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Heiner Depner and Harald Bathelt

**Cluster Growth and Institutional Barriers:
The Development of the Automobile Industry Cluster
in Shanghai, P.R. China**

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Authors' Information

Heiner Depner, Faculty of Geography, Philipps-University of Marburg, Deutschhausstraße 10, 35032 Marburg, Germany,
E-Mail: depner@staff.uni-marburg.de

Harald Bathelt, Faculty of Geography, Philipps-University of Marburg, Deutschhausstraße 10, 35032 Marburg, Germany,
E-Mail: depner@staff.uni-marburg.de

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Abstract: Recent work has provided evidence that the establishment of new industry clusters can hardly be jumpstarted through policy initiatives alone. This does not, however, imply that the genesis of a new cluster cannot be planned at all. Especially in the context of a developing economy, it seems useful to re-investigate the relation between economic development, multinational firm strategies and state intervention in this respect. Drawing from the case of the automobile industry and its supplier system in Shanghai, in which German firms play an important role, we will provide empirical evidence how a new cluster evolves which is characterized by a focal, hierarchically-structured production system and how this is supported by the state in its various forms. We use a multi-dimensional approach to clusters which provides a more nuanced understanding of the evolution and growth of a cluster than that provided by earlier accounts. This approach allows us to distinguish the development of the Shanghai automobile industry cluster along its vertical, horizontal, external, institutional and power dimensions. We provide evidence that another dimension, i.e. 'culture', plays an important role, especially in its relation to issues of power and institutions. This is demonstrated in the case of German firms which tap into the Chinese innovation system. This system is characterized by particular business relations, institutions, norms and all sorts of social practices which are 'new' to the German firms and where they cannot draw from previous experience. We will demonstrate how this difference creates problems in establishing local production and supplier relations and how these can be overcome.

Keywords: clusters, institutions, power, 'inter-cultural' communication, boundary spanners, automobile industry, Shanghai

JEL classifications: F23, L13, L23, L62, P20

1. Introduction

In recent years, one of the hotbeds of research in sociology, economics, political science and economic geography has been to analyze the establishment of clusters of interrelated firms, their continued growth and the way how they secure reproduction. From a study of a larger number of industrial clusters in different parts of the world, Bresnahan, Gambardella and Saxenian (2001) found, for instance, that the reasons behind the establishment of a new cluster are much different from those which support the growth of an existing cluster. In their comparative study of ICT (information and communication technology) clusters, they found that external effects, agglomeration factors and networking synergies were primarily important in the later stages of growth. In contrast, outstanding entrepreneurial activities, the willingness to take the risk of starting up new ventures and the ability to tap into areas outside the established technologies and markets had been decisive for the genesis of the clusters. The success of these entrepreneurial endeavors particularly depended on the firms' abilities to access major markets outside the cluster in their early stages. Bresnahan, Gambardella and Saxenian (2001) emphasize from their research that state policy did not have a substantial influence on the establishment of the clusters studied.

Although we agree with this study on most accounts, we are somewhat skeptical about the generality of its conclusions. It might be true that the success of clusters cannot be planned in advance and that state policies are not that important in the case of ICT industries, due to the particular nature and organization of this industry. But especially in the case of the automobile industry, the situation is somewhat different. The automobile industry is characterized by a hierarchical social division of labor, organized in tiers around powerful car manufacturers. Although this focal production network is far from being a simple top-down hierarchy, it is characterized by very strong ties and uneven power relations. The car manufacturers are a primary force driving the organization of the production system and its spatial manifestations. When they decide to go abroad, they demand that their key suppliers also establish production facilities in the host country, preferably close-by. Due to its organization around a focal company, the automobile industry is highly responsive to cluster formation when entering new market regions. This development is largely planned as opposed to those cases investigated by Bresnahan, Gambardella and Saxenian (2001). State policies might not be the major force driving the genesis of a new automobile industry cluster but it would be somewhat naive to ignore such influences, especially in the context of a developing country, such as the People's Republic of China, which still has some characteristics of a planned economy.

In this study, we have chosen a cluster perspective with the intention of providing a better understanding of the localized nature of international production networks.¹ There are several reasons which favor such an approach in the context of this study.² Firstly, the organization of automobile production in Shanghai around Volkswagen (VW) and General Motors (GM) is highly localized. Secondly, as seen through a geographical lens, the developing production cluster and producer-user relations in the automobile industry are more persistent than, for instance, those in fashion-related consumer-goods industries, such as textiles, footwear and apparel (e.g. Gereffi and Korzeniewicz 1990, Gereffi 1994, 1999). Thirdly, the approach is well suited to explain cluster formation in response to high spatial transaction costs and difficulties to realize untraded interdependencies in an 'inter-cultural' context.

This paper is organized as follows. In section 2, we develop a conceptual framework for the analysis of clusters which is build upon a multi-dimensional approach. This section also emphasizes missing links in the cluster literature, drawing on the importance of 'culture', institutions and power in network formation. In section 3, we focus on the genesis of the vertical and horizontal dimensions of the automobile industry cluster in Shanghai and the

¹/. The arguments presented in this paper draw from research which was conducted in the Shanghai automobile industry cluster. The primary goals of this research were to understand the successes and failures of German firms which have established production facilities and supplier networks in Shanghai and to elaborate on the role of culture and institutions in this process. Between 2001 and 2003, five research trips were organized and more than 50 personal interviews conducted with representatives of automobile firms, their German and Chinese suppliers, as well as formal institutions which support the growth of the industry. Further, field study analysis was conducted in regular staff and strategy meetings and walking tours through the productions facilities of those firms investigated. In addition, exploratory interviews were conducted at the German sites of some of these firms.

²/. As Humphrey and Schmitz (2002) have pointed out, there are basically two different conceptions which could be used as a basis to study the process how industries extend their production networks to other countries, i.e. clusters and global commodity chains. Each of these approaches is associated with particular problems in this context. The cluster concept (Porter 1998, 2000) explains economic success by drawing on the internal structure of social relations between local or regional firms while neglecting extra-local linkages. In contrast, the concept of global commodity chains (Gereffi 1994, 1999) emphasizes the advantages of international production organization and governance structures but underestimates the territorial dimension and the localized nature of production arrangements. In order to bring both perspectives closer together, Dicken, Kelly, Olds and Yeung (2001) and Hendersen, Dicken, Hess, Coe and Yeung (2002) develop a concept of global production networks which is spatially sensitive because it builds on actor-networks and social and territorial embeddedness. Humphrey and Schmitz (2002) deal with this by applying a global value chain perspective which provides an analysis of the localized effects of upgrading strategies.

role of governmental authorities in this process. Section 4 identifies precursors of a developing trans-national community in Shanghai. In this section, we deal with the consequences of 'cultural differences' between Chinese and German actors. Therein, we emphasize the role of boundary spanners and the process of institution building. In the final section, we summarize our findings and make some concluding remarks.

2. Cluster dimensions in an 'inter-cultural' context

In this paper, we use the term cluster to refer to a local or regional concentration of industrial firms and their support infrastructure which are closely interrelated through traded and untraded interdependencies (Maskell 2001, Bathelt and Taylor 2002). Clusters should be analyzed along several dimensions; that is, their horizontal, vertical, institutional, external and power dimensions. Through this, different configurations of clusters can be identified according to their development stage and growth potential (Porter 1998, 2000, Malmberg and Maskell 2002, Bathelt 2002).

Such a conceptualization may help to overcome the shortcomings and simplifications which Martin and Sunley (2003) have identified in much of the cluster literature. In this paper, we wish to emphasize another poorly developed link in the literature on clusters which becomes particularly important in the context of international production arrangements. The cluster literature tends to under-conceptualize issues of power and 'culture'. This is, in part, due to the fact that empirical studies focus on well-functioning clusters in particular regions. In such a context, efficient communication processes between the cluster actors which enable reproduction within a homogeneous 'cultural' and institutional environment already exist. Such an environment does not exist though for automobile firms trying to establish new production clusters outside their homebase, such as VW and GM in China. Here, the existing 'cultural' and institutional frameworks which shape human interaction differ substantially between home and host country. Automobile firms establishing production in Shanghai have to bridge these differences, establish efficient communication processes between agents with various 'cultural' backgrounds and adjust organizational practices originating from the home country to those in the host country. We develop a conceptual basis in the following subsections which particularly draws upon these 'cultural', institutional and power dimensions of a cluster.

