilation.

The original Diamond Model describes what criteria a business region must meet in order to build an international competitive cluster environment in a Macro Economic perspective. Consequently, some of these criteria must be beneficial for the individual companies, since a successful cluster is consisting of successful companies. This is how the criteria of the Diamond Model are converted into Micro Economic benefits.

It is stated in theory that all clusters are unique; hence, attempts to recreate existing successful clusters have proven unsuccessful, with a large capital black hole left behind (Osama & Popper, 2003). This raises the question if there is a difference between industries as well. To examine if there is a difference between industries what is ranked as the most beneficial qualities of the cluster environment, could add interesting aspects to the research problem.

The problems found with the cluster environments would turn out to be: First, does Porter's Diamond Model need supplementary factors added to it, in order to better suit the dynamic business world of today? Second, does a figure compiled from the Diamond Model and the four perspectives present a better picture of the benefits of a cluster environment? And finally, is there a difference between the different industries in clusters, in terms of which benefits are regarded to be the most critical ones?

## **1.6 Limitations**

The authors of this thesis limit themselves to examine Swedish clusters, to minimize costs of contacting the companies and to facilitate communications with these. The European Cluster Observatory List will provide defined clusters to select the population from. Even though only Swedish clusters are contacted, it does not mean that foreign companies

will be left out from the population. In the Swedish clusters, several foreign companies' subsidiaries are located.

Four perspectives of cluster theory has been designated; Micro Economic, Macro Economic, Social Science and Economic Geographic perspectives. The theories used are classified into these four perspectives, and only benefits stated in the theoretical framework will be taken in consideration. For the empirics, each question represents one benefit, and the questionnaire is intended for employees in the positions of CEO, market manager or employee with a strategic position for responding the questionnaire.

## 2 Method

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*This chapter explains the different choices made concerning the method for this thesis. It starts with choice of methodology where a short summary of how the thesis has been developed scientifically is presented. Thereafter, the research philosophy is discussed followed by choice of theory. The section then ends with a short chapter summary.*

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### 2.1 Choice of Methodology

The purpose of this thesis is to see if there is a need to update Michael Porter's Diamond Model, concerning the benefits in a cluster environment. A central point in this thesis is therefore the Diamond Model.

The benefits have been divided in the literature into four different perspectives. These are called: the Micro Economic, Macro Economic, Social Scientific and Economic Geographic perspectives. Out of the different perspectives and Porter's Diamond Model a combined model of benefits have been created. Hence a deductive approach, discussed further in the research philosophy, is applied in this thesis.

Beside the Diamond Model, findings from other authors within the field of clusters and cluster benefits will be of use. In the final analysis, this compiled model will be evaluated against the hypothesis and general research questions. The purpose of this model is to explore which of the benefits the companies see as most valuable in a cluster environment. And thereafter, depending on the results, implement it as a cluster benefit model.

## **2.2 Research philosophy**

When consulting the “research onion” in Saunders, three major research philosophies are presented (Saunders, Lewis & Thornhill, 2007). These are: *positivism*, *realism* and *interpretivism* (*ibid.*). The starting point in this thesis is the Porter’s Diamond Model. In the positivistic philosophy “you are likely to use existing theory to develop hypothesis” (*ibid.*, p 103). This indicates a use of a positivistic philosophy in this thesis. A *Positivistic* philosophy is also said to be used when one is “working with an observable social reality and that the end product of such research can be law-like generalizations that are similar to those that are produced by the natural and physical scientists” (*ibid.*, p 103). The thesis aims to observe and study the companies’ points of view and the benefits they see in a cluster environment. For doing so a questionnaire could be applied. A questionnaire is a type of study that fit with the positivistic research approach. From the questionnaire quantifiable data can be gathered, which will lead to statistical analysis.

Building the research problem on already existing theories mean a use of a deductive approach. The opposite, called an inductive approach, would not be suitable for this thesis since the research is based on already existing theories.

## **2.3 Choice of Theory**

This paragraph gives an overview of the collection of literature. Kristianstad University and the Internet were the two main sources for finding relevant books and articles. In the beginning efforts were made to obtain as much information as possible concerning Michael Porter’s Diamond Model, and to identify the benefits. Thereafter, findings from other authors from other perspectives and fields were studied to complement Porter’s model. Authors that were found useful were Marshall (1890/1920), Weber (1929), the GRET research group (2006) and the IMP research group (1982) among others. These contributed to create the final model, SMITH, where all findings are gathered.



## **2.4 Summary**

This chapter has presented the methodology, philosophy, approach, and choice of theory used in this thesis. In the choice of methodology, the purpose and main structure for the thesis were presented. Thereafter the research philosophy was defended through the use of a positivistic view. The deductive approach was selected to the use of already existing models and theories as starting point for the thesis. Finally, a short review of applied theories for the thesis was presented.

### **3 Theoretical framework**

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*This chapter presents the theoretical framework of this thesis. Four different theory perspectives are presented: the Micro Economic, Macro Economic, Social Scientific and Economic Geographic perspective. Thereafter a model compiled of benefits from several theories originating from the four perspectives is presented, which will act as a new cluster benefit model.*

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#### **3.1 The four perspectives**

The perspective classification makes it easier to understand and to follow the theoretic findings, as well as identifying the benefits. In these different perspectives different authors' contributions within cluster theory will be accounted for. The theoretic framework will start with the Micro Economic perspective and foremost Porter's findings since he is the one that has contributed most within cluster theory, and has provided the core theory of this thesis; the Diamond Model.

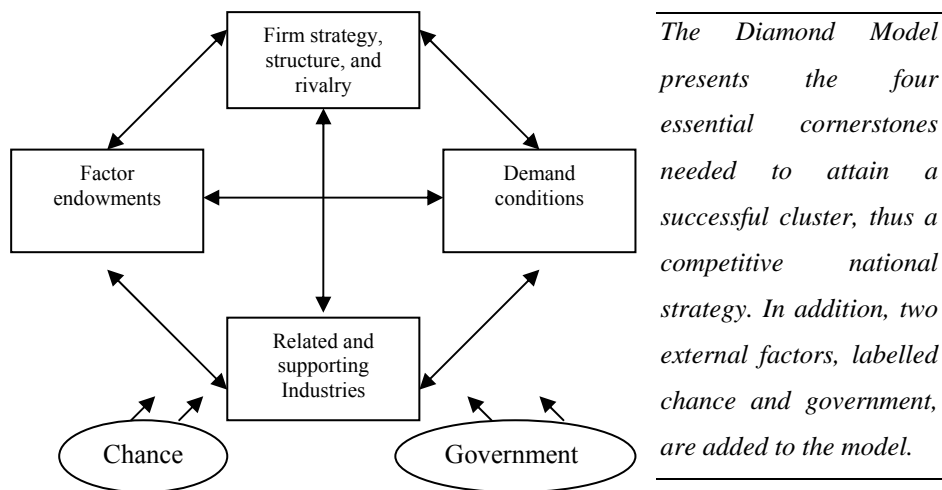
##### **3.1.1 *The Micro Economic perspective***

The authors of the Micro Economic perspective are Michael Porter, Bertil Ohlin, Edgar M. Hoover and Alfred Weber. These authors have made relevant contributions within the field of cluster and agglomeration theory in a Micro Economic perspective.

Common for the authors are that they think of a cluster as a nurturing place for the individual company to be situated in. The cluster is a place where the company evolves, setting the foundation for being competitive and to be internationally prosperous in the future.

One of the gurus, whose ideas have come to be the favourite among policy-makers around the world, is Professor Michael Porter of Harvard

Business School. He is one of the advocates of clusters and has made numerous statements concerning the benefits of clustering. For example why clusters outperform outsourcing in terms of preventing hidden costs of management coordination, inventory, delays, risks and lead time. It also prolongs product cycles and speeds up innovation compared to outsourcing (Harvard Business School, 2003). As mentioned earlier, Porter talks about the paradox of globalization and clusters where, despite a world wide tendency of globalization, clustering proves to be the general recipe of competitiveness (Harvard Business School, 1999). One commonly used model when trying to explain why some nations are more successful in a Macro Economic perspective than others when building a strong cluster scene is the previously mentioned *Porter's Diamond* also known as *The Diamond Model* or *The competitive Diamond* (Porter, 1990/1998). Porter's work is based on extensive research, covering one hundred industries in ten different countries, conducted in 1990 and later published in his book *The Competitive Advantage of Nations*. The Diamond Model is the core theory which this thesis is based upon (Porter, 1990/1998, p 127):



**Figure 1: *The Diamond Model***

In order to sieve the converted Micro Economic benefits, a description of the model will be presented, followed by a presentation of the benefits recognized in the model.

The Diamond Model is based upon four basic criteria plus two additional factors, as shown in figure 1. The first criterion called *Factor endowments* deals with the nearby supply of critical factors. Porter divides these in two groups. The first one is basic factors, such as natural resources, demography, location, et cetera. The second is advanced factors, such as skilled labour force, communication infrastructure, R&D supply, et cetera. The *Firm strategy, structure, and rivalry* criterion includes the inner structure and processes of the companies, as well as the innovation-boosting rivalry (positive competition) between them. *Demand conditions* means a nearby demanding customer platform, and is emphasized as critical by Porter. This will further drive companies to innovate and evolve their products so that additional competitiveness will be achieved. The *Related and supporting industries* criterion demands vertically and horizontally related industries that are situated in the vicinity around each other to be fulfilled, this leads to several benefits according to Porter. Instead of fund-draining vertical acquisitions the companies have suppliers and customers next-door. This fuels efficiency in many aspects and reduces risks and delays. It also brings the opportunity to affect policy makers to invest in different forms of infrastructure, which is beneficial to all companies with similar communication needs.

*Government(s)*, as well as the companies' boards, have seen the benefits of clusters and are through cluster initiatives (CI's) trying to nourish these environments, in order to achieve national earnings. *Chance*, together with government, is not two criteria but additional factors which can be important when describing the competitiveness of a cluster. This is one part where the Diamond theory is a bit vague, since chance includes trends in the business climate, stock exchange fluctuations, foreign natural disasters, as well as many other thinkable and unthinkable scenarios beneficial to cluster development. Porter has received critique for not being academic enough, just fashionable without having supporting empirical limitations and definitions in his Diamond Model, and for claiming vague causalities and linkages (Martin & Sunley, 2003).

The Micro Economic benefits which can be drafted from the Diamond Model are *boosted innovation*, which springs out of the environment of having the related companies in vicinity. *Competition*, or rivalry, which fuels several beneficial attributes of a company. *Supporting industries* is the third benefit, and it also contributes to the fourth; *Specialized labour pool*, in the sense that it helps to attract the right people and to market the region. *Reduced costs of infrastructure*, arises with the strength of the group, since incentives for policy-makers to invest in infrastructure is easier to present if several companies can make use of such an investment. These benefits are presented in a bold font in the Micro Economic benefits list at the end of the chapter.

