

“Business clusters as drivers of sustainable regional development?”

An analysis of cluster potentials for delivering sustainable development in regions- with a case study of the Mexican automotive cluster Saltillo – Ramos Arizpe

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Abstract

The terms “cluster” and “sustainable development” are probably two of the most overused and ambiguous concepts in recent discussions. Linking them together in the context of regional development can therefore be seen as a risky as well as ambitious enterprise. The aim of this paper is to investigate the special potential that clusters have in delivering sustainable development in a region. Today, regions are considered as playing a crucial role in the implementation of new sustainable models of development. In a globalized world, the most important “survival strategy” of regions lies in a simultaneous internal and external networking of its actors.

Businesses are important partners for achieving sustainable regional development. Growing expectations of international costumers force more and more companies to integrate social and environmental aspects in their business practices and the trend towards so-called sustainability funds supports the theory that CSR can also be economically worthwhile. On the other hand, firms cannot be seen as independent entities that act on an isolated scale. In fact, today's economy is a strong global network of different actors who do not only compete but also, or mainly, cooperate. Clusters are a specific form of cooperation that has increasingly gained importance in recent years. They can be defined as geographic concentrations of interconnected companies, specialized suppliers, service providers, and associated institutions. Not only northern industrialized countries observe a real cluster boom. Also in the global south, cluster initiatives are used as an instrument for regional economic development.

The importance of clusters for the economic competitiveness of regions is largely uncontested. However, little is known about their impact on society and ecology. This paper will examine how advantages arising from local embeddedness and spatial proximity, strategic cooperation and constructive competition, as well as the high influence of external actors and the integration into global production networks, can also be used to encourage responsible business practices and joint CSR activities. Clusters often build around endogenous regional potentials and can strengthen the regional identity and the participation of stakeholders in the process of sustainable regional development. The cluster approach fosters the formation of stable cooperation and networks and can reduce barriers for implementing international sustainability standards. Working together within a cluster, companies are able to share knowledge, promote joint learning and achieve innovations and therefore increase efficiency and standard of living. Local governments, educational institutions as well as NGOs and civil society have considerable influence on cluster activities and are capable to promote responsible business practices. However, the rapid economic growth in the cluster region can also contribute to increased costs of living, increased social disparities, and the devaluation of other regions. Collusions between the cluster companies and the local government can weaken the position of the employees and lead to social and environmental dumping. Although clusters facilitate the integration of local SMEs into global production networks, at the same time they often hinder these companies from improving their position as suppliers at low value stages.

Referring to examples from recent cluster literature, publications of leading international institutions in the field of cluster development and personal experiences in Mexico, this paper will examine whether and under which conditions clusters do not only provide economic benefits for a region but can also generate social and environmental improvements, that companies could not achieve alone. Such clusters could create competitive advantage focused on the enhancement of sustainable development and therefore lead to sustainable upgrading.

Keywords: *Sustainable regional development, cluster, CSR, responsible competitiveness, sustainable upgrading, automotive industry, Coahuila (Mexico)*

1 INTRODUCTION

“The whole is more than the sum of its parts”- this frequently used quote, especially when it comes to clusters, describes very well the aim of this paper, which is to investigate the special potential that clusters have in delivering sustainable development in regions.

Previous cluster literature and cluster research did primarily concentrate on the economic advantages of clusters and focused on productivity and innovation in order to increase competitiveness. These investigations did mainly concern internal processes and social networks between cluster partners and local institutions and therefore implicated a nearly self-contained cluster system that remains unaffected by external influences. Over the past years, the “new geography of the world economy” led to a more broadened perspective in which the external embeddedness in global production networks is increasingly seen as a substantial factor for the performance of clusters and the development of the region.

While the importance of clusters for the economic competitiveness of regions is largely uncontested, little is known about their impact on society and ecology. This paper should therefore contribute to the emerging literature on the relationship between clusters and sustainable regional development. Referring to examples from recent cluster literature, publications from leading international institutions in the field of cluster development and personal investigations in a Mexican automotive cluster, the present paper will examine whether and under which conditions clusters do not only provide economic benefits for a region but can also generate social and environmental improvements, that companies could not achieve alone.

In the course of this paper, the following two questions should be answered:

1. In which specific areas do business clusters have the potential to contribute to sustainable regional development?
2. Which internal and external factors influence the potential of clusters for the sustainable regional development?

The paper is structured into four sections. The following chapter will introduce the two concepts, *sustainable development* and *cluster* and explains how these concepts can be adapted for the specific propose of this paper. Beside the spatial concentration on the region

as main implementation level of sustainable development, this chapter focuses on the role of the private sector and furthermore on the advantages of multi-stakeholder-cooperation.

The third section of this paper identifies potential contact points between the two concepts and describes a number of resultant areas, in which clusters could contribute to sustainable regional development. In section four, these theoretic assumptions will be applied to the case study. Based on the results, I will develop a model of influence levels, affecting the potential of clusters for the sustainable regional development. The final section explains this influence model and offers a concluding summary in order finally to answer the question: „Are Clusters drivers of sustainable regional development?

2 THEORETICAL FONDATIONS

Our global world system and in particular global economy have changed significantly over the last 200 years. During this time the world's population has grown by the factor six and the worldwide BNP by the factor 850 (cf. Gardner/ Prugh 2008). Globalization and the advancing process of international division of labor have lead to a tremendous increase in cross-border trade of goods and especially of capital. Apart from these quantitative aspects, also the structure of the world's economy has changed significantly during the last three decades. Due to the increasing segmentation of value chains, it is now possible to break up the production process in different parts and locate them in different countries and regions all over the world. This so called “disintegration of production”, together with a concentration on core competences (see Milberg 2004, S.46), leads towards a new geography of the world economy (cf. Messner 2003), where peripheral regions are playing a particular role.

In fact, the steady growth of the world's population and economy as well as the developments in the global economic structure have caused three fundamental problems of today's society: 1.) the increasing scarcity of natural resources and the destruction of our ecosystem, 2.) the rapid augmentation of emissions und resulting climate change, 3.) the enlarging gap between the global north and south¹ as a result of the unequal distribution of resources and power in the world (cf. Nussbaumer 2007: 14; Gardner/Prugh 2008: 29).

2.1 The concept of “Sustainable Development”

The solution for these complex and global challenges requires a holistic approach that also takes the interdependencies between economic activities, social aspects and the natural environment into account. The concept of *sustainable development* aims to provide such a

¹ This paper follows the terminology of global north and global south instead of the terms developing or underdeveloped and developed countries, because of the problematic history of these terms.

balance by considering economy, ecology and society as three equally important areas. The Brundtland Report (1987) defined sustainable development as “[...] a development that meets the needs of the present without compromising the ability of future generations to meet their own needs“(WCED 1987, S.43). In August 2002, the Johannesburg World Summit on Sustainable Development expanded this definition identifying the "three overarching objectives of sustainable development" to be (1) eradicating poverty, (2) protecting natural resources, and (3) changing unsustainable production and consumption patterns (cf. Moiseyenko 2006: 201).