2.1 Cooperation and competition: the vertical and horizontal dimensions of a cluster

When discussing the advantages of being located within a cluster, most studies refer to those firms of a value chain which are linked through supplier and customer relations. This vertical dimension consists of firms with complementary products and competencies. They benefit from intensive transactions within the cluster and form networks of traded interdependencies. The idea behind this is that an existing agglomeration of specialized producers gives rise to a substantial demand for specialized inputs. This creates an incentive for suppliers and service firms to move close to these customers to supply the growing regional market (Marshall 1920). The firms, in turn, benefit from low transportation and transactions costs, as well as economies of scale, and thus gain a competitive advantage (Scott 1988, Krugman 1991, 2000, Fujita, Krugman and Venables 1999). In part, this explains why existing clusters tend to grow, giving rise to labor market specialization.

The reduction of transaction costs is, in fact, an important reasoning to understand why automobile suppliers in Shanghai have a much stronger tendency to agglomerate than their counterparts in Germany. VW demanded that or offered incentives to their suppliers to locate within China. This was also due to the pressure of the Chinese government to fulfill local-content regulations. Mostly, the firms established production facilities within the larger Shanghai region (Depner 2003). The concentration in the region is extremely important as it reduces the costs of communication, knowledge-transfers and adjustments in products and processes.

Of course, the German firms in this cluster do not exclusively do business with each other or rely on imports from their overseas operations. They have also begun to establish relations with Chinese suppliers. This is, however, a difficult process as knowledge about Chinese firms is quite limited. As one manager mentioned, new suppliers appear on their doorstep on a daily basis and offer their services (Interview 3). In this respect, co-location within the cluster serves as an important mechanism to access information about potential suppliers. It also reduces the costs of supervising them.

The above discussion, however, shows that the advantages of clustering cannot be grasped by concepts of cost and traded interdependencies alone. In emphasizing localized capabilities (Maskell and Malmberg 1999a, 1999b) and untraded interdependencies (Storper 1995, 1997), recent studies have provided evidence that clusters offer manifold opportunities for inter-firm communication and interactive learning within the same socio-institutional and technological environment (Lundvall 1988, Gertler 1993, 1995). This generates specialized information flows and supports innovation (see, also, Cooke and Morgan 1998, Cooke 1999, Lawson 1999, Gordon and McCann 2000, Bathelt and Jentsch 2002).

In a similar way, advantages from a local or regional concentration of competing firms also cannot be easily measured. This horizontal dimension of firms producing similar products is often neglected in studies of clusters, although this dimension is sometimes key to understanding why a cluster exists to begin with (Porter 1990, 1998, Maskell 2001, Malmberg and Maskell 2002). Since these firms produce the same sort of products and have similar competencies they have little reason to cooperate. Co-location provides the opportunity to closely watch other firms and compare their economic performance with that of others (Maskell 2001, Grabher 2001). This is possible because firms in a cluster basically operate under the same conditions, sharing the same labor market, the same set of local suppliers and essentially the same cost structure. This creates a competitiveness to outperform others. It serves as a strong incentive for product differentiation, process optimizing or cost reduction, depending on the information about the competitor's strategies, product decisions and technologies.

In the context of the Shanghai automobile industry cluster, competition between firms is quite limited, at least with respect to foreign producers and suppliers. This is related to the fact that the production system of the automobile industry is characterized by a hierarchical governance structure. Inter-firm linkages are primarily oriented upwards or downwards the value chain, according to the requirements of the focal agent. Although linkages exist between suppliers in the same tier, most relationships are vertical in character. This is quite different from a localized network in an ideal-type industrial district (e.g. Scott 1988), where interrelated small- and medium-sized producers interact with one another in many different ways, without a single dominant producer.

Co-location and face-to-face contacts within a cluster also give rise to additional advantages related to the circulation of information and inspiration (Bathelt, Malmberg and Maskell 2002). This creates a particular information and communication ecology or 'buzz' (Storper and Venables 2002) in a cluster. It is related to constant flows of information and updates of this information, intended and unanticipated learning processes in organized and accidental meetings, based on the same understanding, interpretative schemes and technology attitudes within a particular value chain (Bathelt, Malmberg and Maskell 2002). The importance of this 'buzz' is that actors do not have to search their environment or make particular investments to get access to this information. They are automatically exposed to news reports, gossiping, rumors and recommendations about technologies, markets and strategies, by just 'being there' (Gertler 1995, Grabher 2002a).

In the Shanghai automobile industry, we would also expect that this 'buzz' plays an important role, despite the fact that the horizontal dimension is still in an infant stage and the communication ecology limited. Contacts with suppliers, customers and trade

organizations, executive meetings and social activities within the professional community help to stimulate some sort of 'buzz' about governmental agencies, local suppliers and day-to-day problems. This 'buzz' is even more important for the Chinese joint venture partners who engage traditionally in personal relationships to obtain, for instance, access to contracts or political decision makers. Such dyadic relationships or 'guanxi' are still quite important in the Chinese society. They are open-ended in character and involve an ongoing 'give and take' of those actors involved.³ 'Guanxi' and the wider business networks which develop from these dyadic relations, through the effects of recommendation and day-to-day practices ('guanxi wang'), are characterized by long-term social relations and continuous communication between the network members. This stimulates fine-grained information transfer. However, this Chinese 'buzz' does not always make its way to the foreign joint venture partners. As will be shown in section 4, information exchange between joint venture partners is often fairly problematic, indirect and incomplete.

2.2 Trans-local linkages and the external cluster dimension

It is clear that a cluster cannot fully unfold its growth potential if the firms exclusively rely on internal markets and knowledge circulating through the local 'buzz'. If the social relations inside a cluster become too rigid and too exclusive, focussing on only a few local actors, this could cause problems of lock-in, gullibility and blind confidence (Granovetter 1973, Kern 1996, Oinas 1997, Scott 1998, Maillat 1998). This phenomenon of being too inward-looking, which has been described as 'over-embeddedness' (Uzzi 1997, Bathelt 2002, Sofer and Schnell 2002), could cause firms to overlook technologies developed outside and

³/. These relationships, in combination with a strong hierarchical society structure, defined rules how a person should act in certain situations, depending on the type of relation he/she had with another person. 'Guanxi' were never one-sided relationships but were always associated with obligations and returns on both sides (Hsu and Saxenian 2000, Yeung 2000, Wang 2001, Schramm and Taube 2002). Each side would have to fulfill its commitments in order not to lose 'face' (Hwang 1987). The latter would cause some sort of social isolation. In such a society, which was based on clear rules and commitments according to the structure of social relations, the law system and contracts did not play an important role. The importance of personal relationships and the attached rules are especially problematic for foreign companies as they are used to relying on the authority of contract and law, instead of more-or-less tacit, unwritten rules and regulations. Foreign firms which look for Chinese partners often do not understand that their counterparts show little interest in the negotiation of contracts. And, if they have agreed upon a contract with their Chinese business partners, they could easily draw the wrong conclusion from this, assuming that a business relation would easily develop based on formal agreements.

slow down innovation. Of course, this problem is always present in the automobile industry, where most advanced suppliers rely on strong ties with few customers, organized in a hierarchy of tiers. 'Openness' in this production system is limited but remains an important issue for individual firms (Bathelt and Taylor 2002).

Many studies provide evidence that decisive triggers for innovation result from trans-local partnerships with leading actors and firms from other regions (see Bathelt and Taylor 2002). When firms consciously establish such 'pipelines' (Owen-Smith and Powell 2002) they can get access to knowledge pools and markets outside the cluster. In this case local 'buzz' and trans-local 'pipelines' can be mutually reinforcing. The more firms engage in 'pipeline' development, the more additional information and knowledge enters the local 'buzz', driving product and process development. In turn, this knowledge enables firms to build up new ties to external actors (Bathelt, Malmberg and Maskell 2002).⁴

An important pre-requisite for a firm to successfully establish 'pipelines' is the ability to assimilate the information arriving through pipelines and apply it successfully. Cohen and Levinthal (1990) have labeled this ability as being a firm's 'absorptive capacity' (Malecki 2000). This 'absorptive capacity' depends on the firm's direct interface with its local environment and on the number and extent of its 'pipelines'. It also depends on the way in which information can be transferred across and within sub-units of the firm. The role of internal gatekeepers and boundary spanners, which we will discuss further in the context of relational power, becomes crucial for translating externally produced knowledge into a form that can be internally understood (van den Bosch, Volberda and de Boer 1999, Giuliani 2002).

In the case of the automobile industry in Shanghai strong pipelines exist between the German headquarters and their subsidiaries. VW's engineering and development activities are still concentrated at its headquarters in Germany, with the exception of those models which have been designed for foreign markets, such as the VW Santana 2000 and VW Gol. When the German headquarters of VW decides to make changes to a model which is not only being produced solely in China but also in Europe, such as the VW Passat and VW Polo, the respective suppliers in China get the exact specifications through their German headquarters

⁴/. In the case of VW, the establishment of production facilities in Shanghai can be viewed as an attempt to develop a 'growth periphery' in the sense of Storper and Walker (1989) in order to obtain access to a new consumer market and stay ahead of main competitors. The move into the Chinese market was a step to actively develop 'pipelines' which also have a growth impact on the company's home country operations. Strategic competencies, of course, have largely remained in Germany.