A continuance of other contributions within the Micro Economic perspective will now be presented. Bertil Ohlin (1933) and Edgar M. Hoover (1937, 1948) further discusses benefits in an agglomeration economy (Bekele & Jackson, 2006, p 3) with:

Economies of scale and scope within the firm, the development of varied labour markets and pools of specialized skills, enhanced interaction between local suppliers and customers, savings on transport costs and shared infrastructure.

These are benefits not accounted for in Porter's work, except infrastructure, which will be regarded as a Diamond Model benefit, because of the identical characteristics. These characteristics made them important for the theoretical framework.

Ohlin & Hoover were interested in how the individual company was influenced by co-location and, more generally, which conditions that made the company more productive than other companies that were not co-located (van Oort, 2004). Compared to Marshall's Macro Economic work (presented in the next perspective), which dealt with the positive effects of geographical concentration of industry, Ohlin and Hoover have a more individual firm perspective. This is why it is placed in the Micro

Economic perspective. The benefits of *Scope* and *Economies of Scale* and *Enhanced Interaction Business to Business* are Ohlin & Hoover's contributions to the Micro Economic benefits.

Alfred Weber's book *Theory of the location of industries* from 1929 discusses several important factors concerning agglomerations. His foremost work lies in finding factors for finding the optimal location and minimal cost for manufacturing plants. He came to the conclusion that three factors decide where the optimum location for the industry is, so that costs are minimized for transportation and labour. *Optimal transportation distance* deals with the ratio of weight and distance between raw materials and finished products. *Lower cost labour* may justify longer transport distances and finally the *Agglomeration and deglomeration* factor which handles the balance between the two extremes (Weber, 1929).

Weber's efforts to show the optimal location can be seen in one of his models, the *isodapanes* model. This is an essential part of Weber's contributions within the field of agglomeration theory where he shows where companies can enjoy the benefits of an agglomeration economy (Weber, 1929). He has also made several mathematical contributions showing how the optimum location for the individual firm in an agglomeration theory could function. Weber's contributions to the benefits in the compilation will be *logistics*. His discussion of a big labour force which lowers the cost of labour and thereby legitimizes longer transport routes generates the logistical benefit.

To summarize the Micro Economic perspective, clusters function as a place where the right supporting industries are located, which means that together companies can get important benefits like better logistic solutions, shared orders which means lower costs of order, transportation and time savings. Being within the same industry allows for shared infrastructure among the companies located in the vicinity.

Being located in a cluster benefits the company in that way that there is an enhanced interaction of businesses. The company can use scope and economies of scale to specialize on its products to certain companies within the cluster giving the company a strong customer base. In a cluster it is easier to access specialized skilled labour due to interconnection of companies with a similar labour pool.

Rivalry, or competition, between companies in a cluster creates an atmosphere in which companies strive to stay ahead of competitors.

Boosted innovation is a creation from the favourable rivalry that is formed in a cluster. In a cluster, innovative R&D is seen as important, being a platform where collaboration as well as competition takes place as a cornerstone.

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**Micro Economic benefits**

(Diamond benefits in bold)

- Enhanced interaction business to business
  - **Supporting industries**
  - **Reduced costs of infrastructure**
  - Economies of scale
  - Scope
  - **Competition / Rivalry**
  - Logistics
  - **Specialized Labour pool**
  - **Boosted innovation**
- 

**3.1.2 The Macro Economic perspective**

The Macro Economic perspective is showing how a nation's economy is affected by the benefits. From the Macro Economic point of view, a flourishing industrial cluster should contribute to an improved national economy. Publications from Alfred Marshall and Örjan Sölvell are included in this perspective.

Macro economist Alfred Marshall was first to mention the development of clusters, designated agglomeration at the time, which was thought to be an explanation of the economic development of industrial districts. Industrial districts were referred to as a concentration of economic activities in a city or a region (Kuah, 2002). With this theory as a starting point, it built a framework for other theories to develop for today's clusters.

Marshall's classical analysis of agglomeration phenomenon from 1890 explained that companies within the same branch were actively striving to be collocated and thereby increase the possibility to build a *constant market for competence* (Marshall, 1890/1920). Constant market for competences creates *pools of labour* which is the first benefit from the Macro Economic perspective. The more firms specialize and advance in respective businesses, the bigger is the chance of creating geographically pooled labour markets. This is no more complicated than the bonds between supply and demand, so a concentration of labour is to be expected wherever a successful cluster emerges.

The labour pool is a great resource for the companies involved in a cluster environment but also very good for the competitiveness of a nation. This motivating force developed industrial complexes with positive externalities, or benefits, with agglomerations of interrelated firms and industries. Marshall explains that these benefits were caused by three major forces (Kuah, 2002):

- *Knowledge flows and knowledge spillovers between firms*
- *Specialized inputs and services from supporting industries*
- *A geographically pooled labour market*

The benefit of *knowledge flows* and *spillovers*, emerge when knowledge is moving autonomously from one firm to another so that the nation itself gains a richer basis of knowledge. For instance; *Knowledge flows* as well as *knowledge spillovers* are a result of firms' constant urge for unique knowledge and development in order to be more competitive. This development of knowledge is spreading to the businesses around, thanks to the proximity. With specialized knowledge that is created as a result of agglomeration, firms can accomplish special *technological developments* that they otherwise, if located somewhere else, never could perform (Marshall, 1890/1920).



As soon as one firm is more successful than other firms in a cluster environment, the other firms will follow the same strategy in order to make the cluster and the firms in it, more successful as well. Therefore, the benefit of *Common strategies and paths* appears due to that *all* firms within the cluster need to be successful, in order to construct a successful cluster. This consequently acts beneficial to the individual company.

When specialized knowledge is created due to the competitiveness and rivalry in a cluster, *specialized inputs and services from supporting industries* are also something that other firms inside a cluster can exploit. This benefit of having supporting industries in the vicinity is mentioned in the Diamond Model as well, in an identical way. Therefore, since the authors' thesis is examining benefits that may complement the Diamond Model, supporting industries will be considered a Diamond Model benefit and Marshall's mentioning of this factor will not be taken in consideration for this thesis. However, the close relation required between customer and supplier in order for the supplier to provide this specialized input creates a bond through a common technology that may be beneficial for both parties (*Customer/ supplier relations through common technologies*).

Basically, Marshall states that the existence of "dynamic complementarities" within a system of interdependent economic units or entities influences specialization patterns in production, because of the three externalities mentioned above (*ibid.*). For example, innovation and growth in one economic unit can exert positive impulses for innovation and growth in other parts of the connected system as well (Knowledge flows and spillovers). Therefore, Marshall explains, a cluster of industrial complexes as a whole is expected to perform better than the individual firm or a single economic unit (*ibid.*)

In the report "Sveriges Framtid – behovet av ökad klusterdynamik och förstärkta omvärldslänkar" from Svenska Attachéer (June 2000),

Professor Örjan Sölvell describes some of the most important cluster benefits.

Sölvell claims that the idea of companies being part of a whole system has, in modern times, become central, both in economic and in industrial thinking (Sölvell, 2000). Several different system-conceptions are partly completing and partly competing with each other. Most system-conceptions emerge from companies that are connected in some way through different types of relations and that these relations make it possible and profitable to consider the industry as one whole system or several systems of relating companies, rather than a couple of free-standing companies (*ibid.*).

Firms inside a cluster tend to share conditions and culture. For the purpose of making business more effective and easier, rules and conditions are created by *standardization* and *logistic* costs can be shared between firms, two important benefits of clustering (*ibid.*). According to Sölvell, the sharing of conditions and culture develops into *cooperation* and by doing so, the positive effects of clustering can be best exploited.

To summarize the Macro Economic perspective, governments need to constantly nurse and take care of their productive regions. The constant flow of incentives must be given and aimed at the most creative and industrial regions. Diversity should be prioritized and the pools of specialized labour market should be given special attention. Specialization is essential if a country wants to be a leader in some special business areas.

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**Macro Economic benefits**

- Knowledge spillovers
  - Knowledge flows
  - Pool for labour market
  - Customer/supplier relations through common technology
  - Standardization
  - Cooperation
  - Technology development
  - Common strategies & paths
-

### 3.1.3 *The Social Scientific perspective*

Within the Social Scientific approach the massive work of the IMP group is represented. The IMP group, which stands for The Industrial/International Marketing and Purchasing research group, started their work in the late 1970's (Tikkanen, 1998). IMP discusses networks and the importance of strong relationships, high trust and control in a buyer/seller relationship, information flows and knowledge creations (IMP group, 1982).

Even though The IMP Group consists of many contributing authors, it is referred to as the work of The IMP group. Axelsson and Easton (also IMP group members) are the only members that are cited as individual authors, due to extensive use of their contributions in this thesis.

There are two different approaches within the IMP group. The first one, just mentioned as IMP1, deals with an Interaction Approach between buyers and sellers (*ibid.*). From the book of IMP group (1982) some characteristics can be seen as well as benefits from the interaction approach. The interaction approach is based on the Inter-Organizational Theory, New Institutional Theory and relevant marketing contributions within the field (*ibid.*). The inter-organizational theory can be divided into to three different areas; organization based studies, studies based on several organizations and studies of the organization in a societal context (*ibid.*).

The organization based theory deals with the setting (environment), the relationship between organizations within it and its dependency to access certain inputs within the given environment (*ibid.*). Studies based on several organizations can best be explained with a quote of Håkansson (*ibid.*, p. 19):

In order to obtain necessary resources, the organization is seen to develop relations with a number of other organizational units and thus it enters into a network of relationships.

The new Institutional theory presented by Williamson in 1975, discusses transaction cost in two different situations. First one is a transaction (exchange) in a market setting between separable units. Second is a transaction within an organizational unit (internalization) (*ibid.*). There are incentives to internalize operations when transaction costs get too high in the market (*ibid.*). The benefits that can be extracted here are; *Access to resources, Networks and the lowering of transaction costs.*

The Industrial Network theory, known as IMP2, was created sometime around the middle of the 1980's and is a continuance on IMP1 (Tikkanen, 1998). The main focus lies on networks and "the buyer/seller relationships with an emphasis on issues related to power and control in a marketing channel" (Axelsson & Easton, 1992, p 9). This adds the benefit of *Power/ control in channels* to the Social Scientific perspective.

From the book of Axelsson and Easton (1992) some outlines can be drawn as well as benefits from industrial networks. Relationships in a network "implies that the firms are prepared to interact with each other and expect each other to do so" (*ibid.*, p. 9), this means that there needs to be a clear understanding between the firms and their objectives. Relationships and cooperation may be created to get access to different important variables seen from the individual firm, new technologies, new process or a new market entry (*ibid.*). The new technology is acquired through sharing and this generates the benefit of *sharing technologies.*

Positive aspects of entering into a relationship can be that "relationships allow of a more effective acquisition of resources and sale of product" (*ibid.*, p. 9). This can be seen from the way of increasing sales or decreasing costs, but also in an increasing intentional knowledge transfer between firms. One other factor is that "relationships also provide continuity and stability" (*ibid.*, p. 9). *Knowledge transfer* and *Stability* are extracted as benefits from these statements of Axelsson and Easton.