Since the United Nations Conference in Rio de Janeiro in 1992, the concept has been spread among international and national policy makers and is currently meeting big response in the public and among businesses. Hence, the overuse of the term that means very different things to different people, as well as difficulties in operationalizing the concept for practical implementation, have provoked a lot of criticism during the last years (cf. Atkinson et al. 2007; Sedlacek 2002: 15). This paper will undertake a specification of the overall concept sustainable development, by identifying regions as main geographic reference level and clusters as potential organization forms of implementation.

2.1.1 Sustainable development- a regional concept

Today, regions are considered as playing a crucial role in the implementation of new sustainable models of development. In response to increasing competition, outsourcing and globalization there is a growing specialization and concentration of industries across all regions in the world. Regions are replacing nations as principle reference level of competitiveness (cf. Cernavin/ Führ 2005: 8). At the same time the relation between economic, social and ecological objectives is much more visible at the local level. Consequences of one's actions can be experienced immediately and the consternation of the players as well as collective regional characteristics can enforce regional identity and thus contribute to participation (cf. Schleicher- Tappser et al. 1992: 1; Lardelli et al. 2006). According to the Rio conference in 1992, sustainable regional development builds on endogenous potentials and focuses on the integration of the regional economy through the promotion of regional economic cycles. Besides the purely economic evaluation of regional development, also socio-cultural factors like the strengthening of regional identity, as well as environmental factors through the sustainable use of regional natural resources are taken into consideration. Moreover, at the political level, a greater regional involvement and the participation of different actors is addressed (cf. Voll unpublished: 2f.)

Regions can be defined as a system of actors in a space below the national level that comes into existence by the interaction of its members (cf. Scheff 2001: 26). However, regions should not be interpreted as isolated units, which develop entirely independent from the world economic systems. Rather, regions are often part of global production networks (see Henderson et al. 2002²), and therefore, underlay their constraints but can also benefit from their chances. In a globalized world, the most important “survival strategy” of regions lies in a simultaneous internal and external networking of its actors (cf. Genosko 1999: 120).

2.1.2 The role of the private sector

The private sector is recognized as playing a key role for the successful continuous development of regions. Companies are not only the driving force of many innovations, but in recent years also increasingly becoming centers of economic and political power (cf. Gray/ Bebbington 2007: 376). Due to their crucial impact on environment and society, businesses have to be considered as major partners for achieving sustainable regional development. This includes large national and transnational corporations as well as local small and medium enterprises (SMEs). Without their involvement sustainable regional development can hardly be achieved (cf. Bergmann 2005: 149; Moiseyenko 2006: 201). Bratianu et al. (2008: 288) describe the influence of companies on sustainable development in a region as follows: „Regional sustainable development is influenced by the ability of the enterprise, especially SMEs to create strategies that confer them sustainable competitive advantages on the local and global market, so as to be profitable and pass on their wealth to the community”. The role of small enterprises as key producers, employers, innovators and wealth creators is increasingly recognized. They make up over 90 per cent of worldwide businesses and are prevalent connected to their local environment (cf. Nelson 2007: 4)

The decline of legal requirements in the neoliberal world economy since the 1980s, has led to an increased degree of freedom for the private sector. At the same time growing expectations of customers, employees and local communities force companies to take responsibility for their complex, social and natural environment (cf. Schweiger 2008: 14; Ivanisin 2006: 99). Today, more and more companies are integrating social and environmental aspects in their business practices. These efforts, more or less seriously taken, are often communicated under the term corporate social responsibility (CSR)³. The European Commission defines CSR as

² The global production network concept (GPN) was developed by Henderson et al (2002) and is based on the global commodity chain approach (GCC) of Gary Gereffi (1994). By analyzing the dynamics and structures of the global world economy this concept attempts to draw conclusions about local consequences of globalization for companies, regions and employees.

³ In this paper the terms CSR, responsible business practices and sustainable business practices will be used equivalently

„A concept whereby companies integrate social and environmental concerns in their business operations and in their interaction with their stakeholders on a voluntary basis“ (EC 2001: 5). At the level of individual firms, there is a growing body of evidence that CSR strategies can help to reduce risks and costs and the trend towards so-called “Sustainability Funds” supports the theory that CSR can also be economically worthwhile. Whether responsible business practices can also lead to increased competitiveness on the regional or even national level, is currently investigated by different institutions like the international NGO AccountAbility⁴. This leads us to the concept of *responsible competitiveness (RC)*, which can be described as: „[...] an essential ingredient for effective global markets. It blends forward-looking corporate strategies, innovative public policies, and a vibrant, engaged civil society. It is about creating a new generation of profitable products and business processes underpinned by rules that support societies' broader social, environmental and economic aims“ (Pascal Lamy, General Director of the WTO In: AccountAbility⁵). This definition makes clear that RC can't be achieved by businesses alone.

2.2 The cluster concept

In other words, firms can't be seen as independent entities that act on an isolated scale. In fact, today's economy is a strong global network of different actors who do not only compete but also, or mainly, cooperate. “More now than at any time in recent memory, there is an urgent need for cooperation between governments, business and civil society to find shared solutions to global challenges.” (Ruggie, Gerard 2007 in Nelson 2007: preface). Today, cooperation of multiple stakeholders are often considered as the most appropriate tool for the achievement of sustainable development (cf. Nelson 2007: 10).

Clusters are a specific form of cooperation that has increasingly gained importance in recent years. They can be defined as geographic concentrations of interconnected companies, specialized suppliers, service providers, and associated institutions, which are interacting on a vertical, horizontal and diagonal dimension and are further embedded in global production networks (for further explanation see Porter 1994, 2000). Not only northern industrialized countries report a real cluster boom. Also in the global south, cluster initiatives are used as an instrument for regional economic development.

Previous cluster literature and cluster research has primarily concentrated on the economic advantages of clusters and focused on productivity and innovation for the enhancement of

⁴ <http://www.accountability21.net/>

⁵ <http://www.accountability21.net/default.aspx?id=2074> [14.11.2008]

competitiveness. These investigations did mainly concern internal processes and social networks between cluster partners and local institutions, and therefore implicated a nearly self-contained cluster system that remains unaffected by external influences. Over the past years, the “new geography of the world economy” led to a more broadened perspective in which the external embeddedness in global production networks is increasingly seen as a substantial factor for the performance of clusters and the development of the region.

While the importance of clusters for the economic competitiveness of regions is largely uncontested, little is known about their impact on society and ecology. This paper acts on the assumption that business clusters deliver a great potential for the sustainable development in a region. “[T]hey can deliver the existing benefits of business clusters - competitiveness and innovation – as well as wider social, economic and environmental benefits.” (Berry 2004: 1). Working collaboratively within a cluster and sharing resources, know-how and risk, firms could be able to achieve social and ecological improvements and create local competitive advantage based on sustainable development.