(Interview 15). This rigid hierarchical structure is changing, however. As the suppliers diversify their customer base in China, they develop a need to create developing and engineering competencies within the country. Therefore, some suppliers have begun to set up engineering departments in Shanghai (Interviews 33, 45, Case study 2).⁵

Exchange between operations in Germany and China in both directions also takes place, as management and technical personnel are being sent from the headquarters to foreign locations, who return after a few years. Most German executives in Shanghai have a three-year contract, which can normally be extended. An obvious goal behind this strategy of constantly employing executives, managers and technicians from Germany abroad is to maintain control over the production activities in China. Another goal is to reintegrate these managers in their respective German headquarters and, through this, improve knowledge about the Chinese market, the ways how people interact and the rules according to which processes are being organized in China. While some firms have a substantial number of Germans who constantly work in their Shanghai locations, others have reduced this number to a minimum. Often they replace German managers by Chinese experts who have studied or lived in Germany and have acquired knowledge of both production contexts. In such firms, German experts are usually appointed to work in the Shanghai facilities for shorter time periods, often associated with the solution of a particular problem or the introduction of technological and organizational innovations (Interviews 14, 23, 45, 47).

Further, Chinese managers and technicians are also being sent to Germany for training purposes and to obtain work experience. This appears to be an efficient way to train them and make them familiar with German routines, as has been pointed out by some German executives (Interviews 27, 48). The advantage of training qualified Chinese employees abroad is that they are not in their day-to-day working context where they would be watched and evaluated by their co-employees.⁶

⁵/. An executive of a German-Chinese joint venture pointed out that this was absolutely decisive. Technicians of a Chinese car manufacturer had come to him one day for help in the construction of a particular module. As they were unable to explain the problem in technical terms, they simply presented the module to him (Interview 35). To react to such a request for help requires engineering competencies be available.

⁶/. Another important link to firms in other countries results from the need to install and run specialized machinery and equipment in the production process. Most of these machines are not produced in Shanghai or other Chinese regions, as the machinery industry in China is still in an infant stage. German firms also prefer to use the same type of machines at different locations and to cooperate with those machinery suppliers they know already from Germany. Case study analysis showed that this tendency to rely on foreign machinery producers is reinforced by negative experiences with Chinese machines which have to be repaired more

Over time, Shanghai operations of German automobile suppliers have been able to reduce their dependence on their headquarters and make more decisions about day-to-day practices and local market strategies on their own. This occurs as Germans are increasingly being replaced by Chinese managers and producer-user linkages become more diversified, due to a growing horizontal and vertical dimension of the cluster.

2.3 'Culture' and institutions: underconceptualized links in the cluster literature

The ability to overcome barriers is most important in an international context where firms operate across national borders and 'cultural' contexts. If firms are engaged in trans-local linkages with partners from other parts of the world, they have to be able to understand different institutional regimes in order to communicate and interact with their partners (Owen-Smith and Powell 2002). This requires complex capabilities. The debate about the 'cultural turn' in economic geography has shown that 'cultural' contexts are an important influence on economic action which cannot be neglected (Crang 1997, Sayer 1997, Boeckler 1999, Thrift 2000).

We are aware that it is quite difficult and problematic to define 'culture' (e.g. Lash and Urry 1994, Cavallardo 2001). There are many competing definitions and sometimes it appears that the term 'culture' is used as a catchphrase to include almost every human practice. Our intention is not to engage in this discussion. Rather, as Power (2002, p. 104f.) points out, "it is useful to stress that in contemporary capitalism culture seems to have particular characteristics that are constituted and bound into processes of definition and distinction that are inherently woven into the fabric of relations of production, consumption, and power that make up everyday life". Of great importance for a representation of 'culture' are the implicit and explicit norms, rules, convictions, moral codes and philosophies of life which are accepted by or imposed on its members. These have developed through a history of social relations and are shaped, produced and reproduced in everyday's practices of human action and interaction (Lash and Urry 1994, Sayer 1997, Cavallardo 2001, Höhle 2002). Language, arts, symbols, artifacts, etc., help create meaning and 'cultural identity', which are different from that in other cultures. Through this, it is possible to distinguish 'insiders' from 'outsiders'.

frequently. In many instances, Chinese machines are used for simple activities only. Often, they are simply imitations of European machines (Case studies 2, 3, 4).

A 'cultural' context creates an institutional framework for ongoing human interaction. At the same time, existing rules and norms are constantly being reshaped and new ones created through interaction. Therefore, 'culture' cannot be reduced to a fixed number of characteristics. It is a phenomenon in a state of flux. In this paper, we are interested in which way 'culture' has an impact on human action and interaction in economic context.⁷

Gertler (2001) points out that systematic influences of institutions, especially between different national environments, prevent the diffusion of universal operational standards or a single 'best practice' (see, also, Boyer 1998). As he states, "[t]he nation-state (whether 'home' or 'host') is still a primary source of influence over industrial practices" (Gertler 2001: 16). It still seems to be a powerful umbrella to produce not only language, symbols, artifacts and meanings associated with a 'culture', it also stimulates particular ways of economic action and interaction through formal and informal institutions. The nation state further shapes practices of learning (Tracey, Clark and Lawton Smith 2002). One way how these structures and practices are being reproduced is by the creation of social identities and 'othering' (Berndt 2001, Cavallardo 2001). It is quite possible that a lack of understanding of different institutional contexts may block communication. In this case, firms would continue 'speaking different languages'.

Foreign automobile firms, establishing a new production cluster in Shanghai, have to face this problem of bridging 'cultural differences' in a number of cutting points. First, they have to develop viable communication structures with their Chinese joint venture partners to establish coherent management systems and gain access to external information about state regulations, market developments and labor market characteristics on the national and regional level. Second, it is necessary to train Chinese workers to develop work routines and enable interaction between these workers and German managers and technicians. Third, routines will also have to be established to integrate Chinese suppliers into the production system. Fourth, if the German firms intend to create 'pipelines' to other Chinese regions they have to acquire information about potential partners in order to evaluate them.

⁷/. This is not to say that 'culture' is a homogenizing phenomenon. In relational economic geography (see Bathelt and Glückler 2003), 'culture' can never be a phenomenon which fully determines human action and interaction. It does create, however, patterns which are more or less accepted and have, over time, established structures and habits which make some actions appear more likely than others (Sayer 1997, Höslle 2002). There is, nonetheless, always a fundamental openness as in which way an individual may decide in a particular situation. When we talk about views and habits of Chinese and German agents in this paper we do not imply that such behavior can be projected into simple categories.

The successful establishment of 'inter-cultural' communication in the Shanghai automobile industry cluster therefore requires the development of a shared institutional context which enables interaction and knowledge creation. It also requires the establishment of methods and routines to control production and pass on orders and messages effectively within the production system. The joint institutional framework enables specialized users and producers to discuss and solve particular problems (Hodgson 1988, North 1990). Such an institutional framework does not, however, exist spontaneously. It is created through social practices in day-to-day interactions between the actors of a cluster. In these interactions, joint problem-solving and experimentation lead to preliminary fixes which must be robust in order to survive the next series of interactions. These fixes are constantly updated or adjusted to new goals in the innovation process (Storper 1997, McKelvey 1997).

Co-presence and co-location within a cluster serve as a powerful means to participate in the process of creating institutions. It enables firms to make sense of the local 'buzz' and distinguish between valuable and unimportant information. This happens as firms develop a similar language, attitude toward technology and interpretative schemes (Lawson and Lorenz 1999). Over time, ongoing interaction may give rise to what could be phrased as a high-trust environment within the cluster (Maskell, Eskelinen, Hannibalsson, Malmberg and Vatne 1998).

This role of institutions becomes much less straightforward in a multinational context, such as the automobile industry cluster in Shanghai, where different rules of the game exist which are not easy to grasp (Lundvall and Maskell 2000, Bathelt and Depner 2003). German firms are used to operate within an existing institutional framework, which has been shaped in their home country over a long time period. The institutions they are faced with in the Shanghai region result from a different national context. Some of the institutions may be supportive to the production system of the German investors. Many others, however, are different and not compatible. Another problem arises since the institutional conditions in China are not fully known to the German firms in advance. This creates a great deal of uncertainty in transactions. In order to create a production system similar to the one in Germany, institutions will have to be imported from Germany to provide the basis for interactions within and between firms. In addition, a new set of institutions will have to be created to enable effective communication between the Chinese and German management and workforce in joint ventures.