Other positive aspects in a relationship are that of getting access to a network of firms. This access “implies a measure of control over another organization and, through that organization, the environment” (*ibid.*, p. 10). The control, that the access to other firms gives, works as uncertainty reduction and thus makes the stability of the network and the individual firm stronger. Another important factor that the firm gets access to in a network is the information flow within the network (*ibid.*). Control is already mentioned as a benefit but *Uncertainty reduction* adds to the list.

Axelsson & Easton continue to discuss the positive aspects of relationships in networks. A factor they call social exchange can build trust and reduce risk in a network (*ibid.*, p. 10):

Social exchange relations evolve in a slow process, starting with minor transactions in which little trust is required because little risk is involved and in which both partners can prove their trustworthiness, enabling them to expand their relation and engage in major transactions.

IMP group writes that an organization enters into a relationship to access certain inputs or resources within a given environment. In a social context the organization works as an efficient exchange place of values. Further on the interaction approach builds one part on the work of Williamson, who wrote that there are incentives to internalize in an organization when

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#### **Social Scientific benefits**

- Access to resources
  - Lower transaction costs
  - Networks
  - Power/control in channels
  - Trust
  - Sharing technologies
  - Stability
  - Knowledge transfer
  - Uncertainty reduction
- 

transaction costs gets too high in the market. The lowering of transactions cost should also withstand when thinking of networks and clusters. The mentioning of the critical benefit of *Trust* is the last benefit added to the Social Scientific perspective.

To summarize the work of the IMP group, they state that an industrial network gives access to resources and technology. It reduces risk and uncertainty, builds trust, control, power and stability. Networks can also be used to get access to knowledge and shared information.

#### **3.1.4 *The Economic Geographic perspective***

Economic Geography is the study of a geographical region, and the economic activities within it. From a cluster perspective, Economic Geography describes the logics behind geographical location of businesses, their trade, transportation patterns as well as world trade. Economic Geography is the least contributing perspective in this thesis, but it has a few benefits that can utilize.

Within industrial dynamics a widely known conception is *the regional agglomerations conception* (Sölvell, 2000). During the 1990's, *Regional agglomeration conception* experienced a rebirth when it comes to condensed industry milieus (clusters).

Regional agglomeration theories have contributed to the ambition to understand the importance of geographical closeness for the industrial system's functionality (Malmberg, 1996).

Further research within the Economic Geography field has been conducted by the researchers of GREMI and GRET. GREMI stands for Groupe de Recherche Européen sur les Milieux Innovateurs and was established by Philippe Aydalot in 1984 (Grandi, 2005, p. 9). This is GRET's description of research conducted by GREMI (GRET, 2006, p 1)

GREMI has been working on building a conceptual framework aimed at understanding the role of local dynamics in the more general transformations of the economy and the society, as well as in proposing policies.

The 'milieu', as GREMI calls it, is affected by social, cultural and environmental factors. Grandi says "all these aspects combine to create a

unique system of externalities, developing a milieu, which stimulates innovation and learning” (Grandi, 2005, p. 9). Hence, these are the extracted benefits; *Technological development, Learning and Social/cultural environment*.

Today, the GREMI group has taken one step further to update and build on their former work within the innovative milieus. Therefore a new research group called GRET (Group of Research in Territorial Economy) has emerged.

To summarize the Economic Geographical perspective; Researchers talk about an innovative milieu that gets its strength from a limited area. The innovative milieu is a place where technological development and learning thrives. Social and cultural exchanges create a homogenous atmosphere among organizations in the innovative milieu.

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**Economic Geographic benefits**  
(Innovative milieu)

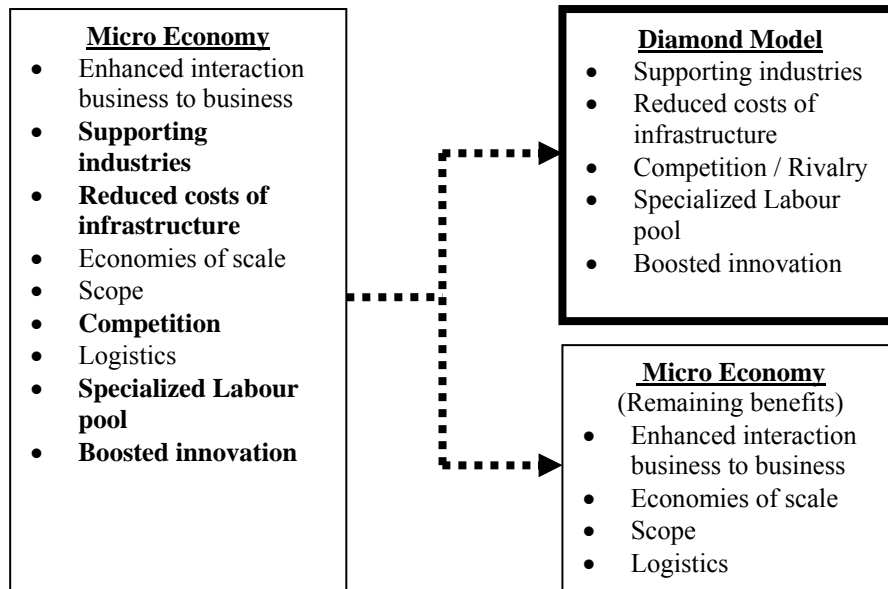
- Technological development
  - Learning
  - Social/cultural environment
- 

### **3.2 Theoretical compilation**

As presented in the different perspectives, the definition of a cluster is quite indistinct. Michael Porter’s critics claim his definition has insufficient limitations and empirics, but at the same time, no model or expansion is presented to solve the issue. Also there are statements among these critics that the good of clusters is no higher than each company on its own if the firms were spread out, and that the generalisation of the Diamond Model is false (Martin & Sunley, 2003).

The authors of this thesis believe that the Diamond Model is in need of complementing, mainly because the extended period of time since the empirics of the model were obtained and those benefits from other perspectives not accounted for in the Diamond Model has here been revealed. In order to solve this problem, the first thing needed to do is to

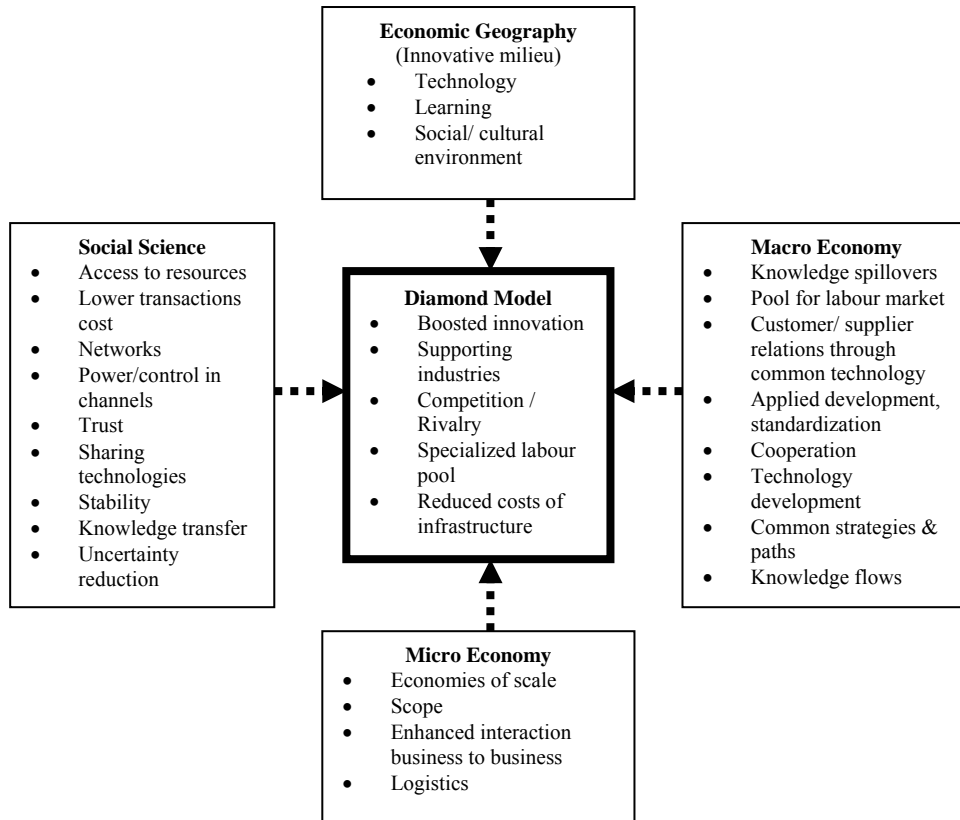
extract the Diamond Model's benefits out of the Micro Economic perspective (*fig. 2*), in order to get a clear picture of which benefits are going to complement the Diamond Model.



**Figure 2: Diamond Model benefits extracted from the Micro Economic perspective**

With the Diamond Model's benefits extracted, the benefits found in the four different perspectives are compiled into a figure (*fig. 3*), designated *Summarized Milieu description, Irrespective of Theoretical Heritage* (SMITH):





**Figure 3: The SMITH; Diamond Model benefits complemented by the four perspectives**

With the SMITH figure, two research proposals are formed, along with one hypothesis. These are as follows:

**Research proposal 1: There are benefits found outside the Diamond Model that are ranked higher than the benefits found in the Diamond Model.**

This is the main research proposal of this thesis and why the research is conducted. The claim that the Diamond Model is out of date leads to the search for a better alternative, which is the background of the second research proposal:

**Research proposal 2: The SMITH provides a higher ranked mean than the Diamond Model.**

The figure is a compilation of benefits from four perspectives and should be able to cover more of the benefits found in the dynamic business world of today. Nevertheless, since being dynamic, the different businesses are

not guaranteed to pull in the same direction, thus resulting in the following hypothesis:

*Hypothesis 1:*

- a) Benefits are ranked differently between industries**
- b) The perspectives compiled benefits are ranked differently between industries**

One may assume that different industries have somewhat different use of the different benefits, since they all have their own prerequisites, and paths of development. This is the background of the assumption of hypothesis number three. A test, if the different perspectives compiled benefits showed any difference will further add information of the difference between the industries.

Two general research questions are also formulated to further investigate the experienced benefits from clustering:

- Which benefit is ranked the highest?
- What perspective has the highest ranked mean?

The SMITH will act as the foundation for the questionnaire, in order to see if the research proposals are true and if the hypothesis is accepted or discarded. The operationalization of how the benefits are translated into statements is further described in chapter three, which is method.