There are a number of well-argued critiques of the inflationary use of the term cluster in recent regional and economic sciences (see Asheim et al. 2006). Nevertheless, some characteristics of the cluster concept recur in most of the respective cluster definitions (see Porter 2000; Brenner 2004; Cernavain 2005; Van der Linde 2005; Asheim et al. 2006; Zwazl 2008). These cluster features offer a variety of potential advantages for the promotion of sustainable development in a region.

1. Strong regional relation and spatial proximity

Spatial and in particular social proximity can be important steps towards a sustainable economy (cf. Schramm 2009). Due to the settlement of several companies from a related industry in a specific region, a number of agglomeration advantages, or so called *external economies (EE)* can occur. These passive side-effects of the activities of the cluster partners, include a specialized pool of labor, common infrastructure, the availability of inputs, access to information and capital, collective knowledge stocks, access to markets, the mutual knowledge of the intra-regional actors, their common cultural, and political background as well as their understanding of historical and cultural particularities of the region (cf. Giuliani et al. 2005: 556, Sternberg 2005: 128). Further advantages of geographical proximity in the context of sustainable regional development are the reduction of fuel consumption by lower transport and the regional identity of firms that are more willing to comply with environmental and social requirements (cf. Assadourian 2008: 270)

2. Interconnected businesses in related industries:

Cooperation between cluster partners is considered to be more effective and stable than it is the case in of other geographical constellations (cf. Jonas 2006: 1). Regional networks in the clusters reduce risk and uncertainty, and ease the process of information and knowledge exchange (cf. Sedlacek 2002: 56, 60) Continuous interaction between the partners encourages collective learning creating a common basis of trust. These interactions help to define the economic, social and environmental goals for the region and gradually implement sustainability strategies. (cf. Sedlacek 2002: 61)

These actively generated benefits from the exchange of goods, technology, know-how and knowledge through collaborations and networks is often described as so-called *joint action (JA)* (cf. Giuliani 2005: 551, 556). The two dynamics, external economies and joint action together compose the concept of *collective efficiency (CE)*, which was developed by Schmitz (1995) in order to summarize the advantages of clustering for the competitiveness of companies and regions.

3. Large influence of institutions, NGOs and governments

Clusters often act as a magnet for well-qualified workforce and may put pressure on policymakers to set up special assistance such as training or research centers. Moreover, companies themselves are motivated to create specific educational and training opportunities (cf. Simmie 1997: 20). In addition, they promote not only inter-company networks, but also support collaboration between business and academic science as well as between business and politics. Clusters also provide a good entry opportunities for NGOs and educational or governmental institutions, which aim to support sustainable development (cf. UNIDO/AccountAbility 2006)

4. Simultaneous competition and cooperation

According to Porter (1990), clusters stimulate a rapid diffusion of new technologies and assist in upgrading⁶ local suppliers due to intense competition and cooperation. Clusters often reach a high degree of flexibility through so-called *diverse specialization* in which every company in the cluster focuses on its own core competences based on the skills of other cluster firms. This allows some kind of complementarity between the cluster partners (cf. Wolfe 2002: 17). The highly competitive environment in a cluster forces firms to continuous improvements and new innovations. This leads to higher efficiency and productivity, which can not only reduce costs but also diminish negative effects on the natural environment and improve the living standard of the people in the region.

5. Integration into global production networks

⁶ The upgrading concept will be explained in chapter 3

Beside the importance of intense intra-regional cooperation, Sternberg (2005: 130) stresses an urgent need for the external exchanges with non-regional or international partners. Due to global dynamics in production systems and the financial market, the international dimension of clusters in particular when it comes to sustainable development has increasingly gained importance.

3 POTANTIAL AREAS OF CONTRIBUTION

Based on the mentioned characteristics of the cluster approach, the following hypothesis about cluster potentials for sustainable development can be derived:

1. Clusters strengthen regional identity and thus encourage the participation of stakeholders in the process of sustainable regional development.

“Endogenous development is more likely to be successful when people are able to identify with the region they live and/or work in. Regional identity attaches people to places and motivates them to become involved in the regions activities” (Lardelli et al. 2006: 11). To develop regional identity, the economic, ecological, social and cultural strengths of the region have to be identified. Clusters are often formed around these endogenous potentials and try to exploit them commercially. Successful clusters can therefore later become endogenous potentials and “brands marks” of the region themselves (cf. Scheff 2001: 33; Schamp 2005: 107). Examples for such a strengthened regional identity through clusters are for instance the “Holzwelt Murau” (Timber World Murau) in Styria referring to the particular importance of the raw material wood in the region and the IT cluster in Bangalore in India, also called the “Silicon Valley of India” (see Abbas/ Madan 2008).

2. Clusters promote specific collaborations and networks, in which common sustainability goals can be achieved more easily

In the scientific literature it is considered to be relatively uncontested that the cluster approach fosters the formation of stable co-operation and networks. A clear distinction between the concepts of clusters and networks is often missing in the respective literature. In the course of this work, networks are seen as part elements of clusters, which develop by the joint action of the cluster members. The mutual knowledge and geographical proximity of firms from different stages of the value chain are specific features of the cluster approach and can promote collective CSR activities and a better coordination of the production process on the vertical, horizontal and diagonal level (cf. Posch et al. 2006: 213). The tannery clusters in the Indian state of Tamil Nadu, are a good example of collective efforts for the improvement of

the environmental performance (see Kennedy 1999; UNIDO/ Accountability 2006). Thanks to their cultural and religious solidarity and in collaboration with the nearby "leather research institute" and financial assistance of the state, the tanners succeeded to decrease the pollution in the region significantly through the construction of collective waste water treatment plants. Another example for sustainability networks related to clusters is the concept of industrial symbiosis. These recycling networks connect companies from different industries while the waste of one firm serves as a raw material for another network partner (Posch et al. 2006: 211). The most famous example of a recycling network is located in Kalundborg in Denmark (cf. Brouder/ Berry 2004; Strebel/ Schwarz 1998).

3. Clusters foster knowledge creation, knowledge spillovers and joint learning and thus promote sustainable innovations in a "learning region"

"Knowledge, learning and innovation are the most important factors for competitiveness in the globalizing and knowledge-based economy" (Lundvall 1992). Continuous interaction between the cluster partners allows shared learning and the proximity in the cluster increases the absorption capacity of knowledge (cf. Gassler 1999: 4; Wolfe 2002: 5). The concept of knowledge spillovers describes these intentional or unintentional knowledge transfers between actors, affecting both technology as well as tacit knowledge (see Gallagher/ Zarsky 2007: 19). Ivarsson/ Alvstam (2005) come to the conclusion that clusters, in general, benefit a technology exchange between the transnational corporations (TNCs) and their local suppliers, because transaction costs are kept relatively low and a higher degree of control and flexibility is guaranteed. Furthermore, many TNCs prefer a personal "face-to-face contact" with the local businesses, as technology exchange is a trust issue (cf. Ivarsson/ Alvstam 2005: 1327). Cernavin (2005) especially emphasizes the importance of social resources for the learning process. These social resources can partly arise from the historical and cultural particularities of the region, and include: common standards and values, communication patterns and cultural codes, cluster-specific forms of innovation and, above all, trust (cf. Cernavin 2005: 47; Wolfe 2002).