The experiences of firms within a particular national context provide evidence that the process of institution building can be triggered or strongly supported by the establishment of 'communities of practice' (Brown and Duguid 1991, Wenger 1998). Wenger and Snyder (2000: 139) define such communities as "groups of people informally bound together by

shared experience and passion for a joint enterprise ...". 'Communities of practice' consist of agents which are bound together through day-to-day interaction of various kinds, such as e-mail networks, social events and regular feedback meetings. Members of these communities discuss their work to bridge the gap between theoretical and practical knowledge (Brown and Duguid 2000). This is beneficial in processes of problem-solving, strategy and business development and the diffusion of 'best practice'. Specialists voluntarily join these communities, adding passion, commitment and an identification with the group's competence. This holds the communities together (Wenger and Snyder 2000).

'Communities of practice' can develop within a firm but may also span a single organization and include other firms (Gertler 2001, Grabher 2002b). Shared experiences in solving the same sort of problems, based on the same basic understanding and technological paradigm, support the development of mutual engagement, joint enterprises, shared repertoire and negotiation of meaning (Wenger 1998, Coe and Bunnell 2003). Clusters can become important catalysts for the formation of such communities. In this case, they develop into local frames to understand the meaning and significance of local 'buzz' which in turn serves to stimulate the generation of more local 'buzz' and its rapid diffusion.

It would not be easy, however, to establish 'communities of practice' in the automobile industry cluster in Shanghai. Individual firms send only few specialists to their foreign branches, once they start regular production activities. As communication with foreign workers is limited because of language problems and 'cultural distance' (Gertler 1997), the potential to develop communities within firms is, at this point, fairly low. At the same time, communication and interaction between technical experts of different firms is also limited. Only rarely do German specialists of different automobile suppliers get together to discuss problems and exchange solutions, partially because the competencies are too diversified to engage in an inter-firm community. The German branches also focus on few stages and selected functions in the overall production process. The most likely scenario for community establishment, aside from the already existing 'organized' community of Chinese managers and technicians, is between the foreign executives of different firms. At this level, managers can share their experiences in dealing with their Chinese joint venture partners, the difficulties they face when designing labor processes for Chinese workers and the strategies they use to get information about the quality of Chinese suppliers.

2.4 Relational power and the role of 'inter-cultural' boundary spanners

A cluster does not automatically encompass a coherent group of firms which cooperate harmoniously with one another to achieve a common set of goals. A cluster's horizontal and

vertical dimensions are shaped by existing power relations and asymmetries, which impact the agents' ability to react to changes in their regulatory environment and external markets (Taylor 2000; Bathelt and Taylor 2002). In actor-network theory, those actors who are viewed to have power are able to build networks and develop them further by enrolling others actors (e.g. Murdoch 1995, Smith 2003). This is the sort of power referred to by Latour (1986) as the 'powers of association' or as 'power as relationships' (Allen 1997, Taylor 2000).

In a cluster context, it is necessary to consider the whole structure of relations within the actor-network. These social relations are constantly being produced and reproduced through ongoing communication between the actors. This is not a simple diffusion of information from one end of the cluster to the other. Rather, this should be viewed as a translation process where messages are being transferred to other actors through social relations who evaluate them according to their goals. During this transfer, the messages are constantly being interpreted and reinterpreted by those actors involved, giving each actor the opportunity to apply changes (Latour 1986). The power of a cluster can thus be defined as the potential to enroll actors in joint enterprises. Since the coherence of a cluster and its ability to work are dependent on day-to-day interactions between its actors and firms, distance and visibility are of great importance. They enable ongoing interaction with others and to exercise control over their activities.⁸

According to this relational view of power, network builders, who are able to enroll others into networks, are particularly important in the process of network activation and formation. In an 'inter-cultural' context, the role of boundary spanners also becomes important as they have the potential to communicate between the people involved and provide an understanding of heterogeneous habits and attitudes. Coe and Bunnell (2003) emphasize the importance of transnational communities in translating news, claims and

⁸ Of course, it is difficult to establish coherence within a cluster through social relations alone. Material and non-material resources, such as non-human artifacts (e.g. particular technologies, symbols), tools (e.g. manuals, reports) and accepted rules, enable human actors to engage in social relations and keep them going (Murdoch 1995, Dicken, Kelly, Olds and Yeung 2001). They are the glue of social relations (Latour 1986). In a cluster context, particular process and communication technologies serve to stabilize interactions between the actors of a cluster, as they have similar day-to-day experiences and develop the same understanding. Especially, in an 'inter-cultural' context shared technologies and existing norms and rules are important to support the interaction between people from different 'cultural' contexts in achieving common goals. Such material and non-material resources also shape the course of action. Without them, messages could, for instance, be easily misinterpreted by other actors and technologies used differently.

problems back and forth between the different nationalities and parties in a cluster (see, also, Hsu and Saxenian 2000, Smith 2003). These are people who have lived and worked in different 'cultural' contexts and, from this, are able to understand the different expectations and patterns of behavior and clarify them between actors. They are not to be confused with traditional immigrants as they develop professional expertise and maintain active contacts with both 'cultures' they are related to. Saxenian and Hsu (2001: 915f.) conclude from their case study of US-Taiwanese linkages in high-technology industries that "[a] transnational technical community allows distant producers to specialize and collaborate to upgrade their capabilities, particularly when the collaborations require close communication and joint problem-solving. The trust and local knowledge that exist within technical communities, even those that span continents, provide a competitive advantage ...".

In the context of the Shanghai automobile industry cluster, such boundary spanners are extremely valuable in communicating between Chinese and German managers and workers. Chinese boundary spanners can also help Germans to get access to the Chinese political and law system. This can be very beneficial when making decisions about strategies and investments in the future. However, this potential is not easy to mobilize, especially when the German management does not view Chinese joint venture partners as experts. Relationships with the Chinese management in joint ventures are often seen as a burden and remain limited. At the same time, the Chinese management does not do much to intensify these relationships either. In short, the argument is that a lot of inefficiencies and problems could be avoided if knowledgeable 'inter-cultural' boundary spanners would be employed by German or other foreign firms entering the Chinese market. Within joint venture firms, this could help stimulate the creation of shared systems of meaning and allow access to 'inter-cultural' knowledge pools.

The conceptual framework developed in section 2, which draws particularly upon the 'cultural', institutional and power dimensions of a cluster, serves as a basis to investigate the establishment of a new automobile industry cluster in Shanghai. In the sections 3 and 4, we investigate how this cluster has been initiated and shaped by political influences and analyze the cluster along its dimensions.

3. Genesis and growth of the automobile industry cluster in Shanghai

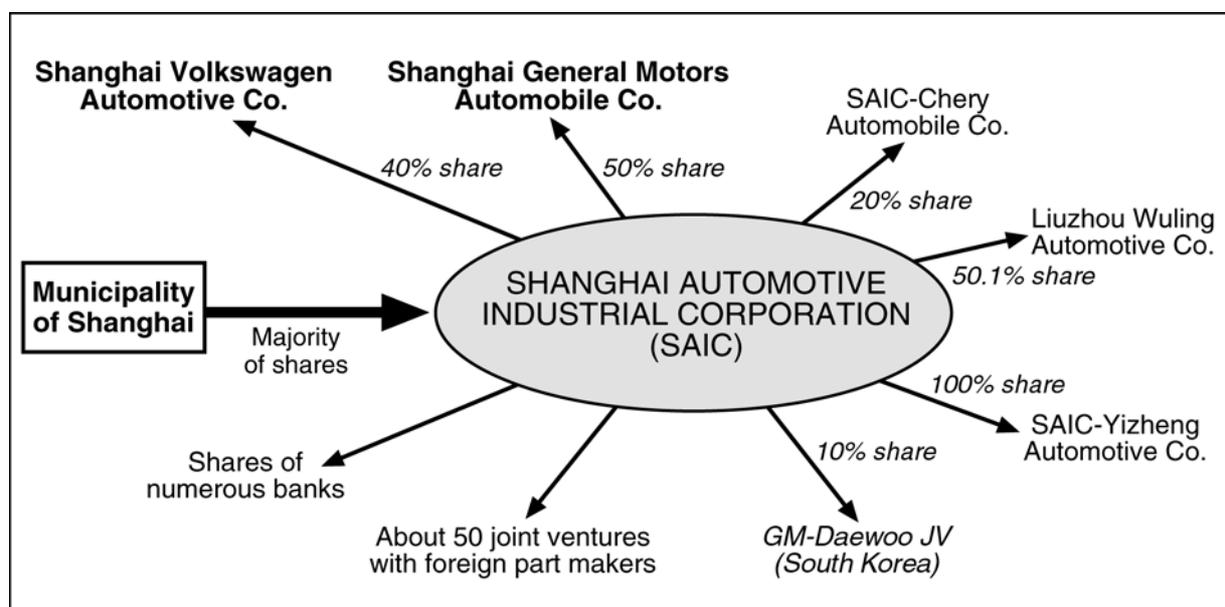
When China undertook its first steps to open the economy by designating 'special economic zones' and 'open cities' and directing foreign investment to these areas Shanghai was not included. The city was regarded as the central industrial core in the country which should not be part of economic experiments. In the early 1990s, the government regretted this

decision and opened the city for foreign investors. Special support was granted to those firms which established a business in the 'Pudong New Area', an area which previously had been under agricultural use. The automotive industry was selected as one of a total of five 'pillar industries' to shape the future development of the city. After the financial crisis in Asia, the municipal government strengthened its support of the manufacturing industry and postponed plans to focus particularly on the financial and trade sector (Zeng 2000).