## 4 Empirical method

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*This chapter first presents the research strategy, giving the reader an outline of the strategy used throughout the thesis. Thereafter the time horizon as well as the data collection method is shortly described. A profound description of population and sample selection are presented. In addition operationalization, data analysis, reliability and validity are presented.*

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### 4.1 Research Strategy

The research strategy used in this thesis is a survey, conducted through a questionnaire. The use of a questionnaire allows for easy comparison of quantitative data. Quantitative data are described by Saunders et al. (2007) as “Often obtained by using a questionnaire administered to a sample, these data are standardized, allowing easy comparison” (Saunders et al, 2007, p 138). Therefore, it is possible to analyse “particular relationships between variables and to produce models of these relationships” (*ibid.*, p 138).

Conducting a questionnaire gave an opportunity to investigate how benefits in a cluster were seen from the companies’ perspective. Analysing the questionnaire showed relationships and made it possible to test hypothesis.

### 4.2 Time horizon

This thesis is based upon a cross-sectional study, which means that it is a “study of a particular phenomenon at a particular time” (*ibid.*, p 148). The questionnaire was conducted over a very short period of time, and thus gave a mere picture. The compiled model was created and thereafter tested with cluster benefits in a current setting.

### **4.3 Data Collection Method**

In this part, an explanation of how the data was collected in the survey is shown. Data can be collected in many ways (Saunders *et al*, 2007), through observations, interviews and questionnaires et cetera. When having a positivistic philosophy and a deductive approach a questionnaire is often followed and used.

In this thesis the best way to measure companies' opinions were through a web based questionnaire. The main reasons for thinking a web based questionnaire was the only way were: time limit, money and the generalization factor. First, the time consuming factor would be too high if trying to set up meetings with all those companies that should be in the research population. Second, transportation costs to meet all companies through interviews or handing them questionnaires would be extremely high. Third, enough companies needed to be reached to be able to get answers that could be generalized. By creating a web based survey companies in the population could be reached through e-mail addresses, at a low cost and in time.

It is said that web questionnaires generates a very low response rate (Saunders et al., 2007). But, for this thesis the authors thought that it was the only way of conducting the survey. This argument was used because it was important to be able to generalize the final result, which would not been able for example with qualitative interviews, a case study or a regular questionnaire. To get started an existing template was used for inspiration and design (Mayer, 2003).

### **4.4 Population**

Because of many varied definitions of clusters, one clear definition was important to use when finding the population. If not, the ability to defend why certain companies was chosen for the questionnaire would be extremely hard. It was therefore crucial to find an already outspoken

cluster ‘map’, were the chosen population come from. During the theory search a web page was found on the internet called Cluster observatory. This page lists clusters in 32 countries; but only contact information to the Swedish clusters is presented. The clusters are based on the cluster definition used by Michael Porter. The page is owned and presented by the Center for Strategy and Competitiveness (CSC) at the Stockholm School of Economics, which of course makes it very reliable and accredited. There was now the possibility to reach more than 1000 companies located in over 30 cluster environments. 29 clusters were located in Sweden as one was located in Denmark.

It is possible to obtain lists of companies’ email addresses from an Internet-based employment directory or via a search engine, but was not recommended (Saunders *et al*, 2007). Therefore the respondents were found manually in each separate cluster organization. From there the names of the companies and the right respondents e-mail addresses or phone numbers were located. “Internet-and intranet-mediated questionnaires are usually administrated in one or two ways: via email or via a website” (*ibid.*, p 389). Of those over 1000 companies from the beginning, some form of contact information could be found to 809 respondents. Those that could not be located were unlisted or protected by the cluster organization in some way or another, which hindered the authors of this thesis to contact them.

#### **4.5 Sample selection**

Of the 809 contacts, 415 were to e-mail addresses. The remaining contacts were to phone numbers. Most of the e-mail addresses were to CEOs or market managers. To get as high response rate as possible, personal e-mail addresses were used instead of sending to “info@” addresses. Before launching the questionnaire, a test respondent was contacted to evaluate the questionnaire. The test respondent was a person well used of working in a cluster environment, with a history of business-strategic employment. Of the 415 e-mail addresses that were used, 8

could not be delivered to the respondent. Therefore 407 e-mails were sent away. In the e-mail, an explanation of the research was presented as well as an appeal to the contact to answer the web based questionnaire (Appendix 1, 2). In the e-mail the link to the questionnaire was attached. “Covering email and good design of the survey will help to ensure a high level of response” (*ibid.*, p 389). To obtain a higher response rate, a decision was made to randomly call each 10<sup>th</sup> company from the contact list who had not been contacted through e-mail (Appendix 3, 4). As many companies as possible were called during the remaining time of the questionnaire. An additional 39 e-mails were therefore sent to respondents e-mail addresses after telephone based agreements. A total of 446 e-mails with an attached link to the questionnaire were sent out. Of the 446 e-mails sent, 72 responses were received. This generates a total response rate of 16 percent (16.14 %).

The questionnaire had a lower limit of collected answers to be accepted as empirical base for an analysis. The limit was set to a minimum of 50 returned and answered questionnaires. The goal was to get over 100 complete and answered questionnaires. In the end 72 responses were received. For being a web based questionnaire the response rate is acceptable.

#### **4.6 Operationalization**

Each of the benefits in the SMITH model is represented by a statement in the questionnaire, which reflects the current benefit. Respondents in the survey will take position to it through choices graded 1 -7, where “1” equals if respondent does not agree at all and “7” equals agrees completely. A more specific description of how each benefit is operationalized is found in appendix 5, but this is the general operationalization (*fig. 4*):

- Diamond Model**
- Boosted innovation
  - Supporting industries
  - Competition
  - Specialized labour pool
  - Reduced costs of infrastructure

The Diamond Model originates from the Micro Economic perspective, so no additional effort to get the companies perspective was needed. The statements are put in a way so that the respondents know if the statements regard the cluster in general or with specific business partners within the cluster.

- Micro Economy**
- Economies of scale
  - Scope
  - Enhanced interaction business to business
  - Logistics

The Micro Economic perspective is operationalized in the same way as the Diamond Model. Specific words, not regarded as common have been formulated in a more common terminology, for example scope.

- Macro Economy**
- Knowledge spillovers
  - Pool of labour market
  - Customer/ supplier relations through common technology
  - Applied development, standardization
  - Cooperation
  - Technology development
  - Common strategies & paths
  - Knowledge flows

Two of these benefits were extra carefully formulated when operationalized, these were “Knowledge spillovers” and “Knowledge flows”. Extra effort was put into the statement to ensure the respondents that the spillovers were created autonomously and that the flows occur thanks to the proximity. The rest of the benefits were not expressed in a terminology foreign to companies in the different theories.

- Social Science**
- Access to resources
  - Lower transaction costs
  - Networks
  - Power/control in channels
  - Trust
  - Sharing technologies
  - Stability
  - Knowledge transfer
  - Uncertainty reduction

The benefits of the Social Scientific perspective are not formulated in a special terminology in the theories, so the statements were easy to operationalize. No statements were considered hard to understand by the test respondent either, so a high level of understanding from the “real” respondents was anticipated.

- Economic Geography**
- Technology
  - Learning
  - Social/ cultural environment

The benefits from the Economic Geography perspective of our thesis originate from the GREMI group, where an innovative milieu is emphasized. This milieu is also emphasized in the statements regarding technology and learning, to make respondents answer to if this milieu is present or not.

**Figure 4: Operationalization of the different perspective’s benefits.**

#### **4.7 Data analysis**

The research proposals and the hypothesis will be tested as follows:

*Research proposal 1: **There are benefits found outside the Diamond Model that are significantly ranked higher than the benefits found in the Diamond Model.*** A mean of each benefit from the Diamond Model will be calculated, and the lowest ranked benefit as well as the highest ranked benefit will be tested with all benefits of the SMITH figure. This, to see what benefits outside the Diamond Model is worth complementing with, and if they are ranked higher at all.

*Research proposal 2: **The SMITH provides a higher ranked mean than the Diamond Model.*** The mean of the benefits from the SMITH will be compared to the mean of the Diamond Model. If the SMITH shows a higher mean, we can draw the conclusion that it provides a better picture of cluster benefits than the Diamond Model. This test will unfortunately contain a statistical flaw; the standard deviation will be a “mean standard deviation” and will not show the spread amongst the different deviations, since the different perspectives have an unequal number of benefits.

*Hypothesis 1: **a) Benefits are ranked differently between industries***

**b) The perspectives compiled benefits are ranked differently between industries.** These two hypotheses will be tested with a Kruskal-Wallis test to see if the difference can be statistically proven. The significance of difference will affect the conclusions whether a compiled or complemented model can be regarded as generally applicable.



#### **4.8 Reliability and validity**

It was important to contact the appropriate employee that had insight in the company's strategic business plans, for the sake of validity. With such a small sample as this survey provided, one can not be certain that this survey will turn out the same way if conducted again. A larger population would provide a wider picture and decrease the graph's fluctuation of each answer. This is problematic for reliability as well as for validity reasons.

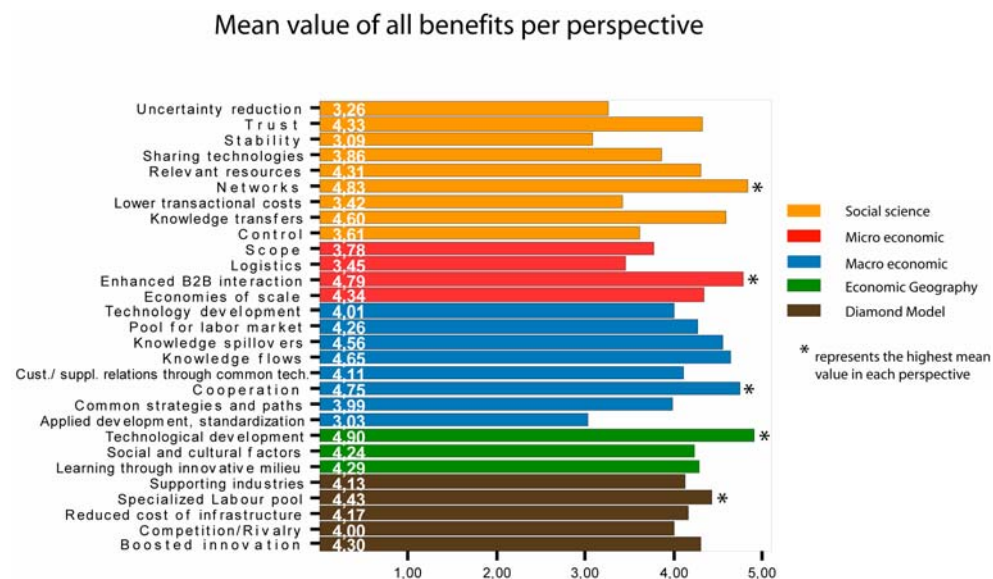
The similarity of the benefits, which consequently leads to a similarity of the statements, means that the survey would probably not render the same results if the questionnaire was sent to the same respondents once again, since the statement can turn out problematic to tell apart. We consider this a theoretical drawback which we are not able to counteract. Only companies listed as members of cluster organizations were contacted, in order to ensure that the companies themselves are aware of the cluster environment.