Wolfe (2002) argues that firms in a cluster often share a common regional culture and specific communication codes that make social learning easier. The concept of learning region describes those places, which provide an appropriate social, institutional and economic environment to encourage such learning processes (see Wolfe 2002; Ivanisin 2006; Scheff 2001). Such learning regions offer a high potential for innovations, which are increasingly seen as "driving forces" for sustainable regional development (cf. Sedlacek 2002: 51). Therefore the regional level and especially clusters offer a wide range of positive externalities

for the innovation process, such as locally available resources, education - and research facilities and communication networks. Besides the classic examples of innovative high-tech and IT clusters, like Silicon Valley in the U.S., Guadalajara to Mexico (see Gallagher/ Zarsky 2007) and Bangalore in India (see Chaminade/ Vang 2008), there are also case studies which analyze particularly sustainable innovations through clusters (see Eco- cluster Styria-Sedlacek 2002; Chilean wine cluster in Colchagua- Giuliani/ Bell 2004).

4. Clusters facilitate the sustainable upgrading of local SMEs

One of the main objectives of sustainable regional development is the strengthening of regional value added (cf. Gothe/ Hahne 2006: 7). In recent decades, there is a dominating opinion that the regional value added can be increased in particular through the integration into global production networks. The term upgrading means in its original understanding "[...] the process by which economic actors, nations, firms, and workers move from low-value to relatively high value activities in global production networks" (Gereffi 2005: 171). The classic upgrading concept focuses primarily on the enhancement of economic activities through better production processes (process upgrading), higher quality products (product upgrading), the adoption of more lucrative functions in the value chain (functional upgrading), or the shift in a more profitable value chain (intersectoral upgrading) while value is more and more depending on intangible factors such as innovation, technology, design, and marketing (cf. Giuliani et al. 2005; Gereffi 2005: 164).

This upgrading concept has hardly been questioned in the scientific literature on global value chains and production networks where it has been consistently used in a positive sense. However, upgrading almost always leads to winners and losers among companies and employees and the profits arising from the increased value through upgrading processes is often very unevenly distributed. Benefits are not shared with the employees in the form of higher wages, greater job security or better working conditions. As the example of the Torreon's jeans cluster in Mexico shows, the functional upgrading of some lead firms can also have negative effects on other companies in the second and third stage leading to negative employment effects as well as deterioration in working conditions and declining wages (see Bair/ Gereffi 2001).

Bair (2005) and Oliveira (2008) criticize this lack of consideration of social implications and argue for a broader concept of upgrading. For this reason the present work, will introduce the concept of sustainable upgrading as "[...] an upgrade that would aim at a long-term development strategy based on formalized firms paying taxes, following environmental, labor, health and safety regulations and track ring local social development " (Oliveira 2008: 2).

This concept takes into account different forms of social upgrading⁷ and ecological improvements as well as an economic upgrading of local small and medium-sized enterprises.

4 CASE STUDY

Located in the north-Mexican state of Coahuila, the cluster Saltillo - Ramos Arizpe is, measured at its output, the most important automotive cluster in the whole country. More than a quarter of all nationally produced vehicles are produced in this area that creates more than 70,000 direct and indirect jobs in the region (cf. Ramirez 2009; Cedillo et al. 2006: 410). The presence of the two “big players”, General Motors and Chrysler, acts like a magnet to other international companies in the automotive industry and has significantly contributed to the formation of the cluster in the region.

Due to its high degree of diversification, its vertical depth and the specific role of local small and medium enterprises, the cluster represents a very interesting object of analysis. The following presentations are the result of literature research combined with personal investigations and interviews in the cluster.

4.1 Introduction

Today, the automotive industry is among the ten most important industrial sectors in the world. Short product life cycles, overcapacities, falling demand and intense global competition force automotive companies to develop new strategies (cf. Sanchez 2008). Brand image and flexibility as well as the rapid adaptation to customer needs are now considered as the most important factors of competitiveness (cf. Sturgeon et al 2009: 14f.). Mexico is the eleventh largest automobile producer in the world. Accounting for a share of 24.5% of the national GDP in the manufacturing industry, the automotive industry is one of the most dynamic sectors in the country. Every fifth industrial job is created in this industry, binding nearly one million workers directly (see Sanchez 2008: 8; Umann 2009: 2). Following international trends, the Mexican automotive industry is characterized by its high degree of foreign direct investments (FDI), the geographic proximity between production and end market and a heavily concentrated firm structure on the horizontal level. A small number of international lead companies, so called *original equipment manufacturers (OEMs)* together with their global suppliers on the first tier have a lot of power and take on the most lucrative parts of the value chain such as design, sales, marketing and after sales service⁸. Furthermore,

⁷ Social upgrading includes employment and poverty reduction, skill upgrading, wages, working conditions and empowerment/ labor unions

⁸ Following the distinction by Gereffi (1994), the automotive industry consists of producer-driven value chains,

Mexico's automobile industry is highly export oriented, selling 90% of all vehicles abroad. At the same time, the majority of the necessary technology and raw materials for the production process is imported from other countries (cf. Sturgeon et al. 2009: 17; Umann 2009: 2; AMIA⁹).

Clusters are a widespread form of organization in the Mexican as well as in the international automotive industry. The geographical proximity between suppliers and customers as well as the availability of necessary inputs accelerate the production process and the dissemination of technical innovations and facilitate inventory management by reducing storage costs¹⁰. Whether automotive clusters can also have a positive impact on the sustainable development in Mexican regions, is not so easy to answer. Once the advantages of clusters for the sustainable development in regions have been described in section 2, the present case study of the north- Mexican automotive cluster in Saltillo - Ramos Arizpe illustrates very well the problems and challenges, which the cluster approach can bring about.

4.2 Evidence from Mexico

In 2003, former Mexican president Vicente Fox, declared "sustainable growth" for the new Mexican economic strategy for the 21st century: „Estamos decididos a que la competitividad se convierta en el eje central de la nueva política económica, que conduzca a las empresas mexicanas por el camino del crecimiento sustentable” (CECIC 2003: 1). However, it remains questionable which particular understanding of sustainability underlies this statement. Anyway, the practical implementation of this strategy, so far proved to be little if any sustainable.

Not only the internal cluster dynamics and the strategy of foreign corporations largely prevented an active joint action of the cluster partners and an upgrading of local small and medium-sized businesses. Also, the structure of the global automotive industry, as well as the socio-economic and political conditions in Mexico and Coahuila are crucial factors for the developments in Saltillo - Ramos Arizpe, and in the whole region of Coahuila.