3.1 The role of SAIC as a nucleus of the cluster

The Shanghai Automotive Industrial Corporation (SAIC) is the dominant Chinese player in the Shanghai automotive industry (Figure 1). As the group is largely state-owned, with the majority of its shares being controlled by the city of Shanghai, SAIC is closely interlinked with and supported by the city's policy makers. It is more, however, than a remnant of the old era of state monopolies. The SAIC group consists of different companies and establishments which manufacture cars, trucks, busses and motorcycles, as well as parts and equipment. By the end of 2001, SAIC had established 55 joint ventures with other automobile and component manufacturers and employed almost 62,000 people (SAIC 2002). As a leading car manufacturer in China, the group strives to become competitive at an international level. The operations of SAIC are not limited to Shanghai (Figure 1). Among others, the group holds major shares of the Liuzhou Wuling Automotive Company and Jiangsu Yizheng Automotive Company, as well as shares of Anhui Chery (SAIC 2002). In 2002, SAIC acquired a 10% stake in GM's South Korean operations (China Daily 2002).

Figure 1: Financial control over other companies as exercised by the Shanghai Automotive Industrial Corporation, 2002 (Sources: SAIC 2002, survey results).



The Shanghai automobile cluster developed thanks to massive governmental support at different levels. In the beginning, the central government's initiative was key to attract VW to China. In order to upgrade the national automobile industry to international standards and to avoid having to import automobiles at a large scale, the central government started negotiations with Volkswagen (VW) from Germany already in 1978. These resulted in a joint venture agreement between the SAIC, Bank of China, China National Automotive Industrial Corporation (the parent organization of the Chinese automobile industry) and VW. The joint venture, which was called Shanghai Volkswagen (SVW), started to produce the 'VW Santana' in 1985.

In the first years of production, SVW still imported most parts and components needed from overseas, a large part of which from Germany. At that time, there were basically no firms within the region who could have supplied the parts needed. For VW's German suppliers the number of VW Santanas produced in Shanghai in the 1980s was too small to establish production facilities in China. In 1990, SVW still assembled less than 20,000 cars per year. In the late 1980s, the Chinese government threatened to enforce a production limit upon SVW if the firm would not increase its local content in production. The idea behind this policy was to stimulate broad manufacturing competencies within the region and integrate Chinese suppliers, instead of importing key supplies from abroad.

In order to fulfill the regulations, SVW had to enroll Chinese parts producers into the production. Zhu Rongji, who became the mayor of Shanghai in the 1990s, was especially interested in supporting the growth of the automobile industry and, at that time, mediated between the central government and SVW (Harwit 1992). Local suppliers were tied together in the 'Shanghai Santana Local Content Cooperative'. The municipality supported this initiative by increasing the prices of cars by 16% and by providing low-interest loans to the local suppliers (Lee, Chen and Fujimoto 1996). Additionally, the policy was established that each taxi in the city had to be a VW Santana (Sit and Liu 2000). In 1991, many of the parts producers were integrated into the SAIC group. In addition to the enrolment of local suppliers VW demanded that some of its German first-tier suppliers establish production facilities in China, preferably within the region.

As a consequence of this, the vertical cluster dimension has developed quite rapidly. The growth of the cluster later on was very much supported by different policies of the municipal authorities, such as infrastructure development, labor market and industrial policies (e.g. Harwit 1992, Zeng 2000). The resulting supplier network is one of the most advanced in China (Yang 1995).

Still, this was not enough for SVW to establish a hierarchical supplier network, similar to the way it operated in Germany. Since the 1980s, there had been a strong tendency in the

international automobile industry to develop hierarchical supplier networks and pass development, manufacturing and assembly responsibilities of important modules to the first tier of suppliers. This reorganization enabled firms to reduce the number of direct suppliers substantially (Gaebe 1993, Schamp 1995). Due to the strategy of automobile producers to limit their suppliers to no more than two for each module (Velooso and Kumar 2002), the first-tier suppliers were increasingly required to follow their clients to other countries when these established new production facilities. This trend also had consequences for the Shanghai automobile industry. In 1993, there were only nine foreign suppliers with local operations in the Shanghai region (Yang 1995). But this changed quickly in the following years. Especially, first-tier suppliers from Germany began to set up facilities in Shanghai.

3.2 The SAIC joint ventures: triggering vertical and horizontal growth

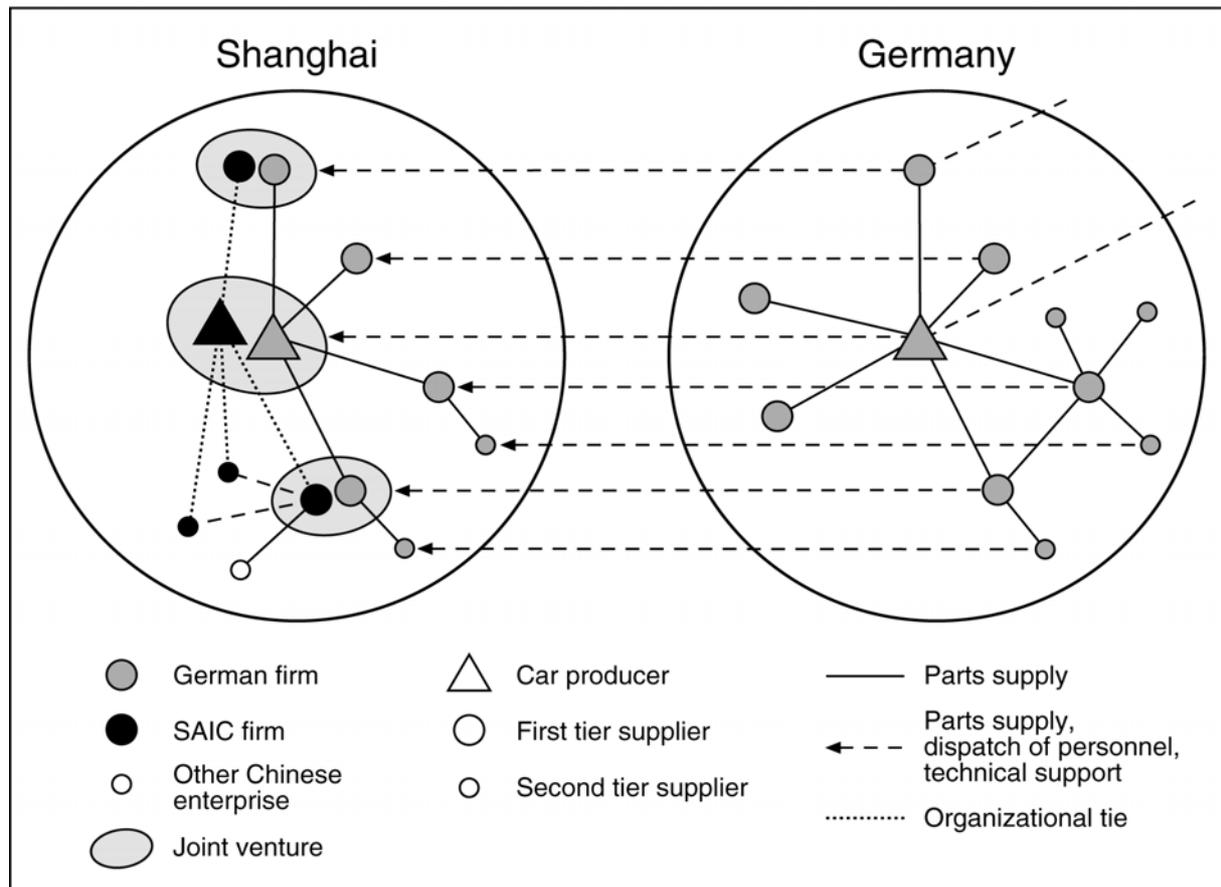
The majority of German suppliers chose to enter the Chinese market by establishing a joint venture with one of the SAIC firms or branches (Figure 2). According to one representative, this was not the free will of the German suppliers in all cases (Interview 26). At least in some instances, SAIC demanded that those firms entering the supplier network establish German-Chinese joint ventures and set up their facilities in Shanghai.⁹ In 2002, SVW had 371 direct suppliers in China. Compared to its European operations, this is a much larger share of direct supplier relations (Interview 26). As has also been shown for other automotive supplier networks in China (Velooso and Kumar 2002), this indicates that the restructuring of supplier relations into a multi-tier system is not as advanced in China as it is in Europe.