## 5 Analysis

In this chapter, the empirical findings are shortly displayed and the general research questions are answered. The different tests used are presented. The research proposals, along with the hypothesis are thereafter tested and findings are analyzed. Finally, critique and a conclusion end the chapter.

### 5.1 Empirical findings

The survey generated quite an extensive amount of figures. Due to space saving reasons, the frequency tables of each question will not be presented. Instead, the mean value of each benefit is presented. The benefit with the highest mean rank within each perspective is marked with an asterisk (figure 5):

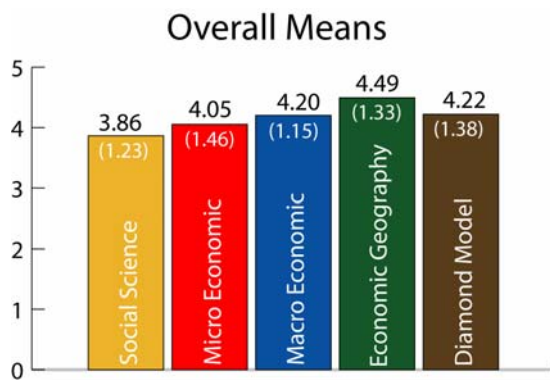


**Figure 5: Mean value of all benefits per perspective**

As seen in figure 5, the Diamond Model presents an even overall rank while the other perspectives present a higher variation within each group (consult appendix 9 and 10 for standard deviation). The first general research question of which benefit received the highest mean rank, turned

out to be Technological development, from the Economic Geography perspective.

Figure 6 shows the overall means for each perspective. The figure contains a statistical flaw, and that is the standard deviation, which is a “mean standard deviation” due to that the different perspectives hold various number of benefits. Despite this, the graph shows a good overall picture of how the respondents ranked the different perspective’s content. The Economic Geographic perspective received the highest mean rank, and is consequently the answer to the second general research question.



**Figure 6:** Overall means per perspective, standard deviation in brackets

## 5.2 Tests

Two different tests were used to analyze the results. The following is a presentation of the different tests, what they measure and where they were used.

### 5.2.1 Mean value with standard deviation

The mean value shows the average point received by the respondents and the standard deviation shows the spread of the points given. Mean values with standard deviation has been calculated on the different benefits from the four perspectives as well on the benefits from the Diamond Model. The overall means also include standard deviation but an average deviation. The test with mean values and standard deviation was conducted for the research proposals.

### 5.2.2 *Kruskal-Wallis test*

The Kruskal-Wallis test is used when more than two unrelated samples with different variables shall be tested. It is similar to the Mann-Whitney test, but the Mann-Whitney can only be used with a maximum of two unrelated samples. If the scores received by each benefit have little difference between them, their mean rank should be similar (*Cramer, 1994*). If the difference in ranking the benefits by the different industries is strong, the significance level for the specific benefit should be between zero and five per cent, between five and ten per cent indicates some significance. In the cases of a level above ten per cent, no significance can be proven.

The test was used for the hypothesis. Since our respondents were unevenly distributed among the industries, only four contained enough respondents to be tested; those were *IT, Metal, Biomedicine* and *Other*.

### 5.3 Research proposals & Hypothesis

**Research proposal 1: There are benefits found outside the Diamond Model that are ranked higher than the benefits found in the Diamond Model.**

The benefit from the Diamond model with the highest ranking was Specialized Labour Pool (mean value of 4.43), and the lowest ranked benefit was Competition/Rivalry (mean value of 4.00). The table below displays the benefits that are outside the Diamond model and have the higher or same mean value than the highest rank in the Diamond model (Table 2):

**Table 2: Benefits that may complement the Diamond Model**

Benefits ranked higher than the highest ranked Diamond benefit	Mean	Std. Deviation
Knowledge spillovers (Macro)	4.5556	1.53723
Knowledge flows (Macro)	4.6528	1.49327
Knowledge transfers (S. Sc)	4.5972	1.57140
Technological development (Ec. Geo)	4.9028	1.57587
Enhanced B2B interaction (Micro)	4.7917	1.57388
Networks (S. Sc)	4.8333	1.66995
Cooperation (Macro)	4.7500	1.79004

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Benefits ranked higher than the lowest ranked Diamond benefit	Mean	Std. Deviation
Pool for labour market( Macro)	4.2639	1.69501
Technology development (Macro)	4.0141	1.55373
Customer/ supplier relations through common technology (Macro)	4.1111	1.75672
Economies of scale (Micro)	4.3380	1.77236
Trust (S. Sc)	4.3333	1.53824
Social and cultural factors (Ec. Geo)	4.2394	1.55347
Learning through innovative milieu (Ec. Geo)	4.2857	1.60744
Access to resources (S. Sc)	4.3099	1.65263

The seven benefits above the dashed line are all ranked higher than the highest benefit in the diamond model and would thereby make a strong complement. The remaining eight benefits below the dashed line were ranked higher than the lowest ranked benefit of the Diamond Model, and

would consequently make a good complement. Since the test revealed benefits that presented a higher ranked mean than the lowest ranked benefit, and even some that were ranked higher than the highest ranked mean of the Diamond Model; the hypothesis is accepted.

**Research proposal 2: The SMITH provides a higher ranked mean than the Diamond Model.**

This hypothesis is tested with a comparison of the means from the Diamond Model and the mean from the SMITH (Table 3):

**Table 3: Means comparison, Diamond Model and SMITH**

Diamond Model		
N	Valid	67
	Missing	5
Mean value		4.2209
Std. Deviation		1.37780
SMITH		
N	Valid	55
	Missing	17
Mean value		4.0633
Std. Deviation		1.20122

The test shows that the SMITH does not present an overall higher mean than the Diamond Model (4.06 compared to 4.22). However, a wider array of benefits is presented in the SMITH than in the Diamond Model (29 compared to 5). When describing benefits in a cluster environment, the SMITH may be applicable to show a multi-faceted perspective in terms of benefits. In the end, it did not generate a higher mean than the Diamond Model.

*Hypothesis 1: a) Benefits are ranked differently between industries*

The Kruskal-Wallis test was applied on the four groups *IT*, *Metal*, *Biomedicine* and *Other* since these industries were the only ones with enough respondents to perform a test of statistical relevance.

The test showed a significant difference between the industries in the following benefits (Table 4):

**Table 4: *Kruskal-Wallis test, difference between industries per benefit***

	Boosted innovation (Diamond)	Technology development (Macro)	Sharing technologies (S. Sc)	Technological development (Ec. Geo)	Supporting industries (Diamond)
Asymp. Sig.	.027	.048	.081	.046	.064
	C/ S. relations through common tech (Macro)	Economies of scale (Micro)	Learning through innovative milieu (Ec. Geo)	Stability (S. Sc)	Logistics (Micro)
Asymp. Sig.	.037	.021	.025	.011	.055

In table 4, a significance level below five per cent ( $\leq 0.05$ ) showed a strong significance, and between five and ten per cent ( $\leq 0.10$ ) showed some significance. Over ten per cent presented no significance at all and these benefits are not accounted for in table 4 (for full significance table, consult appendix 8). The test showed that the biggest difference between the industries was in Stability, from the Social Scientific perspective. Nine other benefits showed significant difference in percentages varying from two point one per cent (Economies of scale) and eight point one per cent (Sharing technologies). Given that the benefits were ranked differently between the industries in ten out of twenty-nine cases, the hypothesis is discarded.

The following table is a presentation of which industry ranked the current benefits the highest. The industry with the highest mean rank consequently ranked it the highest (Table 5). For example, in the benefit *supporting industries* the industry Biomedicine had the highest mean rank.

**Table 5: *Kruskal-Wallis test, highest ranking industry per benefit***

	Industry	N	Mean Rank
Boosted innovation (Diamond)	Other	20	33.88
	IT	18	21.56
	Metal	8	18.81
	Biomedicine	7	30.71
	Total	53	
Technology development (Macro)	Other	21	32.55
	IT	18	20.81
	Metal	8	23.00
	Biomedicine	7	34.71
	Total	54	
Sharing technologies (S. Sc)	Other	21	32.29
	IT	18	20.17
	Metal	8	31.44
	Biomedicine	7	27.50
	Total	54	
Technological development (Ec. Geo)	Other	22	28.84
	IT	18	22.56
	Metal	8	25.81
	Biomedicine	7	41.86
	Total	55	
Supporting industries (Diamond)	Other	20	31.53
	IT	18	21.11
	Metal	8	22.00
	Biomedicine	7	34.93
	Total	53	
Customer/ supplier relations through common technology (Macro)	Other	22	32.16
	IT	18	19.81
	Metal	8	27.44
	Biomedicine	7	36.64
	Total	55	
Learning through innovative milieu (Ec. Geo)	Other	22	31.59
	IT	16	21.63
	Metal	8	19.94
	Biomedicine	7	21.81
	Total	50	
Economies of scale (Micro)	Other	21	29.81
	IT	18	18.69
	Metal	8	34.81
	Biomedicine	7	34.86
	Total	54	
Stability (S. Sc)	Other	21	33.67
	IT	17	18.68
	Metal	7	20.57
	Biomedicine	7	29.93
	Total	52	
Logistics (Micro)	Other	22	30.73
	IT	17	19.06
	Metal	8	33.31
	Biomedicine	7	31.21
	Total	54	



**Hypothesis 1: b) The perspectives compiled benefits are ranked differently between industries**

*The Kruskal-Wallis test was applied yet again to see if the industries ranked the four perspectives and the Diamond Model benefits differently.*

The test showed that there are great differences between how different industries value benefits in the different perspectives. In the test shown below the Macro Economic perspective had a strong significant level, below five per cent (0.022). This means that the four different industries value this perspective very differently. The Diamond Model and Economic Geography showed some significance, between five and ten per cent (0.076 and 0.097). This means that there are some differences between how the different industries value the two perspectives. For the other two, Social Science and Micro Economic, no significance was found. Therefore the hypothesis must be discarded

In the test there was little difference in significance between four of the perspectives. The one that stood out was the Macro Economic perspective that showed a very strong significance compared to the other perspectives. This, as mentioned before is a sign of great difference in how the different industries value the benefits.

**Table 6: *Kruskal-Wallis test, difference between industries per perspective***

	Economic Geography	Social Science	Diamond Model	Macro Economic	Micro Economic
Asymp. Sig.	.097	.103	.076	.022	.125

In this table below, a presentation of which industry ranked the different perspectives the highest is shown. The industry with the highest mean rank consequently ranked it the highest (Table 7). For example, in the perspective Economic Geographic the industry of Biomedicine had the highest mean rank.