Since the 1980s, the policy of economic growth, pursued at any price, has led to a reduction in the power and will of government regulations. The competition for investment has largely minimized environmental and social requirements and there is even a disposition to set aside tax revenues from industrial companies in order to attract FDIs. Such a proactive attitude of

characterized by high entry barriers and capital-and technology-intensive production

⁹ <http://www.amia.com.mx/estadisticas.html> [13.06.2009]

¹⁰ According to the classification of Giuliani et al. (2005), the automotive industry belongs to the group of complex products industries (COP). In this sector, the collective efficiency tends to be low as the case study will confirm.

the government towards businesses also runs the risk to undermine the existing legal regulations. The cluster companies in Saltillo – Ramos Arizpe capitalize on their powerful position in the region and negotiated a so called devil's deals with the government. These arrangements have lead to a disempowerment of trade unions and largely deteriorated the position of workers in the cluster. In order to prevent such a devil's pact, the control by civil society initiatives is necessary. A suitable network, could be for example provided by the organization "Regional Development Observatory Coahuila "(ODR-Coahila), where regional citizens from various sectors have joined together and actively participate in their regions through communication and information projects (cf. Teissier 2006: 664). Overall, there is hardly any active participation of NGOs in Saltillo - Ramos Arizpe.

Also, the cluster development took place largely without the support of international organizations. This could also be a reason for the limited integration of local small and medium-sized enterprises, who have previously also missed the support of the regional policy. Environmental problems and growing social disparities have frequently been ignored by the regional government. Thus, the problem of rising unemployment, despite the company's settlements, was simply covered up by statistical tricks.

Economic constraints, such as high foreign debt and the tight fiscal policy for the purpose of a low inflation, made the attraction of foreign capital to the highest priority for the Mexican government. These foreign direct investments (FDIs) promised not only jobs and foreign exchange earnings, but also long-term economic growth, technology transfer and skill upgrading. The OECD praised FDIs even as "a source of sustainable development" (cf. Gallagher/ Zarsky 2007: 13, 28). These expectations, however, are still not fulfilled. Many critics argue that the policy change in Mexico from the import substitution industrialization (ISI) before the 1980ies to a system of export oriented growth have led towards a more unequal income distribution and declining wages for the majority of workers in the country (cf. Bair/ Peters 2006: 204).

Indeed, the wages for workers in Mexico have steadily fallen since the 1980s. However, the level of wages inside the cluster in Saltillo - Ramos Arizpe has always been above the Mexican average. Even the standard of living in the region has increased in recent decades. For the most part, this can be explained by the high educational level and the regional economic power which is certainly also a result of the local automotive cluster. But at the same time, also the number of poor people in the region has increased. According to Teissier (2006: 242) the abandonment of agricultural land in favor of industrial production is

prevailing responsible for these negative trends. Due to the dependence on food from other regions, he sees at risk the food security of poor people.

The location profiling as well as the competition for investment have also increased the rivalry between regions within Mexico. Those regions in northern states, that are heavily involved in international trade account for the highest GDP per capita and the highest level of development in Mexico. At the same time, the poverty situation in the southern areas has further aggravated. In recent years, this inner- Mexican gap has increased internal migration and the problem of rural depopulation.

Also the desired economic growth could not be reached. The high proportion of imports did not only cause annual trade deficits but also kept the regional value added in the automotive industry very low. In addition, the accession to NAFTA, in the mid-1990s, enforced the dependence on the U.S. market even more. Especially during the current crisis, this dependence has serious implications for regional development.

On the cluster internal level, in the case of Saltillo – Ramos Arizpe only a limited potential for the promotion of sustainable regional development can be identified. The automotive industry, characterized by its high environmental impact in all phases of the product life cycle, is not a very sustainable industry per se. Social and environmental dumping by outsourcing the "dirty" stages of production process to countries with lower statutory requirements, are a widespread strategy to reduce costs. On the other hand, corporate governance and CSR are very important factors especially in such a globalized industry and influence the strategies of TNCs who seek to improve their corporate image and brand reputation.

In the cluster Saltillo – Ramos Arizpe, first steps have been taken through initiatives for the collective certification with environmental standards and the establishment of common water treatment plants. However, the joint action, not only in relation to sustainable development, remained very low until now. Local cluster experts therefore believe that the automotive cluster in Saltillo - Ramos Arizpe belongs to the group of physical clusters, thus a mere geographical concentration of nearby businesses without any specific form of interaction¹¹ (see Sanchez et al.2007: 807f.; Cedillo et al. 2006: 407ff.).

¹¹ In contrast, in the so-called functional clusters, the advantages arising from the geographic proximity are used to develop other forms of relationships such as social networks and relational and organizational exchange and can therefore contribute to a competitive advantage in the region

This can be attributed to the sector-specific characteristics of the automotive industry, as well as the high degree of competition and the lack of trust between the cluster members. In addition, the joint regional culture that usually links the cluster companies to each other is largely missing in the case of Saltillo – Ramos Arizpe, where most of the lead firms are transnational corporations. This lack of joint regional culture and history makes the achievement of regional identity even more difficult. The investigations have shown that, especially those foreign branches that enjoy a high degree of autonomy from their parent company, feel more connected to the regional environment in which they are operating.

Physical or social networks for sustainable development are a rather rare phenomenon in the local cluster. In certain areas, social exchange relationships and collective projects can be observed; however, they remain mostly limited to the international lead firms (OEMs) and their global suppliers. In reference to the cluster classification of Meyer-Stamer (1999), Mexican researchers even speak of the existence of two distinct cluster types in Saltillo – Ramos Arizpe. On the one hand there is the *transnational cluster* that was created by the settlement of the OEMs and their international suppliers and is characterized by a high degree of specialization and innovation. On the other hand there is a *survival cluster* consisting of small and micro enterprises, some of which are in the informal sector, that act as suppliers on the lower levels of the value chain. This cluster is characterized by a low degree of specialization and differentiation, low technical and economic expertise, broad mistrust and hardly any innovation.

The interaction between these two cluster types remains very limited, what complicates the prospects for an upgrading of region SMEs. In addition, the technology- and capital-intensive production in the automotive industry cause high entry barriers for small and medium-sized enterprises. Knowledge spillovers from transnational cluster partners are often seen as main sources of external knowledge and know-how for local businesses. In the automotive cluster Saltillo – Ramos Arizpe, knowledge exchange and technology transfer is only taking place within the transnational cluster, what largely excludes local businesses. The influence of transnational corporations on the upgrading process is not always a positive one. However, some examples of local suppliers on Saltillo – Ramos Arizpe show that successful functional upgrading can be reached through strategic collaborations with foreign partners (see Casanueva 2005).

Recent developments in the international automotive industry have increased the power of the supplier firms. However, vertical selection and concentration mechanisms simultaneously have led to even higher barriers to entry and more competition between supply companies.