Joint ventures between German suppliers and SAIC seem to offer advantages to both sides. SAIC benefits from the technology transfer. The German firms are able to use existing production facilities, acquire parts and components through already established channels and have access to all partners of SAIC, including the automobile producers. As will be shown later on, day-to-day interactions can, however, be very complicated and inefficient. As a result, a few German firms went a different route by setting up wholly-owned foreign enterprises (WFOEs) or establishing a joint venture with non-SAIC firms. This is not done without risk, however. In an institutional context, which relies heavily on close personal

⁹ SAIC's strategy in this process obviously was to integrate as many suppliers as possible into its own group networks in order to develop broad competencies in the production of automobiles. Eventually, this would enable the group to produce cars on her own. With the production of the 'SAIC-Chery', the group has recently shown that it already has the potential to develop and produce cars without the aid of foreign partners.

relations to get access to resources, one can easily get locked out of the system. One manager of a Sino-German joint venture, established without the participation of SAIC, was angry because his firm ran into difficulties, as it had to undergo unusually hard, uncooperative audits which the manager referred to as an 'inquisition' (Interview 17). Other managers in similar situations mentioned that they were under much greater pressure to cut costs than their SAIC counterparts (Interviews 18, 31).

Figure 2: Idealized structure of the automobile industry cluster in Shanghai and its external linkages.



Until 2001, most German suppliers were able to make profits through their Shanghai operations despite the relatively small number of units they produced. Some of the SAIC-German joint ventures reached their break-even point already during the first year of production. Since then, however, competition has increased and price control been lifted,

creating pressure on the automobile producers to reduce car prices.¹⁰ One interviewee mentioned that, as a consequence, SVW demanded its suppliers to reduce cost by 10-40% in 2002 (Interview 35). This price pressure serves as an incentive for the suppliers to localize their parts production instead of importing parts and components at high costs.

At the same time, the establishment of parts production within the region is also time-consuming and requires substantial investments. Often there is no alternative, however. Although there are approximately 5,500 suppliers in China (Roland Berger Consultants 2001), it is very difficult to find high-quality, technologically-sophisticated firms which the German suppliers can rely on. Several managers blamed Chinese firms for claiming that they are able to produce parts according to the exact specifications even if they were not able to meet the required standards (Interviews 1, 3, 14, 15). An important task for German firms is therefore to find reliable Chinese suppliers. Particularly complex and sophisticated parts, such as electronic components and air bags, are typically still being imported.¹¹ Many interviewees also criticized the low quality of parts produced by Chinese suppliers (Interviews 22, 30, 42, 52). In order to increase quality standards, some have begun irregular visits at their suppliers' plants to check up on quality. This requires, of course, that the Chinese suppliers are 'visible' and located close-by.

Despite these problems in producer-user relations, the policy to increase local-content production has generated a growing vertical dimension of the automobile industry cluster. Supposedly, this industry infrastructure which had been created was one of the reasons why GM also decided to set up production facilities in Shanghai in 1997, as the firm was able to benefit from an already existing network of suppliers.

¹⁰/. The year 2001 was a milestone for the Chinese automobile industry, as the country joined the WTO. As a prerequisite for this, customs-duties for imported goods had to be reduced and import quotas increased, thus allowing for increased competition from the world market.

¹¹/. Another interviewee explained that his firm did not intend to expand its local supplier linkages further as they had already reached a certain level. He was fed up with the process of establishing a supplier relationship with a Chinese firm, as it requires too much attention and manpower. There are too many discussions involved in the course of introducing and maintaining producer-user relations. Having engaged in a number of relations with Chinese suppliers, the firm noticed that these same suppliers had also begun to produce parts for its competitors (Interview 46). Another manager pointed out that his firm does not even try to integrate Chinese parts producers and, instead, continues to rely on imports (Interview 17). Even a Chinese executive complained about Chinese suppliers: "They don't have the management capabilities, they have no capital and no technologies. I don't want to work together with these companies any more." (Interview 34).

Prior to 1997, SVW was the only car manufacturer in Shanghai and had a network of exclusive suppliers. Back then, GM decided to set up manufacturing operations in Pudong in a joint venture with SAIC, i.e. Shanghai General Motors (SGM). Although SVW is still the major customer of the German automobile suppliers, increasing shares of their activities are now devoted to the production of parts for SGM and other car manufacturers. For a long time period, SVW had only introduced one model, i.e. the VW Santana, into the Chinese market and was a typical transplant in a developing country (Lee, Chen and Fujimoto 1996). To reduce its dependence on VW and to put pressure that it changes its product policy and increases technology transfer, SAIC decided to engage in the joint venture with GM. Since its establishment, SGM has grown into one of the largest car manufacturers in China. Between 2001 and 2002, GM increased its market share in China substantially from 2.7 to 7.7%, mainly due to its Shanghai operations (Vwd: Asien 2003b).¹²

GM's entry into the Chinese market has initiated a number of changes in the product strategy of SVW. The firm now produces several different models in Shanghai, i.e. the 'Santana', 'Santana 2000' (a model which was customized for the Brazilian and Chinese market), 'Passat' (since 2000), 'Polo' (since 2001) and most recently the 'Gol' (since 2002), which was originally designed for Brazil. One interviewee pointed out that VW now pushes forward to the establishment of broad engineering competencies at SVW, to be able to adapt cars to the specificities of the Chinese market (Interview 51).

SAIC is also involved in the national joint venture SAIC-Chery Automobile Company (Figure 1). Although SAIC-Chery's operations are located a fair distance away from Shanghai in the Chinese province Anhui, this new manufacturer buys parts and components from SVW's German-Chinese suppliers. The involvement of SAIC in this joint venture has not only enabled the Shanghai suppliers to develop new linkages, they also deliver parts and components which are similar to those produced for SVW. This was a move, however, that VW Germany did not agree with. VW regards the parts and components which have been developed by the suppliers for SVW as its intellectual property. According to one executive, headquarters of the suppliers in Germany were thus asked to stop deliveries for SAIC-Chery. Otherwise they would suffer negative consequences, also in their German relationships (Interview 8). The suppliers in Shanghai did not agree with this policy as they benefit, at this point, from a growing horizontal dimension in the automobile industry cluster.

¹²/. To increase its production capacity for the production of its model 'Sail', GM and SAIC have acquired another firm in Shanghai with large production facilities. In the new plant, they plan to assemble 100,000 vehicles per year (Vwd: Asien 2003a).

Nonetheless, they had to follow VW's decisions made in Germany in order to avoid conflict. As a result, SAIC-Chery had to stop its operations because its warehouses with input materials were empty.

At present, SAIC's dominant position and power in the Shanghai automobile industry remains unchallenged. As the group is closely tied to local authorities, banks and China's federal government in various ways, it has the power to exercise influence on the course of the Shanghai automobile industry cluster. SAIC has benefited from the competition between SVW and SGM, as it has absorbed much of the technologies imported and developed manufacturing competencies. The SAIC-Chery venture has exemplified this quite clearly. To be involved in several joint ventures also enables the firm to play one partner off against another one and shift its resources accordingly. This does not exactly provide grounds for the establishment of trust between the joint venture partners. Skepticism also increases because SAIC organizes meetings in which Chinese managers from different operations and joint ventures participate and exchange experiences. As they move from one joint venture to another through the course of their career, they develop personal ties with many other SAIC managers helping them to create something like a 'community of practice'. Such communities are not in the interest of the German joint venture partners, as this might create stronger information flows between than within SAIC joint ventures.

4. Difficulties of establishing cooperation between Chinese and German actors: issues of 'culture' and power

Having analyzed the development of the vertical and horizontal dimensions of the Shanghai automobile industry cluster, we will now focus on the effects of 'culture', institutions and power. In this section, we investigate how formal institutions are being imported to and new institutions created within the Shanghai automobile industry. Further, we discuss the intra-firm problems which arise from different norms, habits and expectations between the German and Chinese management and workforce of joint ventures. We argue that boundary spanners can become quite important to overcome such problems and mediate between different positions in an 'inter-cultural' context.

4.1 Crossing the 'cultural barrier': Different tastes, expectations and behavior

The transfer of production arrangements and industrial practices to another national institutional context requires adaptation to those social and economic structures of the host country (Boyer 1998). It also requires that German firms adjust their products, at least

to some extent, to the customers' tastes and behaviors to be successful in the new market. SVW, for instance, had to make its Passat model longer in order to fit the taste of Chinese consumers.¹³ Compared to product adjustments however, adapting to a different way of doing business in another institutional context is even more difficult and can easily result in failure. From our investigation, it seems that many firms underestimate the challenges they face when they extend their business to another political, cultural and economic setting. In a number of the joint ventures studied, for instance, either the German or the Chinese part of the management had to be exchanged because of heavy communication and interaction problems. German firms in China seem to be focussed on their technological capabilities and the superiority of their products. In following their 'missions', they tend to believe they can transfer their rationality and bureaucracy efficiently to the Chinese context and underestimate the challenges awaiting them (Hoon-Halbauer 1999).