**Table 7: Kruskal-Wallis test, highest ranking industry per perspective**

	Industries	N	Mean Rank
Economic Geographic	Other	22	26.84
	IT	15	21.40
	Metal	8	24.56
	Biomedicine	7	38.57
	Total	52	
Social Science	Other	18	31.33
	IT	17	20.18
	Metal	7	20.50
	Biomedicine	7	24.93
	Total	49	
Diamond Model	Other	17	30.06
	IT	18	20.75
	Metal	8	19.69
	Biomedicine	7	33.29
	Total	50	
Macro Economic	Other	21	32.02
	IT	17	18.26
	Metal	7	23.00
	Biomedicine	7	33.43
	Total	52	
Micro Economic	Other	18	28.69
	IT	17	18.41
	Metal	8	26.88
	Biomedicine	6	30.08
	Total	49	

## **5.4 Critique**

When conducting an analysis, as many answers as possible from the questionnaire, is of course beneficial to the survey. The questionnaire for this thesis was answered by 72 respondents. With a higher response rate, and thereby a higher sample, the analysis would be easier to generalize.

As mentioned in the empirical findings, the standard deviation used for comparing means per perspective is a mean standard deviation. Due to that the different perspectives inhibit various numbers of benefits, analyzing them has its flaws.

The sample collected from the questionnaire presented some indications that some questions should have been created differently. For instance, when choosing the industry 'other' in the questionnaire, the respondents should have been able to fill in the industry they belong to in an open field. This way, a more profound analysis of differences in benefits between industries could be made.

## **5.5 Conclusions**

The first hypothesis showed that the SMITH contained benefits that are ranked higher than the lowest ranked benefit of the Diamond model, and even benefits that are ranked higher than the highest ranked benefit of the Diamond model. The seven benefits ranked higher than the highest benefit from the Diamond Model are:

- 1.** Knowledge spillovers (Macro)
- 2.** Knowledge flows (Macro)
- 3.** Knowledge transfers (S. Sc)
- 4.** Technological development (Ec. Geo)
- 5.** Enhanced B2B interaction (Micro)
- 6.** Networks (S. Sc)
- 7.** Cooperation (Macro)

The majority of the seven top ranked benefits involve either social relations (3, 5, 6, 7) or the knowledge exchange (1, 2), intentional or unintentional, between companies. Only Technological development (4)

reflected a superior benefit through an improved technical level in the cluster environment. This may be interpreted as if there is need of complementing the Diamond Model with a social criterion, since the social factors are not present in the Diamond Model.

The second hypothesis presented that the SMITH does not provide a higher ranked mean than the Diamond Model (4.0633 compared to 4.2209), and the hypothesis had to be discarded. The SMITH does not deliver a model with a generally higher mean of cluster benefits to our sample. Some of the individual benefits are ranked higher according to the analysis of hypothesis number one, but generally it does not add statistical proof as an incentive for implementing the SMITH.

In the third hypothesis, the Kruskal-Wallis test revealed that ten out of twenty-nine benefits had a ranking that statistically could be proven different between the industries. The hypothesis is discarded and for our sample, no difference can be proven between the industries in the majority of the benefits. Of the benefits where a difference could be statistically proven, these results are found (Table 8):

**Table 8: Statistically proven difference between industries**

<i>Benefits (perspective)</i>	<i>Industry with highest ranking</i>
Boosted innovation (Micro)	Other
Technology development (Macro)	Biomedicine
Sharing technologies (S. Sc)	Other
Technological development (Ec. Geo)	Biomedicine
Supporting industries (Diamond)	Biomedicine
Customer/ supplier relations through common technology (Macro)	Biomedicine
Economies of scale (Micro)	Metal
Stability (S. Sc)	Other
Logistics (Micro)	Metal

As one may have expected, the traditional industry of metal, ranked the benefits of logistics and economies of scale the highest among the tested industries. This might have a correlation with the costs of resetting big

machines to different product lines and the cost of transporting heavy goods.

The biomedicine industry ranked the technological benefits the highest along with the benefit of supporting industries, which can be seen from a technological perspective as well in terms of receiving technologically advanced input. Unfortunately, no further information is available in the empirical material regarding what industries are present in the “other” category. This prevents a further analysis of which industries ranked boosted innovation, sharing technologies and stability the highest.

From the hypothesis 3b the Kruskal-Wallis test showed that there is a strong significance in how the industries value different benefits within the Macro Economic perspective (0.22). For the Diamond Model and Economic Geography some significance was shown (0.076 and 0.097). For the other two, Social Science and Micro Economic, no significance was found. The hypothesis is therefore discarded, even though there were strong statistically differences in some cases.

When looking at the analysis for the first hypothesis, a high ranking of the benefits related to social factors becomes evident. The social scientific perspective did not produce a high mean compared to the other perspectives, but if the market oriented benefits are removed and the social benefits from the other perspectives are added, the following highly ranked benefits appear (Table 9):

**Table 9: Socially related benefits**

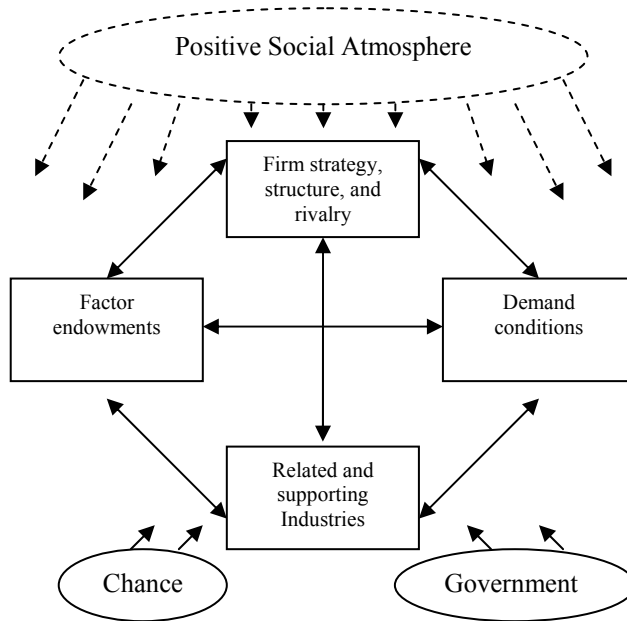
<i>Benefits</i>	<i>Average ranking</i>
Trust (S. Sc)	4.33
Networks (S. Sc)	4.83
Enhanced B2B communication (Micro)	4.79
Knowledge Spillovers (Macro)	4.56
Knowledge flows (Macro)	4.65
Cooperation (Macro)	4.75
Social and cultural factors (Ec. Geo)	4.25
Knowledge transfers (S. Sc)	4.60

Knowledge flows and spillovers are included as social factors, hence knowledge is transferred through relational bonds between companies irrespective if it is intentional or not.

**Table 10: Mean rank of socially related benefits**

	N	Minimum	Maximum	Mean	Std. Deviation
Socially rel. benefits	8	4.25	4.83	4.5950	.21071
Valid N	8				

The high mean ranking of this group (table 10) of benefits is considerably higher than the Diamond Model's mean ranking (4.60 compared to 4.22). All these competitive benefits can best be sieved in an environment of positive social bonds. This leads to the creation of a new group of benefits for the Diamond Model not previously taken in consideration, in order to achieve the highest competitive advantage possible. The benefits are gathered in a group designated Positive Social Atmosphere (Fig. 7):



**Figure 7: The Diamond model with the positive social atmosphere amendment**

This positive social atmosphere contains the benefits that considerably outranked most of the benefits considered in this thesis, and they are all important to implement, in order to achieve the highest competitive advantage for the cluster region. This amendment would contain the previously mentioned benefits, which, from a Macro Economic perspective, would create a new criterion for the Diamond Model, for a better adaptation to the dynamic business world of today.

The differences between the industries affect the applicability of a few of the included benefits, but for the highest ranked benefits of the socially related benefits, no difference between industries could be statistically proven, which implies the general applicability of the amendment.

## **6. Thesis conclusions**

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*This chapter concludes the thesis. A discussion of our findings, the practical relevance of the thesis, some well-needed self-criticism and suggestions of future research finalizes the work.*

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### **6.1 Discussion**

Our findings presented implications of the need of an amendment to the Diamond Model, designated Positive Social Atmosphere. According to our research, it contains benefits which are very important in order to achieve the highest competitive advantage possible for companies, and consequently for the cluster. The overall better detailed description of criteria needed for a successful cluster, generates a better picture for policy-makers when trying to find competitive edges in the globalized economy of the world.

### **6.2 Practical relevance**

The findings of this thesis could be useful for many actors in the cluster environment. Cluster initiators like local policy-makers can further improve their knowledge of cluster environments and what the experienced competitive benefits are regarded among the companies situated in a cluster. Factors that are hard to measure and display in numbers, like social relations, can be obtained from the findings of this thesis and implemented when marketing a cluster.

The survey showed a high ranking of the social connections between companies in the clusters, and these benefits are hard to obtain awareness of, just from figures provided by the cluster companies.



### **6.3 Self criticism**

A positive attitude regarding the time limit turned out to be a major disadvantage for the authors, and efforts to try to obtain a more evenly distributed population, in terms of industries, would probably have helped to show results of higher validity. Feedback from the respondents provided information of how the design of the questionnaire could have been better. The authors concur. A more profound knowledge of SPSS (the statistical software used) would have saved critical hours when compiling the results of the empirics.

### **6.4 Future research questions**

In an article in the *Economical Development Journal*, fall 2006, PhD Steven W. Popper and PhD Athar Osama discuss how to improve the quality of policy advice in the creation of clusters. Ever since the Silicon Valley success, leaders around the world have tried to create economic clusters in an attempt to replicate the Silicon Valley phenomenon in their own regions and cities (Osama & Popper, 2006). It is important to improve the “*quality and relevance of research and analysis from which the policy advice is ultimately derived*”, hence, Popper and Osama highlight some points that are important when analysing clusters in order to successfully establish competitive and productive regions. Governments and various public actors play an important role in this process. Arguments for cluster policy must be established with regards to development of clusters. In most cases today, unfortunately, these are often vaguely formulated and this results in low stimulation of new cluster build ups (*ibid.*). A future profound research might provide an answer to how competitive clusters can be created, by learning from other clusters, but adapted to the new prerequisites of the current environment.

The empirics collected in this thesis contain information regarding more than just what industry the company belongs to. If these figures are analyzed, they may reveal interesting information regarding the correlation between different company variables and the different

benefits. For example turnover, number of employees, company age et cetera.

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# Appendices

## [Appendix 1] Email (Swedish)

Hej!

Vi är tre studenter som läser sista året på civilekonomprogrammet vid Högskolan Kristianstad. Vår examensuppsats är inom företagsekonomi och undersöker olika fördelar i klustermiljöer. Er hjälp skulle vara av stor vikt för vår undersökning och därför ber vi om ca 10 minuter av Er tid att besvara vår webbenkät. Er medverkan är betydelsefull!

Anledningen till att vi kontaktat just Ert företag och Er personligen är att vi behöver Er åsikt angående klustermiljöer. Er kontaktuppgift har vi hittat genom klassificerade klusterorganisationer på clusterobservatory.eu.

För att nå enkäten klicka på länken nedanför. Länken leder till Kristianstad Högskolans interna webb nät. Vi ber er att fylla i vår enkät så fort som möjligt då undersökningen stänger på måndag den 19/11-2007 klockan 3.