Difficulties in the standardization of production processes further deteriorate the position of the suppliers in the already very hierarchical and producer dominated value chain.

The lack of access to adequate funding and to affordable credits is also a major obstacle for local businesses in Saltillo – Ramos Arizpe, to improve their position in the buyer- producer relationships. Another hurdle for the upgrading process is the low degree of dynamic specialization in the survival cluster of local SMEs. Since the companies are often providing the same products and services, the only instrument of differentiation remains the price. For this reason, the government of Coahuila, together with representatives of the municipalities Saltillo and Ramos Arizpe, and with representatives of the cluster companies, has founded the independent Center for integration and development of the automobile industry in Coahuila (Centro de Integración y Desarrollo de la Industria Automotriz de Coahuila , CIDIAC) in 2004. It provides a central platform for businesses, educational institutions, research institutions and local government, which is taking over the coordination and optimization of the cluster. By identifying the specific needs of the cluster the project CIDIAC has the potential to push a functional division of work between the cluster companies. Specific activities for the promotion and development of local small and medium-sized enterprises can reduce the barriers to entry and promote the certification with international standards. The CIDIAC connects multiple players on a basis of partnership. This allows the centre to undertake the role of a mediator in the cluster and improve the cluster internal joint action, also in relation to the sustainable regional development (cf. COMIMSA 2004). However, the support by the government and by transnational corporations also brings certain inconveniences. The dominance of the OEMs in the network for example, has a negative impact on the negotiating position of local SMEs. Furthermore, political conflicts have recently made an effective work of the CIDIACs largely impossible. The promising targets of the network have so far hardly been implemented.

The social upgrading process in the cluster has particularly been hindered by the strong relevance of low wages as a factor of competitiveness and by the weakened role of trade unions. The new production system in the automobile industry is often blamed to reduce job security and to increase the pressure on workers to fulfill specific customer needs “just in time”. Despite all the disadvantages that this so-called *lean production system* brings with it, the changes in the organization process in the cluster Saltillo - Ramos Arizpe, have in some respects led to a skill upgrading of the Mexican workforce. In particular, the high qualifications of the employees in relation to the so-called "soft skills" are now an important factor for the competitiveness of cluster firms. However, this well-educated labor force is not

available for all cluster companies to the same extent. Since the transnational and local companies on the higher levels of the value chain tend to pay higher wages, many of the financially weak small and medium-sized businesses have difficulties in winning over highly qualified workers.

In the cluster Saltillo – Ramos Arizpe, responsible business practices, have so far not been seen as a factor of competitive advantage and certifications with international environmental and quality standards remained limited to the highest tiers of the value chains. According to Gallagher and Zarsky (2007: 67), government regulations are seen as the main drivers for the implementation of CSR - practices and for compliance with social and environmental standards in Mexico. Financial incentives, such as provided by the regional government of Coahuila, however, don't seem to be sufficient to initiate a change process among the local industry. Regional policies for sustainable development goes hardly beyond theoretical confessions and declarations of intent. In particular, the substitution of coal as the main regional energy source has not yet been addressed by the local authorities.

Paradoxically, just the current crisis in the automotive industry, seems to offer opportunities for such a change. For the first time in history, an agreement between all stakeholders of the regional automotive industry has been reached through the "Employment Protection and Economic Fortification Agreement", considering particularly the interests of local SMEs. Moreover some ambitious investment projects of transnational corporations which, more than ever, also account for environmental issues, indicate a positive trend in the Mexican automobile industry. The strengthening of the domestic demand as one consequence of the current crisis could be a way out of the dependence on exports and open up new opportunities for the upgrading of the Mexican companies. Like the case of the Brazilian footwear cluster in Sinos Valley has shown, the domestic market is often providing greater opportunities for a functional upgrading processes than hierarchically coordinated global production networks (see Giuliani et al. 2005: 562; Schmitz 1999).

4.3 Conclusions from the case study

"Sustainable business clusters have great potential - they can deliver the benefits of existing business clusters - competitiveness and innovation - as well as conflicting social, economic and environmental benefits. But it's not happening yet" (Berry 2004: 1.).

The present paper was based on the assumption that clusters provide a significant potential for the sustainable development in a region. However, this assumption must be put into perspective.

By summarizing the findings from the examples in recent cluster literature and the results from the presented case study, this section will challenge the four hypotheses derived in section 3. At the end of this chapter, an influence model will be developed, that brings us one step closer to the answer of the question: "Are clusters drivers of sustainable regional development?"

1. Clusters strengthen regional identity and thus encourage the participation of stakeholders in the process of sustainable regional development.

Regional identity is mostly characterized by the common historical, cultural and political background of the protagonists. In order to build such a regional sense of identity in a cluster, it is essential that the cluster members feel connected with the region. The case study makes clear that such a feeling of connectedness is much higher if the company is either having its origin in the region, or enjoys a high degree of autonomy from the foreign parent company. Sternberg (2005: 131) argues that clusters can promote the start-up of companies originally from the region itself. In particular, small and medium-sized businesses are often strongly embedded in the local, social and environmental context of the region in which they are doing business (cf. EC o.J.: 8). A widespread phenomenon, especially among SMEs is the one of *silent CSR*, This means that companies implement responsibility practices such as self-evident in everyday business without declaring or communicating them as CSR activities (cf. UNIDO/ AccountAbility 2006: 23). The greater the dependence on endogenous regional potentials are and the more scarce these potentials are available, the greater are the efforts of enterprises, to actively participate in the sustainable development of the region. The concentration of clusters on endogenous potentials can on the one hand help in the international location profiling. However, on the other hand, the resulting risks of economic monoculture and over-specialization must not be ignored. As the developments in the current economic crisis and the examples of the Indian tannery clusters in Tamil Nadu made clear, exogenous shocks may also contribute to an increased sense of identity. If at this stage, the policy is able to offer a collective way, which appears to be desirable for all businesses and people, such a crisis can also provide an opportunity for sustainable development.

2. Clusters promote specific collaborations and networks, in which common sustainability goals can be achieved more easily

Sustainability networks can occur either in the form of physical exchanges such as recycling and recovery networks, or can concern social forms of exchanges like knowledge and know-how networks as well as the exchange of social capital and financial resources. Especially for

exporting clusters, the compliance with international social and environmental standards is of particular importance (cf. Messner 2003: 124). Networks can reduce costs and risks and make it easier to implement such sustainable business practices, especially for small and medium-sized enterprises. Collective certification initiatives have been realized in the Malawian sugar sector, the soccer cluster in Pakistan's Sialkot, the Chinese toy industry in the Pearl River Delta and the Vietnamese footwear industry in Trung To (cf. UNIDO 2006a: 62). As examples from a South African wine cluster and the Mexican coffee industry show, the involvement of NGOs and external actors is crucial for the success of CSR initiatives (see UNIDO/ AccountAbility 2006). In cooperation with international NGOs like the UK Ethical Trading Initiative (ETI) (South Africa) or FAIRTRADE (Mexico) cluster companies were able to improve working conditions and the living standards of their employees in exchange for better reputation and a rise in sales.