One important aspect, which cannot be ignored, is that the Communist Party (CP) still has a strong influence on large firms (see, also, Hoon-Halbauer 1999). Larger joint ventures, for instance, all have an extra CP office. German executives mentioned that it is virtually impossible to change the internal organization of a joint venture and shift personnel from one position to another if the CP does not agree with these changes. It seems also difficult to fire a worker for whatever reason if he/she is a member of the CP (Case studies 2, 4). When CP meetings are announced, they have a high priority in the Chinese workforce. If this conflicts with other meetings, even those that have been scheduled much earlier, they typically must be cancelled in favor of the CP meeting. Influenced by the CP, some Chinese managers view a joint venture not just in terms of its business goals, but also see it as part of a larger picture supporting the growth of the Chinese economy overall. As Zhu, Speece and So (1998: 25-26) stated, "[m]anagers build careers by getting the foreigners to put in money, technology and training to help build a Chinese company. ... There is little reward for helping make profits which will partly go out of China to the foreign partner."

Another important aspect of the Chinese context is that communication within and between firms is often based on personal relationships. Actors engage in the formation of dyadic networks which are based on joint interest, interdependence, reciprocity, trust and openness. Such relationships are quite stable and long-term in character and are

¹³/. Another instance which created the need for customization were the complaints of Shanghai taxi drivers that their VW Santanas' horns and brakes would break too easily. As it turned out, failures were due to the extreme stop-and-go traffic in Shanghai and the turbulent style of driving of the taxi drivers, using their horns much more often than in VW's home market (Interview 1).

associated with particular obligations and benefits on each side (Hsu and Saxenian 2000, Yeung 2000, Wang 2001). Engagement in these 'guanxi' is shown through regular contacts and reciprocal confirmations between those parties involved. The consequence of this reliance on 'guanxi' in the social organization of production is that Chinese managers invest a lot more time into the maintenance of these relationships and spend less time for strategic planning and administrative duties than do their European and American counterparts. 'Guanxi' obligations and returns can also be passed on to third parties ('guanxi wang'), if a Chinese manager who has established 'guanxi' with two formerly separate parties wants to bring these together to form a larger network.¹⁴

4.2 Import and creation of institutions

Despite the attempts of the Shanghai municipal authorities to establish a business climate which encourages foreign direct investment, the institutional context of China provides a substantial barrier for those German firms who have no experience of operating in this context. A lack of knowledge regarding the political, cultural and societal settings causes problems when dealing with Chinese authorities, customers, employees and the like.

In order to provide support for German firms investing in Shanghai, the 'German Chamber of Industry and Trade' and 'German Chamber of Foreign Trade' have jointly established an organization, i.e. the 'Delegation of German Industry and Commerce in Shanghai' (GIC). The experts of the organization give advice on how to set up production facilities, how to get approvals from Chinese authorities and how to find appropriate Chinese suppliers (Interview 13). GIC also organizes cultural events and regular meetings for German technicians and managers working in Shanghai in which they get information about new governmental regulations and market trends and have opportunities to exchange information about problems and experiences. There are even regular meetings for executives of automobile firms and their suppliers. Such meetings are important in serving to provide social contacts from within the automobile industry cluster in Shanghai which are otherwise not very

¹⁴ The Chinese executive of one firm which relies mostly on local Chinese suppliers stated that a German could not do this job very well because he/she would not know how to establish and maintain personal relationships with managers of the suppliers. He described that he had regular personal contact with these managers and that these relationships went beyond the pure economic (Interview 29). This statement may, however, underestimate the possibility of foreign individuals to obtain access to Chinese networks. In some cases, German managers mentioned that they had themselves established close ties with their employees, customers or suppliers, which helped them to improve interaction (Interviews 5, 16, 20, 34, 36, Case study 3).

common. Over time, this could lead to the establishment of something similar to 'communities of practice' (Brown and Duguid 1991, Wenger 1991), although this still has a long way to go. In several interviews conducted, executives mentioned that they were not overly interested in having intensive contact with other Germans outside their firm. They work extremely long hours and, thus, do not have the time nor interest for additional meetings (Interviews 16, 22, 27).

One of the problems of the Shanghai automobile industry cluster is that the local labor market has not been able to satisfy the demand for specialized workers which has expanded rapidly in conjunction with the growth of the industry. Firms seemingly have difficulties finding suitable personnel and compete with one another for specially trained workers.¹⁵ Because of the shortages on the labor market, German firms and organizations have begun to improve the vocational and professional training system in Shanghai. The 'Hans Seidel Stiftung' (a political foundation which is based in Bavaria), for instance, opened a vocational training center in which skilled workers of more than 100 firms are being trained. At Tongji University, a Chinese-German university college was founded in 1998 where Chinese students can obtain specialized skills and receive different degrees required by the industry. German universities, such as those in Bochum and Munich, participate in professional training programs in sending teaching staff for temporary training. German automobile firms support such initiatives. SVW and its German supplier Bosch, for instance, have provided funds for additional chairs at Tongji University.

In order to ensure high quality throughout the local production chain, firms have enforced quality control systems onto their suppliers which were developed within the German automobile industry. One of the largest German organizations for the control of technical and management systems in industrial firms, i.e. the 'TÜV Rheinland-Brandenburg', has, for instance, established several branches in China. According to an executive of this organization, the vast majority of first- and second-tier suppliers in Shanghai are already certified according to the standards VDA 6.1 and QS 9000 of the German and American automobile industry associations, respectively (Interview 39). Automobile producers demand these certificates from their suppliers, although they also conduct their own supplier audits as well. As Chinese organizations have also been founded which grant similar certificates this becomes problematic. These certificates do not seem to have the same value, however, as those granted by the German organization. Some German managers

¹⁵ An executive reported that the Chinese workforce is quite mobile. Some engineers would even leave their workplace if a competitor offers a RMB 200 increase (US-\$ 25) in their monthly salary (Interview 1).

complained about these certificates because the auditors seemingly do not exercise enough care (Interviews 16, 19, Case studies 2, 4).¹⁶

4.3 Intra-firm tensions and potential communication failure

Theoretically, international joint ventures have a great potential to overcome 'inter-cultural' barriers and stimulate knowledge creation and interactive learning. In reality, this is quite a difficult venture as it first requires that a common set of rules and routines be established and supported by all parties. Therefore it seems arduous to establish efficient management systems between the German and Chinese partners in joint ventures. Such a system would require to introduce routines and practices which are accepted by both sides and enable effective communication between the partners (Boyer 1998). According to Hoon-Halbauer (1999), Chinese executives in joint ventures often regard the transfer of management know-how as a change in their traditional 'organizational culture'. This can become a major root of conflict within a joint venture. On the other hand, executives at the German headquarters can also be quite skeptical and distrustful of their Chinese counterparts which provides another barrier for communication. According to Kiefer (1998), the performance of SVW would have been better if the German management had attempted to integrate the Chinese 'guanxi' system into their organizational structure, instead of pushing a hierarchical Taylorist division of labor. According to him, things went better when Germans did not try to intervene.

The circulation and diffusion of information provides a good example of differences which exist between the German and Chinese organizational routines. In German firms, it is normal to have regular business meetings in which managers are expected to scrutinize the performance of their divisions and make suggestions for decisions regarding future activities. This seems unusual in the Chinese context. In the meetings in which we participated, decisions were hardly ever made. The Chinese managers did not seem to listen carefully to what was being said (Case studies 2, 4). In fact, they used their mobile phones, smoked cigarettes, talked to their neighbors and even periodically left the conference room during meetings. We view this as a clear indication for miscommunication, as the Chinese managers obviously did not regard these meetings as the 'right' setting to make decisions.

¹⁶ A Chinese manager at the other hand expressed his anger about the German certificates as they do not entirely fit the realities of a Chinese production environment. He regarded these certificates as a tool of VW to make market entry more difficult for Chinese suppliers. According to him, the dynamics of the industry would make it extremely difficult to maintain an industrial system as required by the certificates (Case study 5).