<http://www.luvit.hkr.se/eval/pub/81072>

Tack ännu en gång för din medverkan!

Med vänliga hälsningar,

Martin Persson, Adis Sabanovic och Henrik Wester

## [Appendix 2] Email

Hello!

We are three students studying our senior year at Kristianstad University. We are conducting our bachelor thesis in business administration and are examining different benefits in cluster environments. Your participation is of great importance to us, and therefore we ask for ten minutes of your time to answer our web based questionnaire.

The reason why we ask you (to participate as a representative for your company) is because we need your opinion concerning benefits in cluster environments. We have found your contact information at clusterobservatory.eu.

To obtain the questionnaire, please click the link below. The Survey is located at Kristianstad University's protected web space. We kindly ask you to fill in the questionnaire as soon as possible, as the survey closes Monday 07-19-11, at 15:00.

<http://www.luvit.hkr.se/eval/pub/81072>

Thanks for your participation in our survey!

Sincerely,

Martin Persson, Adis Sabanovic and Henrik Wester

### [Appendix 3] Email 2 (Swedish)

Hej!

Jag skickar här enligt vårt telefonsamtal länken till vår undersökning. Information om undersökningen finns mer utförligt beskrivet i webbenkäten. Klicka på länken här under för att komma till enkäten.

<http://www.luvit.hkr.se/eval/pub/81072>

Tack för din medverkan. Den är viktig för vår undersökning!

Med vänliga hälsningar,

Martin Persson, Adis Sabanovic och Henrik Wester



**[Appendix 4] Email 2**

Hello!

In accordance to our telephone conversation, I hereby send you the link to our survey. Further information regarding the survey is included in our web based questionnaire, which can be obtained from the link below.

<http://www.luvit.hkr.se/eval/pub/81072>

Thank you for your participation, it is of great importance for our survey!

Sincerely,

Martin Persson, Adis Sabanovic and Henrik Wester

## [Appendix 5] Benefits

This is the specific version of how the benefits are operationalized.

No.	Benefit	Operationalization
1	Knowledge spillovers (Macro Economic)	<i>The spillovers are valuables to the surrounding companies that occur from the development taking place inside separate companies. The statement emphasizes that the spillovers are contributed autonomously, similar to a bonus for the surrounding.</i>
2	Knowledge flows (Macro Economic)	<i>These flows are stated to generate a higher value because of the proximity of the cluster, it is therefore compared to if the companies were geographically scattered.</i>
3	Knowledge transfers (Social Science)	<i>In comparison to statement number one, these knowledge transfers are deliberate to create value for all parties, so this is emphasized in the statement.</i>
4	Pool for labor market (Macro Economic)	<i>This pool for labor market is operationalized with the utterance of “favorable supply of labor” to emphasize a hefty supply of human resources attracted by the cluster.</i>
5	Pool of specialized Labour	<i>Similar to statement number four but with the amendment of the word</i>

	(Micro Economic)	<i>“specialized” to distinguish between the macro- and Micro Economic benefits.</i>
6	Boosted innovation (Micro Economic)	<i>This benefit is operationalized by the emphasis on external factors that are stated to boost the technological ability of a company in a cluster, and with competition as an example.</i>
7	Technologic development (Macro Economic)	<i>Statement is reflecting the benefit by mentioning that the companies around contributes to the development of new technology.</i>
8	Sharing technologies (Social Science)	<i>With emphasis on that companies deliberately share technologies, this statement shall reflect the wish of companies to gain from each others R&amp;D.</i>
9	Technological development (Economic Geographic)	<i>The statement is pointing at the general technological development level in the cluster, and if the respondents experience an increase thanks to the surrounding.</i>
10	Supporting industries (Micro Economic)	<i>The increased chance of persuading a supplier to realign the production to a specialized output in a cluster is intended to be reflected with the mentioning of proximity.</i>
11	Reduced cost of infrastructure (Micro Economic)	<i>To operationalize the stated difference of being situated within the cluster or outside in</i>

- terms of costs for infrastructure, the term "...can be shared with companies with similar communication needs" shall reflect the geographical meaning.*
- 12 Customer/ supplier relations through common technology (Macro Economic) *Intends to reflect upon the positive impact common systems have on relations. It reduces market failures, and the statement clarifies this with a comparison between cluster- and non-cluster environments in terms of the use of standards.*
- 13 Enhanced interaction B2B (Micro Economic) *Interaction is dependant on distance, the comparison between the geographically limited cluster and the spread out companies outside it highlights this.*
- 14 Economies of scale (Micro Economic) *The closeness to business partners and the joint effort of putting the geographical area as a target for customers is highlighted to facilitate the respondents understanding of why economies of scale occur in cluster environments, if they recognize it.*
- 15 Scope (Micro Economic) *The term "...adapt a cost efficient scope, thanks to geographical closeness" is used to see if respondent experience a facilitation with the cluster*

- environment when setting scope on the production line.*
- 16 Competition/Rivalry  
(Micro Economic) *To highlight the positive aspect of competition and to clarify that it is that aspect we are examining, the term “positive competition” is utilized*
- 17 Trust  
(Social Science) *By distinguish between the trust within the cluster and outside, we wish to examine is there is a higher degree of trust in the cluster environment in general, than outside.*
- 18 Networks  
(Social Science) *By distinguishing between the respondents networking within the cluster and outside, we wish to examine if the networks are stronger in the cluster environment in general, than outside.*
- 19 Cooperation  
(Macro Economic) *The Macro Economic stated benefit of cooperation is reflected by a simple comparison is the respondents feel an enhanced cooperation between themselves and business partners in the cluster, compared to the relations they experience with business partners outside the cluster.*
- 20 Common strategies and paths  
(Macro Economic) *Strategies and paths are baked into one word in statement, designated only as “strategies”. The addition of “...and/or goals”*

- is to clarify the diverse opportunities of collaboration between business partners.*
- 21 Social and cultural factors (Economic Geographic) *What sounds more of a benefit from the social scientific perspective is emphasized by mentioning within the cluster, which is the current geographical area, and thereby clarified to originate from the economic geography perspective.*
- 22 *Learning through innovative milieu (Economic Geographic)* *The causality of that an innovative milieu results in faster learning is stated and the statement finally adds "...in your cluster" to examine if this is the case for the respondent. The word "milieu" is replaced with "environment" to avoid misunderstandings.*
- 23 Control (Social Science) *Examples are used to clarify why a cluster environment is to prefer, according to theory, if control of the product's value chain is desired*
- 24 Stability (Social Science) *The cluster environment is compared to a scattered company environment to see if respondents can identify an economic stability of being located in a cluster.*
- 25 Uncertainty reduction (Social Science) *Operationalized through examples of uncertainties, and the use of the word proximity when reflecting*

- upon the benefits of having customers and suppliers in the vicinity.*
- 26            Logistics  
(Micro Economic)      *The use of “Your cluster environment facilitates logistical solutions” plus examples and that this results in shorter geographical routes will operationalize logistics.*
- 27            Applied development,  
                 standardization  
(Macro Economic)      *The statement operationalizes the stated benefit by emphasizing that standardized systems are more common with business partners within the cluster than with a business partner outside the cluster.*
- 28            Lowers transactional  
                 costs  
(Social Science)      *A number of transactional costs are accounted for to ensure the respondent of the wide range of factors considered transactional costs.*
- 29            Access to resources  
(Social Science)      *The cluster offers contacts with other companies and individuals who may play a key part in the acquisition of a relevant resource. Therefore, the mentioning of contacts is a cornerstone of the statement.*

## [Appendix 6] Questionnaire (Swedish)

Denna enkäts syfte är att undersöka de företagsekonomiska fördelarna med att ha närbesläktade företag (antingen företag från andra steg i produktvärdekedjan eller företag som sysslar med liknande verksamhet) i geografisk närhet, en så kallad **klustermiljö**.

Enkäten tar ca tio minuter att genomföra. Svaren kommer att hanteras konfidentiellt och användas till en kandidatuppsats inom företagsekonomi. Om ni har några frågor om enkäten så går det bra att kontakta Henrik Wester på telefon 0704-33 94 44, eller skicka ett mail till [henrik.wester0002@stud.hkr.se](mailto:henrik.wester0002@stud.hkr.se).

Tack för er medverkan!

Företagsnamn:

Bransch:

- |                                       |   |
|---------------------------------------|---|
| <input type="checkbox"/> IT           | <input type="checkbox"/> Kommunikation                                      |
| <input type="checkbox"/> Transport    | <input type="checkbox"/> Produktionsteknik                                  |
| <input type="checkbox"/> Metall       | <input type="checkbox"/> Bildhantering/publicering                          |
| <input type="checkbox"/> Biomedicin   | <input type="checkbox"/> Energi   |
| <input type="checkbox"/> Skog         | <input type="checkbox"/> Underhållning                                      |
| <input type="checkbox"/> Medicin      | <input type="checkbox"/> Hälsovetenskap                                     |
| <input type="checkbox"/> Mat & Design | <input type="checkbox"/> Bygg / Byggmaterial <input type="checkbox"/> Annat |

Etableringsår för ert företag:

Etableringsort för företaget/ kontoret:

Verksamhetsort idag:

Etableringsår i närområdet:

Omsättning år 2006:

Antal årsanställda år 2006:

Respondentens befattning:

Jag vill få en länk skickad till mig så jag kan ta del av uppsatsen när den publiceras i Januari. E-postadress:



NEDAN FÖLJER 29ST PÅSTÅENDEN SOM VI ÖNSKAR ATT NI FRÅN ERT FÖRETAGSPERSPEKTIV TAR STÄLLNING TILL OCH GRADERAR PÅ EN SKALA 1-7. **1 BETYDER INSTÄMMER EJ** OCH **7 BETYDER INSTÄMMER HELT**. EN DEL AV FRÅGORNA KAN TE SIG LIKARTADE MEN MÄTER OLIKA VARIABLER, SÅ VAR GOD LÄS FRÅGORNA NOGA. TACK FÖR ER MEDVERKAN!