However, the presented case study shows that a formation of networks in the cluster is not always self-evident. In Saltillo - Ramos Arizpe for example, the cluster companies, even though they knew each other for years, didn't succeed to establish a relationship of trust that could favor the formation of networks and joint action. This can partly be explained by the different origins of the companies, as well as the hierarchical governance structures in the automobile industry. In the lower levels of the value chain, the lack of diversification between the companies has a negative effect on joint action and networking. Here, it would be the task of the regional policy to implement a supportive framework and offer incentives for cooperation and networking. The installation of a multi-stakeholder network (CIDIAC), which particularly supports local SMEs, can be seen as a first step towards a more strategic and sustainable cluster development. However the political commitment in the CIDIAC is also responsible for the lack of implementation of the objectives.

3. Cluster foster knowledge creation, knowledge spillovers and joint learning and thus promote sustainable innovations in a "learning region"

In today's "learning economy", knowledge, technology and innovations, can be considered as important factors of competitive advantage. Knowledge spillovers from transnational cluster partners are often viewed as most important sources of external knowledge and know-how for local SMEs. However knowledge, and especially tacit knowledge, cannot be seen as a static good that can easily be transferred from one place to the other. Rather, knowledge is created and passed on by an interactive process of learning that requires personal communication and is therefore heavily dependent on spatial distances (see Huggins 1997; Wolfe 2002: 5). The example of the tannery clusters in Tamil Nadu, where the common regional and religious

identity was crucial for the success of collective initiatives (see Kennedy 1999: 1673ff., 1678) confirms the theory that social resources are of particular importance for the learning process. Sustainable innovations can concern products, production procedures as well as social improvements. Looking at the environmental impacts of a product throughout the life cycle (product life cycle assessment), environmental innovations do not only reduce the costs of sustainability strategies but can also increase the competitiveness of a company (Sedlacek 2002: 62).

Anyway, spatial proximity and research infrastructure in the cluster are not yet sufficient to promote learning processes or sustainable innovations. The examples have shown that in particular the governance structures in the cluster and in the global production networks may have a major impact on knowledge spillovers. Moreover, the organization of the learning process differs significantly among sectors. The political environment and the strategy of each company can also be responsible for the success of knowledge spillovers and may affect the ability of SMEs to implement the newly acquired knowledge in their local context. In addition, regional institutions of the cluster environment have to support the development of social resources and provide common standards and shared regulation systems. Furthermore, the integration into global production networks and the access to international knowledge sources are crucial factors for the emergence of innovations and enable companies to stay informed about the current state of research and the needs of their customers and therefore realize potential market opportunities faster than individual companies (cf. Wolfe 2002: 18; UNIDO 2006b).

4. Clusters facilitate the sustainable upgrading of local SMEs

One of the main objectives of sustainable regional development is the strengthening of regional value added (cf. Gothe/ Hahne 2006: 7). Regions can be considered as nodes in global production networks while the concept of sustainable upgrading describes an improvement of this position in terms of sustainable development. Although the traditional upgrading approach was solely based on the economic value and ignored negative effects on the environment and society, the approach of the sustainable upgrading considers in addition to increased economic strength of local small and medium-sized enterprises, also social and environmental improvements through responsible business practices.

All upgrading processes are influenced by three different variables associated with clusters: 1.) The degree of collective efficiency (joint action and external economies) in the cluster, 2.)

The governance structures in the cluster and in the global production network¹² and 3) The specific characteristics of the particular sector¹³.

The concentration of firms in a cluster can have different effects on the process of sustainable upgrading. Although the effect on employment for marginalized groups of the society is usually a positive one, the dynamics in the cluster lifecycle nonetheless can threaten job security. Clusters promote the education and training of specialized workers. At the same time collusions between the cluster firms and the government (so called devils deals) can weaken the bargaining power of trade unions and therefore wages can more easily be reduced and social standards be circumvented (cf. UNIDO/ AccountAbility 2006). The diffusion of environmental and social standards can be encouraged by social networks and geographical proximity in the cluster. On the other hand, the rapid economic growth in the region can also contribute to increased costs of living, increased social disparities, and the devaluation of other regions. Clusters facilitate the integration of local SMEs into global production networks; however, at the same time they often hinder these companies from improving their position as suppliers at low value stages. In addition to the individual company's strategy and the collective efficiency (joint action and external economies) in the cluster, there are also internal and external governance structures, sector-specific peculiarities, as well as political and institutional conditions that have a crucial impact on sustainable upgrading processes.

Sustainable upgrading can be encouraged by different factors. Apart from the demands of global customers, also the benefits of corporate social responsibility and the enforcement of social and environmental regulations by the national or regional government can initiate such an upgrading process. Compliance with international standards can result in further competitive advantage for local SMEs, which, in combination with additional regional development programs of the government, could also lead to an improved responsible competitiveness of the whole region. However, such legal requirements and international standards do also represent an additional entry barrier, excluding small and medium-sized businesses that do not have the necessary know-how and resources, from the value-added process.