Hardly any of them participated actively in the discussions, except for the executive manager. This pattern changed only when issues were raised which were directly related to the Chinese personnel. As a consequence of these meetings, the German management was dissatisfied with the results, as, from a German view, there did not seem to be any decisions made. It seemed that information transfers between Chinese managers were more likely in small groups in a less formal surrounding. This could, in part, be explained in terms of the concept of 'face' which is still important in the Chinese society. According to this, the status of an individual within a group depends on the respect he/she receives from other members of the group (Hwang 1987). A person can lose 'face' if he/she is unable or unwilling to fulfill certain tasks and commitments to the group. Since this would cause social isolation, Chinese workers are unlikely to admit failures openly or criticize others in public.

It appears that German firms often send executives to their Chinese operations who are primarily technical experts but lack knowledge on how to manage a company successfully within an 'inter-cultural' context. Sometimes those managers know surprisingly little about expectations and patterns of behavior of Chinese workers and managers. They can easily misinterpret or misunderstand the reactions of their Chinese counterparts. Other studies have confirmed our findings that Chinese managers in joint ventures are unsatisfied with their position and how they are treated in many cases (Zhu, Speece and So 1998, Hoon-Halbauer 1999). Some indicated that their experience was not respected very highly by their joint venture partners. They also complained about the arrogance of their German counterparts. One Chinese interviewee stated that "[i]n China market economy means friends economy. ... you need experience not muscle!" He pointed out that German managers who come to China are often too young and were not there long enough to know what is going on (Interview 19). In comparing two German managers he knew really well, another Chinese interviewee said that the one would fit better in the Chinese context and would gain more respect by Chinese people because he made a conscious effort to listen to the people, tried to avoid conflicts and had strict principles. The other manager, he admitted, might have the better management skills but would not be able to mobilize others to the same extent (Interview 15). In this case, one could say that the first manager is more 'powerful' in the sense of Latour (1986), being able to mobilize people in an 'inter-cultural' context (see, also, Murdoch 1995).

In joint ventures with SAIC, the German counterpart usually has a share of 50% and either nominates the general or the deputy general manager. By contract, both sides are usually expected to agree upon important decisions before they are implemented. But this is often not the case in reality. Decisions are made by one side without informing the other or they

are dragged out (Interviews 15, 18, 33, Case studies 2, 3, 4). Problems particularly arise when decisions have to be made about which machinery to buy, which customers to do business with and whether certain parts of production should be outsourced. The conflicts which arise in such situations are an important source of the development of distrust within organizations. German executives sometimes do not know where their Chinese counterparts are and in what kind of external meetings (i.e. within the SAIC group) they participate and why. One interviewee mentioned that his Chinese deputy manager sometimes stays away from the firm for a couple of days without telling anybody where he is (Case study 3).

Problems also arise between a firm's German management and its Chinese workers. It is, for instance, difficult to persuade the workers that production routines have to be changed if the Chinese management does not clearly support this. It seems that allegiance towards their Chinese bosses is greater than that towards their German ones (Case studies 2, 4). One German interviewee thought that this was natural. If the Chinese workers would lean too much towards the German management, they would be on their own once the Germans eventually return to their German headquarters (Interview 33). Severe problems can arise when German managers lose their temper in front of Chinese co-workers. According to the concept of 'face' (Hwang 1987), this would be considered by the Chinese as being a loss of self control and thus viewed negatively.

4.4 The role of boundary spanners

The above arguments have shown that 'cultural barriers' and embeddedness in different institutional contexts can create massive problems in communication within joint venture operations, as well as in relations with local suppliers. Because of these obstacles, those people who have the capability to become network builders in both 'cultures' and mediate between the German and Chinese sides are of great importance in the long-term success of a joint venture (Bathelt, Malmberg and Maskell 2002, Coe and Bunnell 2003). These boundary spanners might be the first ones to form a larger transnational community within the Shanghai automobile industry cluster. The findings from our research suggest that there are boundary spanners on each side of the joint ventures, which have been successful to varying degrees.

(i) Chinese boundary spanners: It is often assumed that Chinese managers will increasingly be given responsibility for the joint venture operations. To which degree this will happen is still unclear. The managers we have met in such positions were relatively few. All of them had spent some years in Germany and had studied or lived there (Interviews 1, 14, 43, 45). Their advantage is that they know both languages and 'cultural' contexts and are able to

switch between different modes of interaction. Theoretically, they are extremely well suited for establishing communication between the German and Chinese sides, solving conflicts and circulating important knowledge. They are also able to effectively communicate with the German headquarters.

Despite the enormous potential these boundary spanners have, their power within the joint venture is seemingly limited. Their problem seems to be that they do not fully belong to either side. The Chinese are skeptical that they would be too supportive to the German side, while the Germans, especially those executives in the headquarters, do not include them in all strategic decision-making. Some of the Chinese boundary spanners mentioned that they wish the German headquarters would listen to them more carefully and give them more power in decision-making (Interviews 1, 14, 15, 45).

(ii) German boundary spanners: German boundary spanners have adapted to the Chinese business context quite well. They can often imagine to stay for a much longer time period. Two managers married Chinese women, for instance, and have become increasingly familiar with Chinese customs and life-styles (Interviews 2, 12). Some of these boundary spanners have studied Sinology at a German university. Others have participated in special training programs to prepare them for future jobs in China, consisting of a language course and work placement for several months in a German firm in China (Interviews 5, 22, Case study 3). Another group of Germans had no special preparation before going to China but they had international work experience. They had proven that they are able to adjust to a new 'cultural' context and cope with it successfully (Interviews 16, 20). One manager of this latter group mentioned that there was a lot of distrust between him and his Chinese counterparts when he started his term in Shanghai. Over time, however, they began to exchange gifts and developed close relationships. This happened because the German made an effort to participate in Chinese social events and, among other things, invited his partners for dinner parties at his home (Case study 3).

Not all Germans interviewed in Shanghai can be viewed as active boundary spanners. They are under strong pressures from different sides, as they have to deal with customers which require them to drastically cut costs. In addition, they have to act and interact within complex Chinese settings and a very dynamic industry context. In general, we observed that the motivation to understand and follow the rules of the Chinese side and to become an active boundary spanner was low when the German personnel in the Shanghai operations was relatively large or when the managers knew that they were going to leave the city soon.

5. Conclusions

In our analysis of the automobile industry in Shanghai, we have tried to provide evidence that it is useful to employ a cluster concept to analyze the dynamics of production organization in an international context. In choosing this approach, we found that it is necessary to emphasize those cluster dimensions which are often somewhat neglected in the cluster literature, i.e. issues related to the role of 'culture', institutions and power and how they shape economic action and interaction. Through this, it was possible to apply this approach to the 'inter-cultural' context of automobile production in Shanghai and emphasize the role of policy and planning in the establishment of this industry.

Overall, the establishment of the Shanghai automobile industry cluster has been largely planned by international automobile producers, in our case VW, making a strategic move to extend their production system and market reach to China. As a result, a focal cluster is developing which is characterized by a growing vertical dimension of suppliers and service providers. These have been required by VW to establish production in China, to fulfill local-content regulations which were, in turn, demanded by the Chinese government. The horizontal cluster dimension is at this point still in a stage of infancy but changes quickly as GM has also established production in the region and attracts its own suppliers.

The complex relationships between economic development and politics become obvious through the role of SAIC, the dominant Chinese actor in the automobile industry. SAIC is largely owned by the municipality of Shanghai and is thus shaped by the city's general policies and strategies with respect to future development. At the same time, SAIC is involved in a large number of joint ventures with foreign automobile firms and parts producers, serving to closely intertwine economic and political aspects. What makes foreign direct investments in Shanghai's automobile industry even more difficult is that the conventions, rules, norms and expectations in human interaction are different from those which the firms are used to. This, in turn, effects the organization of production and labor processes within and between firms and the ways how firms can get knowledge about their local markets. The successful establishment of 'inter-cultural' communication in the Shanghai automobile industry cluster therefore requires the development of a shared institutional context which enables interaction and knowledge creation. It also requires the development of methods and routines to control production and pass on orders and messages effectively within the production system.

We have shown how German firms import formal institutions to the Shanghai context and begin to create new institutions to enable effective intra-firm communication and interaction with local suppliers and markets. We argue that network builders and boundary

spanners, especially those originating from transnational communities, can become quite important in overcoming problems and mediating between different positions in an 'inter-cultural' context. Their ability to stimulate communication might in fact determine the long-term success of such investments. At present time, many new operations in the Shanghai automobile industry might still suffer from some problems and inefficiencies. This is quickly changing, however, as Shanghai develops into an important cluster of automobile production and firms learn to adjust to the local conditions at hand.

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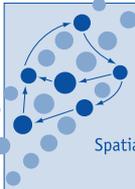
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Spatial Aspects Concerning Economic Structures

Economic Geography
Faculty of Geography

Philipps-University of Marburg

35032 Marburg • Germany

Fon: +49 (+6421) 28 24259 • Fax: +49 (+6421) 28 28950

Email: spaces@staff.uni-marburg.de

www.uni-marburg.de/geographie/spaces/

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