		1	2	3	4	5	6	7
1.	Klustermiljön ni befinner er i gör så att ert företag bidrar autonomt till kunskapsutvecklingen hos andra företag i klustret.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.	Det finns ett kunskapsflöde mellan företag i klustret som skapar högre värde för alla parter, jämfört mot vad som skulle förekomma om företagen låg på olika geografiska platser.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.	Kunskap sprids medvetet mellan företag i ert kluster för att skapa en vinn/vinn situation bland inblandade parter.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.	Er klustermiljö medför god tillgång till arbetskraft.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5.	Er klustermiljö medför god tillgång till <i>specialiserad</i> arbetskraft.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6.	Er klustermiljö medför att innovationsförmågan i ert företag ökar, tack vare	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

	utomstående faktorer i klustret såsom konkurrens från liknande företag.	
7.	Er klustermiljö med liknande företag i närheten, bidrar till er teknologiska utveckling.	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
8.	Inom er klustermiljö delas teknologiska kunskaper mellan samarbetspartners i klustret.	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
9.	Er klustermiljö innebär att den teknologiska utvecklingen ökar mer i området generellt, jämfört om företagen låg geografiskt isolerade från liknande industrier.	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
10.	Leverantörer inom klustret kan, tack vare tryggheten med närheten, förse er med specialiserade varor och tjänster, som utanför klustermiljön hade varit svårare att tillgå, eller förmå leverantörer att tillverka.	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
11.	I er klustermiljö så kan kostnaden för infrastruktur minskas då det i en grupp är lättare att ge beslutsfattande myndigheter incitament att investera i infrastruktur i	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>

	området, jämfört med om ni befunnit er utanför klustermiljön.	
12.	Då användandet av standardiserad teknologi och system är vanligare i en klustermiljö mellan samarbetspartners, bidrar det till att kund-/leverantörsrelationer inom klustret blir starkare än utanför en klustermiljö.	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
13.	Dialog och samarbete mellan er och affärspartners i klustret underlättas, tack var miljön, jämfört med samarbetspartners utanför den.	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
14.	Fördelar med storskalig produktion uppnås lättare i er klustermiljö, då det finns en närhet till företag inom samma bransch och kunder vet vart de skall vända sig när de söker specifika produkter.	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
15.	Er klustermiljö ger möjlighet för er att på ett kostnadseffektivt sätt anpassa bredd och djup i ert produktsortiment, då ni har en närhet till kund i och med klustret.	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>

16.	Rivaliteten mellan liknande företag i klustret skapar en positiv konkurrens på så sätt att den driver er att ständigt utvecklas och hitta nya lösningar.	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
17.	Tilltron mellan er och era affärspartners i klustret är större generellt än mellan er och era affärspartners utanför klustret.	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
18.	Klustermiljön erbjuder möjligheter att med medaffärspartners skapa nätverk som generellt är starkare än nätverket till företag utanför klustret.	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
19.	Er klustermiljö leder till ökat samarbete mellan er och era affärspartners, jämfört om ni låg geografiskt spridda från varandra.	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
20.	Den klustermiljö ni befinner er i, bidrar till att ni kan utveckla gemensamma strategier och/eller mål med affärspartners inom klustret.	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
21.	Det har skapats en gemensam kulturell och social miljö i	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>

	klustret, generellt sett.	
22.	Då er klustermiljö bidrar till en innovativ miljö, finns det möjligheter till snabbare inläring för ert företag.	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
23.	Er klustermiljö underlättar anskaffandet av kontroll i produktvärdekedjan, till exempel genom en större insikt och närhet till marknaden.	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
24.	Er klustermiljö bidrar till en ekonomisk stabilitet i ert företag jämfört med om de geografiska avstånden till era affärspartners var större, dvs. inte en klustermiljö.	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
25.	Osäkerheter, såsom svängningar i efterfrågan, förseningar, falska uttalanden etc. kan reduceras, i och med närheten till kunder och leverantörer i er klustermiljö.	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
26.	Er klustermiljö underlättar logistiklösningar, såsom frakt till kund, eller utskick av service, då en del av logistiken går till företag i klustret, det vill säga på kortare geografiska rutter.	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>

27.	En högre användning av standardiserade system och produkter mellan ert företag och era affärspartners sker i klustermiljön, jämfört mellan er och era affärspartners utanför klustret.	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
28.	Er klustermiljö sänker transaktionskostnader, såsom kostnader för förseningar, inventeringar, kundkontakter, marknadsföring, resor, etc., då de geografiska avstånden till affärspartners i klustret är avsevärt mindre.	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
29.	Er klustermiljö underlättar tillgången till resurser som är relevanta till er företagsverksamhet.	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>

## [Appendix 7] Questionnaire

This is the questionnaire translated from Swedish into English:

1. Your cluster environment results in your company's autonomous contribution to the development of knowledge in the other companies of the cluster.
2. There is a flow of knowledge among the companies in the cluster, which generates a higher value compared to if the companies were situated in geographically scattered locations.
3. Knowledge is deliberately spread among companies in your cluster environment to create a win/win situation for all concerned parties.
4. Your cluster environment results in a favourable supply of labour
5. Your cluster environment results in a favourable supply of *specialized* labour
6. Your cluster environment results in an increase of your company's innovation ability, thanks to external factors of the cluster, for example competition.
7. Your cluster environment with related companies around, contributes to the technological development of your company.
8. Technological knowledge is shared in your cluster environment between business partners.
9. Your cluster environment contributes to a higher momentum in the technological development of the area in general; compared to if the companies were to be geographically isolated from similar industries.

10. Suppliers within the cluster can provide you with specialized input, thanks to the proximity, which outside the cluster would be hard to obtain, or persuade suppliers to manufacture.

11. The cost of infrastructure can be reduced thanks to your cluster environment, since incentives to policy-makers are easier to provide in a group, compared to if you were to be located outside the cluster environment.

12. Since the use of standardized technologies and systems is more common in a cluster environment between business partners compared to outside a cluster, customer-supplier relations grow stronger here.

13. Business to business interaction within the cluster is facilitated, thanks to the environment, compared to interaction with business partners outside it.

14. Economies of scale are more easily obtained in your cluster environment, since there is closeness to similar companies, and customers know where to go in search for specific products.

15. Your cluster environment gives you an opportunity to adapt a cost efficient scope, thanks to the geographical closeness to your customers in the cluster.

16. The rivalry between similar companies in the cluster creates a positive competition which impels you to constantly develop and find new solutions.

17. The trust between your company and your business partners is generally higher, than the trust between you and your business partners outside the cluster



18. Your cluster environment offers opportunities to form networks with other companies that are stronger in general, than your network of companies outside the cluster.
19. Your cluster environment leads to an enhanced cooperation with your business partners, compared to if you were geographically scattered.
20. Your cluster environment contributes to the possibility to develop common strategies and/or goals with your business partners in the cluster
21. A joint cultural and social environment has been formed in the cluster, if seen in general.
22. There are opportunities of faster learning in an innovative environment for your company in your cluster.
23. Er klustermiljö underlättar anskaffandet av kontroll i produktvärdekedjan, till exempel genom en större insikt och närhet till marknaden.
24. Your cluster environment contributes to an economic stability for your company, compared to if the geographical distances were greater, videlicet a non-cluster environment.
25. Uncertainties, such as swings in demand, delays, false statements et cetera, can be reduced thanks to the proximity to customers and suppliers in your cluster environment.
26. Your cluster environment facilitates logistical solutions, such as freight or the sending of service, since some of the logistics are planned to companies in the cluster, videlicet shorter geographical routes.

27. Your company uses standardized systems and products with your business partners inside the cluster to a higher degree, than with your business partners outside the cluster.

28. Your cluster environment lowers transactional costs, such as costs of delays, inventory, customer relations, marketing, travel et cetera, since the geographical distances to business partners in the cluster are considerably reduced.

29. Your cluster environment facilitates the access to resources, relevant to your business, by facilitating the acquisition of contacts.

## [Appendix 8] Kruskal-Wallis test

### Difference in significance between industries per benefit

	Asymp. Sig.
Knowledge spillovers (Macro)	.574
Knowledge flows (Macro)	.470
Knowledge transfers (S. Sc)	.313
Pool for labour market (Macro)	.083
Specialized labour pool (Diamond)	.305
Boosted innovation (Diamond)	.027
Technology development (Macro)	.035
Sharing technologies (S. Sc)	.102
Technological development (Ec. Geo)	.026
Supporting industries (Diamond)	.062
Reduced cost of infrastructure (Diamond)	.379
Customer/ supplier relations through common technology (Macro)	.151
Enhanced B2B interaction (Micro)	.883
Economies of scale (Micro)	.073
Scope (Micro)	.177
Competition/Rivalry (Diamond)	.662
Trust (S. Sc)	.410
Networks (S. Sc)	.428
Cooperation (Macro)	.622
Common strategies and paths (Macro)	.454
Social and cultural factors (Ec. Geo)	.304
Learning through innovative milieu (Ec. Geo)	.042
Control (S. Sc)	.279
Stability (S. Sc)	.029
Uncertainty reduction (S. Sc)	.407
Logistics (Micro)	.137
Applied development, standardization (Macro)	.269
Lower transactional costs (S. Sc)	.339
Access to resources (S. Sc)	.090

## [Appendix 9] The Diamond Model

### Mean value per benefit

	N	Minimum	Maximum	Mean	Std. Deviation
Specialized labor pool	72	1.00	7.00	4.4306	1.84487
Boosted innovation	70	1.00	7.00	4.3000	1.78845
Supporting industries	70	1.00	7.00	4.1286	1.74390
Reduced cost of infrastructure	71	1.00	7.00	4.1690	1.80464
Competition/Rivalry	71	1.00	7.00	4.0000	1.73205
Valid N	67				

## [Appendix 10] The four perspectives

### Mean value per benefit

	N	Minimum	Maximum	Mean	Std. Deviation
Knowledge spillovers (Macro)	72	1.00	7.00	4.5556	1.53723
Knowledge flows (Macro)	72	1.00	7.00	4.6528	1.49327
Knowledge transfers (S. Sc)	72	1.00	7.00	4.5972	1.57140
Pool for labor market (Macro)	72	1.00	7.00	4.2639	1.69501
Technology development (Macro)	71	1.00	7.00	4.0141	1.55373
Sharing technologies (S. Sc)	71	1.00	7.00	3.8592	1.57929
Technological development (Ec. Geo)	72	1.00	7.00	4.9028	1.57587
Customer/ supplier relations through common technology (Macro)	72	1.00	7.00	4.1111	1.75672
Enhanced B2B interaction (Micro)	72	1.00	7.00	4.7917	1.57388
Economies of scale (Micro)	71	1.00	7.00	4.3380	1.77236
Scope (Micro)	68	1.00	7.00	3.7794	1.84347
Trust S.Sc)	72	1.00	7.00	4.3333	1.53824
Networks (S. Sc)	72	1.00	7.00	4.8333	1.66995
Cooperation (Macro)	72	1.00	7.00	4.7500	1.79004
Common strategies and paths (Macro)	72	1.00	7.00	3.9861	1.74011
Social and cultural factors (Ec. Geo)	71	1.00	7.00	4.2394	1.55347
Learning through innovative milieu (Ec. Geo)	70	1.00	7.00	4.2857	1.60744
Control (S. Sc)	72	1.00	7.00	3.6111	1.76472
Stability (S. Sc)	68	1.00	7.00	3.0882	1.51347
Uncertainty reduction (S. Sc)	70	1.00	7.00	3.2571	1.62129
Logistics (Micro)	71	1.00	7.00	3.4507	1.93309
Applied development, standardization (Macro)	69	1.00	7.00	3.0290	1.62672
Lower transactional costs (S. Sc)	71	1.00	7.00	3.4225	1.86442
Access to resources (S. Sc)	71	1.00	7.00	4.3099	1.65263
Valid N	57				