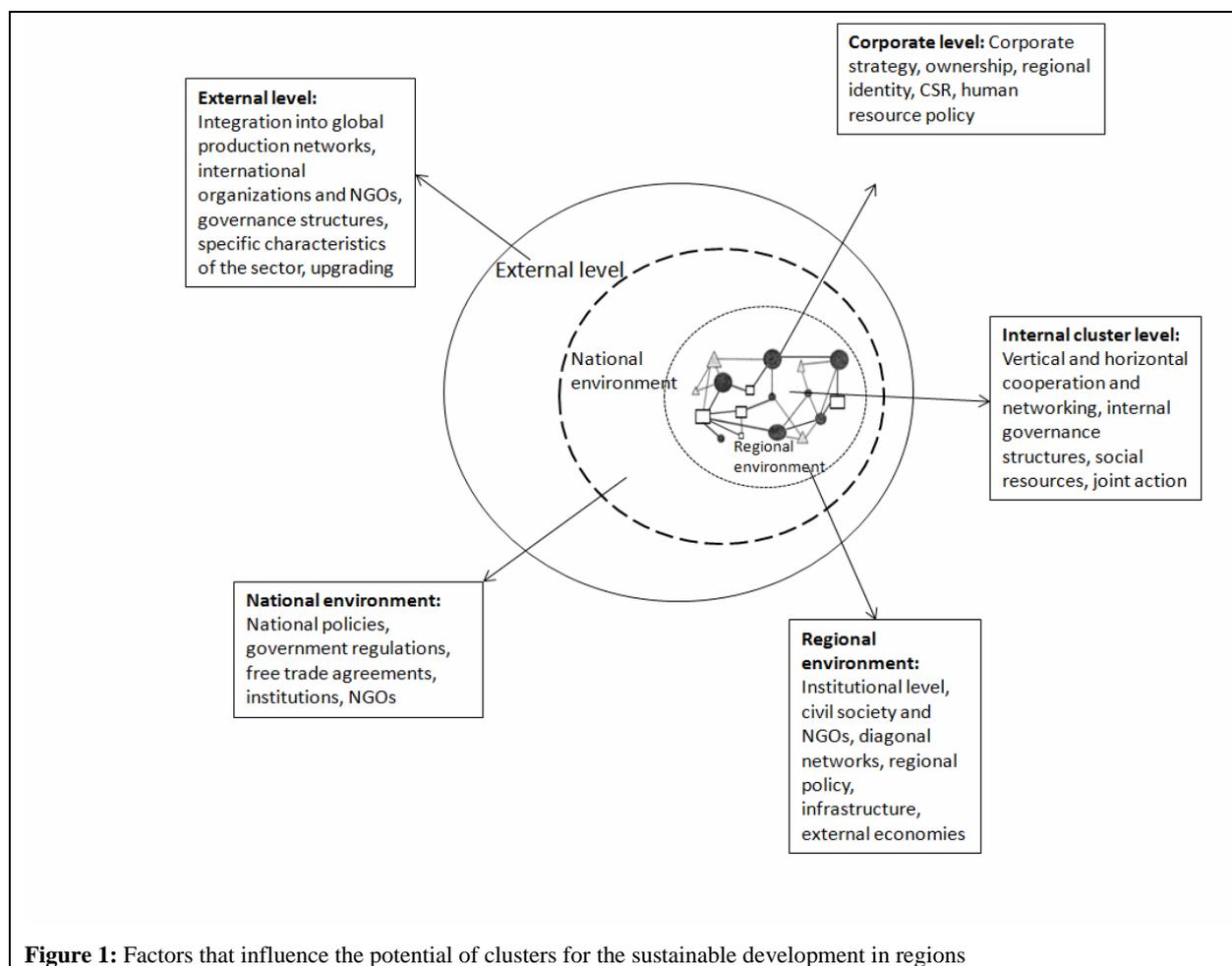
¹² The literature on global commodity chains (see Gereffi 1994, Gereffi 1999) distinguishes in principle between so-called buyer-driven chains (like the clothing and sporting goods industry), and producer-driven chains (like the automotive and aerospace industries). Other categorizations (see Humphrey and Schmitz 2000) differentiate between market or arm's length coordination, hierarchical coordination, quasi-hierarchical coordination and network coordination.

¹³ Based on a study of Latin-American clusters, Guiliani et al. (2005) distinguish between four relevant sectors: Natural resource based, traditional manufacturing (textile industry), complex products industry (automobile industry) and specialized suppliers (software industry)

5 INFLUENCE MODEL AND SUMMARY

Sustainable regional development can be defined as a development that is based on participation, independence, justice and the satisfaction of material and immaterial needs and aims to achieve sustainable growth in balance with nature and society.

Considering this definition of sustainable development, it gets clear that clusters, so far, could only contribute to a very limited extent to the sustainable development of regions. At the same time, in some areas even negative effects of clusters on the regional development could be observed. Based on the results from section 3, the following model has been developed, illustrating five main levels of influence as well as the specific conditions that affect the potential of clusters for sustainable regional development.



1. Corporate level

The smallest unit of analysis is the individual company. In most approaches to global production networks the corporate level remains largely excluded and is treated as a so called "black box" (cf. Plank/ Staritz 2009: 13). However, as has been demonstrated in chapter 2, the private sector plays an important role in implementing sustainable development at the regional level. The respective corporate strategies and the regional identity of the companies

do not only affect the internal cluster processes and the degree of joint action. CSR activities of individual companies can also set an example for other companies in the cluster. Clusters often link companies of different sizes and sometimes different backgrounds together. The various strengths and weaknesses of the partners can therefore be balanced in the cluster and synergy effects, also according to sustainable regional development can be used more easily.

2. Internal cluster level

The benefits arising from the strategic cooperation, communication and interaction, as well as constructive competition within the cluster, may be used to encourage responsible business practices and joint CSR activities. Social resources such as shared values, identity and trust can favor such a joint action and encourage shared learning in the region. The higher the level of joint action, the more likely it is also a process of sustainable upgrading (see Giuliani et al. 2005). Within a cluster multiple forms of governance can coexist. The various forms of governance structures as well as the degree of integration and specialization are essential for the exchange relations between the actors, and thus for the influence of clusters on sustainable upgrading and sustainable development. The observations in the case of the tannery clusters in Tamil Nadu lead to the conclusion that "... a firm's strength depends upon the resilience of the wider network in which it is embedded" (Lazerson 1993: 217 by Kennedy 1999: 1683). Therefore also the socio-political and institutional contexts, in which the cluster is embedded, as well as preexisting structures and networks in the regional, national and global environment have to be taken into account.

3. Regional environment

The circumstances in the region, its natural and social resources as well as the respective historical context are essential for the analysis of clusters in the context of sustainable development. On this level, regional policy and local regulatory bodies as well as local NGOs and labor unions have a great influence on the cluster dynamics and the potential for sustainable development. The settlement of companies in one region leads to positive and negative agglomeration effects (external economies). On the one side improved educational and employment opportunities, collective knowledge pools and easier access to information and technology are some of the advantages of clustering which can also be used for a sustainable regional development. On the other hand clusters often lead to environmental problems, increased costs of living and more social disparities.

4. National environment

Although recent trends towards regionalization on the sub-national and also on the supra-national level seem to have diminished the importance of nations as political and economic reference level, many examples from Asia but also from the northern countries show that the state is still playing a central role as a regulatory body. National laws and their enforcement can affect the process of sustainable regional development through cluster in both ways, positively and negatively. At this level it is also worth mentioning that political and economic external relations of a country (e.g. free trade agreements) are of great importance for the developments in regions and clusters.

5. External level

Finally, the integration of clusters in global production networks has a strong influence on the development in a region. International buyers, supranational organizations and NGOs are the main key players at this level while the power and governance structures between companies and institutions have a particular impact on the protagonists and the regional development. Power can influence the distribution of production factors and the generation and distribution of value added in the network. Whether the interaction with transnational corporations promotes upgrading and sustainable development in the region may depend strongly on the governance structures in the respective value chains. The creation of added value, learning and innovation patterns, as well as education, technology and knowledge varies significantly among sectors.

Only if the dynamics and conditions in all these levels of influence are considered for the specific case, there may be an answer to the question whether clusters have the potential to contribute to sustainable development in regions. To say it in the words of Sternberg (2005: 135) "[...] clusters will never everywhere, but very well in some places lead to a process of sustainable regional development"¹⁴

¹⁴ Translated from German: „[...]Cluster werden nie überall, sehr wohl aber an manchen Orten zu nachhaltigen Regionalentwicklungsprozessen führen“

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